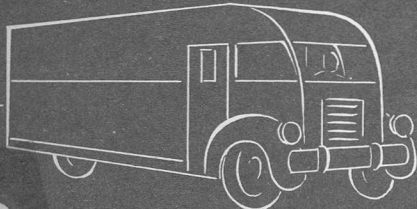
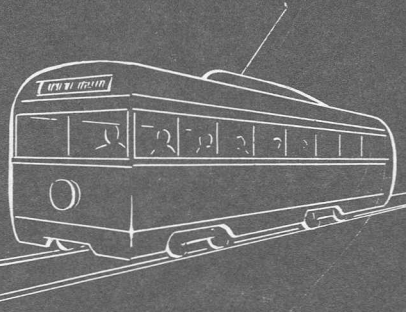
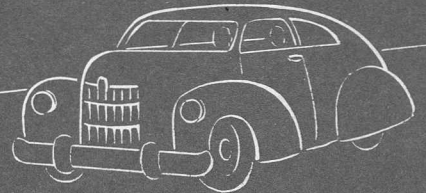
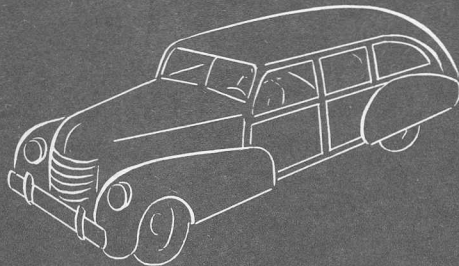
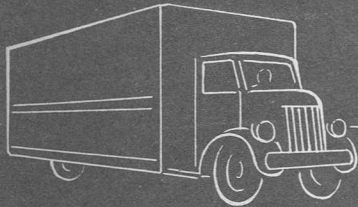
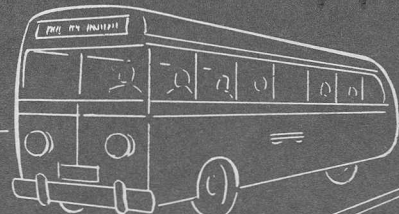
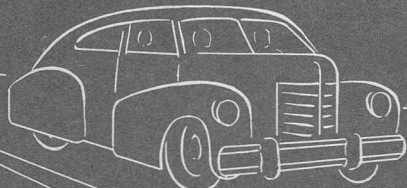


STREET TRAFFIC MANAGEMENT for Los Angeles



Appraisal and Recommendations
Prepared for the City of Los Angeles

1948



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Street Traffic Management for Los Angeles

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Fletcher Bowron, Mayor of Los Angeles

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Traffic Survey Committee

D. Grant Mickle, *Chairman*,
Director, Traffic Engineering Division
Automotive Safety Foundation, Washington, D.C.

Stuart M. Bate
Chief Engineer
Los Angeles Traffic Association

Joseph E. Havenner
Manager, Public Safety Department
Automobile Club of Southern California

Appraisal and Recommendations Prepared for the City of Los Angeles

1948

Submitted at public meeting
in Council Chamber 2 PM
Dec 21 1948

C o n t e n t s

	Page
Acknowledgment	4
Letter of Transmittal	5
Chapter I — Importance of Street Traffic	7
Business and Traffic	7
Industry and Traffic	8
Recreation	8
Public Health and Safety	11
Chapter II — History and Growth of the Traffic Problem	12
Population	12
Motor Vehicle Registration	13
Expenditures for Traffic	13
Revenues for Traffic	13
Congestion	16
Mass Transit	19
Parking	19
Traffic Accidents	20
Chapter III — Elements of the Traffic Problem	23
The Economic Element	23
Population	23
Motor Vehicle Registration	23
Land Use	23
Natural Barriers	23
Character of Land Use	24
Zoning	24
The Street System	24
Access Streets	26
Major Streets	26
Freeways	26
Mass Transportation	27
Parking	30
Operating Elements	30
The Traffic Stream	30
Traffic Control	31
Traffic Regulation	31
The Social Element	31
Chapter IV — Present Duties and Functions of Government Agencies	33
Charter Provisions	33
The City Council	34
Evolution of Traffic Agency	35
Bureau of Street Traffic Engineering	36
Department of City Planning	37
Department of Public Works	39
Bureau of Engineering	39
Bureau of Street Lighting	39
Bureau of Street Maintenance	40
Department of Public Utilities and Transportation	41
Police Department	41

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	Page
Los Angeles County Regional Planning Commission	42
State Division of Highways	42
Los Angeles County Road Department	43
Chapter V — The Role of Non-Government Agencies	44
Automobile Club of Southern California	44
Central Business District Association	44
Downtown Business Men's Association	44
Chambers of Commerce	44
Los Angeles Chapter of the National Safety Council	45
Traffic Association	45
Transit Companies	45
Trucking Companies	45
General	45
Chapter VI — Essential Traffic Management Functions for Los Angeles	47
<i>Section 1 — Traffic Operations</i>	<i>47</i>
Control Measures and Devices	48
Traffic Movement Controls	50
Intersection Re-Design	52
Street Lighting	52
Accident Analysis	53
Parking Controls	54
Investigations and Complaints	58
<i>Section 2 — Traffic Planning and Research</i>	<i>59</i>
Origin and Destination Studies	59
Parking Studies	60
Engineering Accident Analysis	60
Speed and Delay Studies	60
Traffic Volume Studies	60
Physical Inventory Studies	61
Coordination With Planning	61
Coordination With Enforcement	61
Coordination With Transit	61
Special Studies for Location and Design of Improvements	61
Research and Evaluation	62
Development of Standards, Policies, Warrants and Techniques	62
Chapter VII — Findings, Objectives and Recommendations	63
General Findings	63
Traffic Administration Findings	64
Objectives	65
Basic Recommendations	65
I. Immediate Action	65
II. Action by Charter Change	66
Detailed Recommendations	66
Traffic Engineering Department	66
Budget	69
Job Descriptions and Qualifications	71
The End Result	74

Acknowledgment

In making this study, it was necessary for the Traffic Survey Committee to rely on many city departments, private organizations, and individuals for much factual and graphic material. The Committee expresses appreciation to the Office of City Attorney, Fire Department, Department of Water and Power, Bureau of Street Lighting, Bureau of Street Maintenance, Department of Recreation and Parks, Department of Health, and Department of Budget and Efficiency, who gave willingly of their time and assistance. Of special assistance was the Traffic Bureau and the Bureau of Street Traffic Engineering of the Police Department, the City Planning Commission, the Department of Public Utilities and Transportation, and the Bureau of Engineering of the Department of Public Works, who willingly performed work or supplied data and facilities. Valuable advice and counsel were given by the District Office of the California Division of Highways, the Los Angeles County Regional Planning Commission, the Los Angeles County Road Department, and by the U. S. Public Roads Administration, which observed the study.

Appreciation is expressed to the Goodyear Tire and Rubber Company which made a blimp available for city-wide observations and photography, and to the following which contributed to the study in a variety of ways: The California Public Utilities Commission, Downtown Business Men's Association, and Rotary International, which conducted membership opinion questionnaires; the Los Angeles Times; Los Angeles Examiner; the Automobile Club of Southern California; the Los Angeles Traffic Association; the Motor Truck Association of Southern California which made some special field observations; the Los Angeles Chamber of Commerce; the Central Business District Association; the Building Owners and Managers Association; the Los Angeles Chapter of the National Safety Council; the Parent-Teachers Associations; the All Year Club of Southern California; and others.

**Traffic Survey Committee
City of Los Angeles**

Mayor and City Council
City of Los Angeles
City Hall
Los Angeles, California

October 1, 1948

Gentlemen:

The Council and Mayor of the City of Los Angeles, on March 11, 1948, requested the Automobile Club of Southern California, the Los Angeles Traffic Association and the Automotive Safety Foundation of Washington, D. C. to loan certain engineers for the purpose of creating a Traffic Survey Committee.

On April 5, 1948, an agreement was entered into with the City of Los Angeles whereby the Committee was officially formed, consisting of Joseph E. Havenner, Manager, Public Safety Department, Automobile Club of Southern California, whose services were loaned without cost to the City; Stuart M. Bate, Chief Engineer, Los Angeles Traffic Association; and D. Grant Mickle, Director, Traffic Engineering Division, Automotive Safety Foundation, who was named chairman. Work was started promptly on an appraisal of the street traffic problem to determine how various aspects of it were being handled by the several city departments, and to determine existing deficiencies in traffic management.

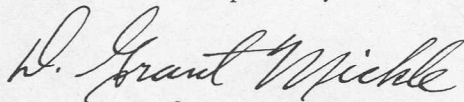
The objective of the study was to develop "recommendations for the improvement of the City's traffic situation, including recommendations as to the reorganization and coordination of the various departments and bureaus of the City having jurisdiction over traffic matters." In attempting to reach this objective the Traffic Survey Committee has examined office records and reports, made independent field investigations, conferred with all affected city department heads, and made careful review of all Charter provisions and ordinances bearing on the subject.

The Traffic Survey Committee takes pleasure in transmitting to you this report, "Street Traffic Management for Los Angeles."

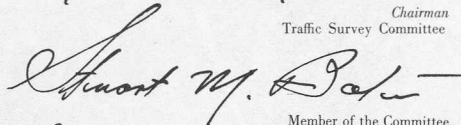
The editorial work of the Committee was given expression and graphic presentation by E. Earle Duffy of the Automotive Safety Foundation.

Members of the Council's Fire and Police Committee and Finance Committee composed the Joint Council Committee to advise with the Traffic Survey Committee. The Joint Committee was composed of Co-Chairmen John C. Holland and George P. Cronk and members, J. Win Austin, Don A. Allen, and Harold Harby. Members of the Traffic Survey Committee are grateful for their deep interest and counsel and for the privilege extended of pursuing an unhampered course in preparing this report.

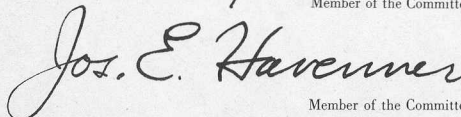
Respectfully submitted,



Chairman
Traffic Survey Committee

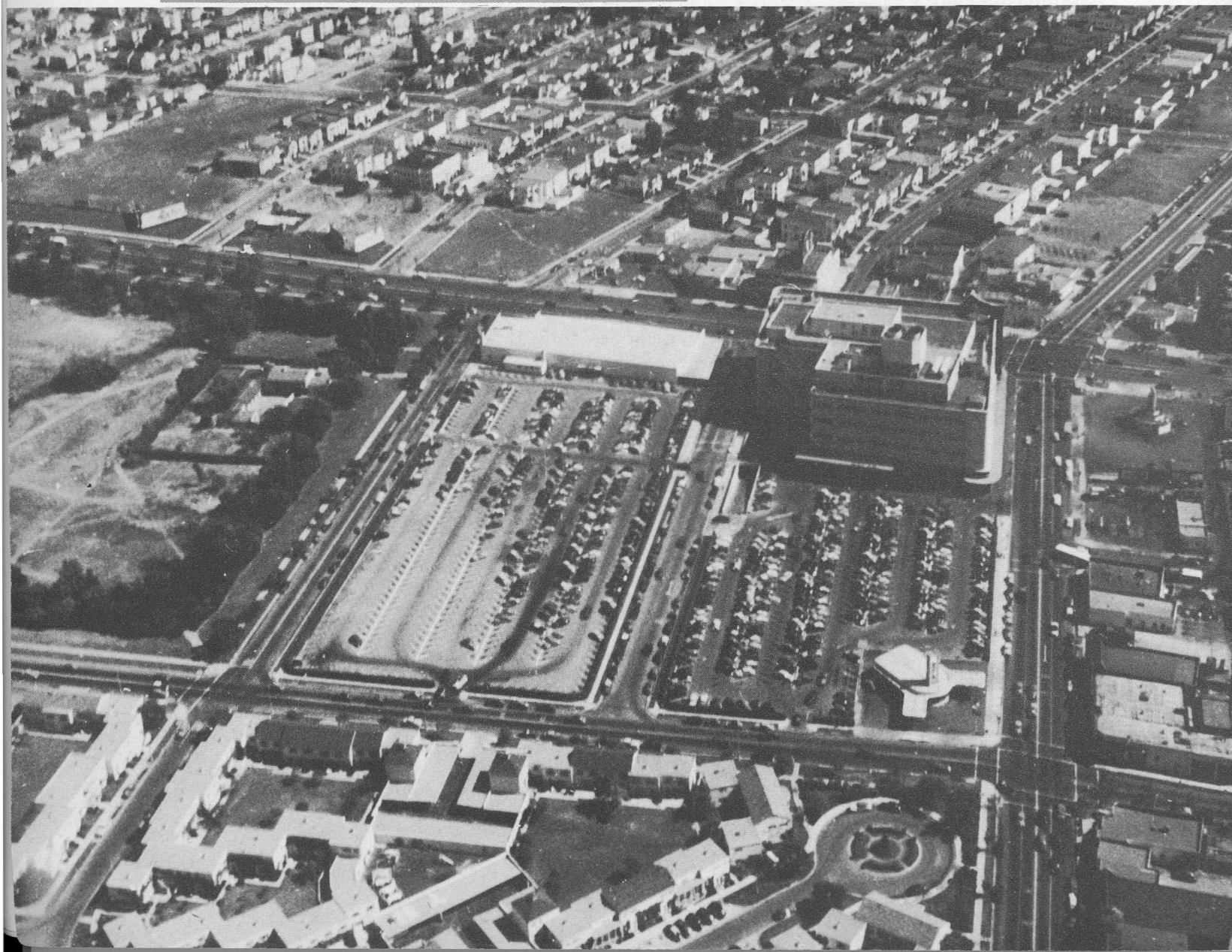


Member of the Committee



Member of the Committee

Covering 452 square miles, with her population soaring to 2,000,000, and the hub of at least 4,500,000 people, Los Angeles has traffic troubles galore. One of these is commercial developments which string along major streets. The large volumes of local traffic generated must mix with heavy flows of through traffic. Sometimes the resultant congestion causes customers and business establishments to go elsewhere, perhaps to a new development, where the process may be repeated.



Chapter I

Importance of Street Traffic

WHEN white men first beheld the site of Los Angeles in 1769 they saw the tiny Indian village of Yang-na nestling by the river called the Porciuncula. Not a wheel of any kind was to be seen. Today probably more wheeled traffic moves over and around that site than in any other city in the world.

In 1900 when cars were commonly called gas buggies the population of Los Angeles was a scant 100,000. Likely by 1950, Los Angeles will break through the 2,000,000 mark, reaching the rarefied atmosphere occupied by only 15 cities in all the world. This, the largest city of all in area, thrived on rubber tires, self-starters and other developments that made the wheeled vehicle mankind's most useful device.

Los Angeles has made excellent use of transportation. It has played a vital role in rapid population growth, in the character and spaciousness of the city, and in the location and growth of industry.

Los Angeles has literally pulled herself up by her own bootstraps. Her development is a phenomenon of modern times. There was little water, so water was brought in from hundreds of miles away. There was no natural harbor, so Los Angeles built a better harbor than most of those created by Mother Nature. Meanwhile, the rough and ready city changed itself into one of the recognized cultural and educational centers.

Alone of the large cities, Los Angeles has had opportunity to keep its growth in step with the benefits and demands of modern transportation. Yet the street traffic challenge is far from met. People and their vehicles came too fast.

Spread over mountains, valleys and beaches, Los Angeles has become a city of magnificent distances. The geographic features that helped make Los Angeles a great and attractive city bring with them natural barriers to low cost and rapid travel.

Streets must be freed from the toils of costly congestion and delay. The visible traffic hazards and the hidden gremlins which today make Los Angeles one of the most unsafe cities in which to walk or operate a vehicle must be eliminated. Metropolitan Los Angeles must have new facilities including express highways and improved mass transit, and much more off-street parking space. But modern roadway or old

streets, traffic facilities must be made to do a better job. They must be fitted to meet today's pressing needs and the certain greater demands of tomorrow. This can be done through efficient traffic management, control and planning.

Of necessity, Los Angeles has done a splendid job of providing a water supply system which has always been ahead of the demands of a rapidly growing population. This has been achieved through continuous evaluation of water usage and of all factors which enable the city to foresee and plan for consumption a decade or more in the future. Not until recently has anything like this far-sighted policy been applied to street traffic. A free flowing traffic is equally vital. Streets are the arteries and capillaries that feed the city, occupying a position comparable to the water trunks, mains, and lead-in lines that supply factory, store and home. Clogged traffic routes are as damaging as pipes in which there is only a trickle of water.

The street traffic problem can be met only by applying the same foresight, planning and factitude that has been given water supply. The size and urgency of this work, the necessity of doing it well and soon, can be judged only by recognizing the importance of street traffic to the economic and social life of Los Angeles and the entire metropolitan region.

Business and Traffic

Transportation has always molded the shape and growth of cities. Steam railways, horsecars, electric transit, the motor vehicle, all have left their marks on the city.

In earlier days men had to live close by their work. Not until the coming of mass transit did cities tend to break away from tight, compact population centers. When the trolleys arrived on the scene cities began to explode at their boundaries. Suburban areas developed along the principal routes of travel. With the coming of the flexible motor vehicle and the extension of bus transit, the gaps between the ribbon-like developments began to fill in.

Los Angeles has become huge and sprawling. Actually in this complex metropolis there is no rapid transit, for either people or merchandise. Today's transit is slow transit, moving over the surface

through intersections and other obstructions.

Over the streets flow all of the city's commerce. Goods must move by streets to store and factory, and they must move by streets from there to customer, railroad or other transport. Trucks carry goods to and from other cities. They carry immense quantities of food, groceries, furniture, building supplies and myriads of goods to customers within the city.

By truck, dairies daily deliver more than 1,500,000 quarts of milk, cream and miscellaneous products. Some 600 laundries serve 500,000 dwelling units. The traveling hamburger stand and ice cream truck move up and down hundreds of streets. Taxicabs pile up a daily mileage of 175,000.

In judging the importance of streets to commerce, full weight must be given Los Angeles' position as the nucleus of a huge metropolitan area. In Los Angeles County alone there are 45 other incorporated cities which along with the four adjoining counties account for large volumes of commercial traffic on Los Angeles' streets. In 1947 the estimated retail business in Los Angeles County alone was nearly \$5,000,000,000—nearly all of it moving in one way or another over streets. The efficient operation of streets, to permit traffic to flow over them freely and safely, is a matter of vital concern to business.

It matters a great deal to the customer, too, as to whether a delivery truck is able to reach say 40 homes in a day rather than only 30. Wages and delivery truck overhead continue when the truck is held back in traffic. High accident rates directly result in loss and high insurance charges. In calculating the cost and price of much merchandise, the merchant must figure on the cost delivered at the door-step. One merchant recently reported costs for delivery of merchandise to customers has gone up about 50 per cent. Reasons were increased wages and delays in traffic.

Industry and Traffic

Industrial growth in Los Angeles and environs has been so rapid that perhaps many citizens of Los Angeles are unaware of its stature.

Since 1929, \$872,609,531 has been invested in new industries and expansion of old. In the postwar years \$364 millions were invested in industry, \$61 million more than was invested by government and private interests during the war years. Important is the fact that corporate and private industry spent a greater portion of its own money for plants in Los Angeles County than in any other industrial area. The Los Angeles area has become the most diversified

production center in the United States.

Today, there are 8,100 industrial establishments in Los Angeles County, an increase of 3,600 since 1939. These have a total employment of 240,000, of which more than 70,000 were created during and following the war. An incredible maze of moving people takes place on the streets as workers in factory and store head to or from home. Only eight per cent of industrial workers use public transit, according to a study reported in 1942 by the Regional Planning Commission.

Freight car loadings, in step with industrial production, have soared. In 1920, freight car loadings were less than 270,000. In 1947, 608,218 cars were loaded, with goods coming from hundreds of widely scattered origins over city streets.

In rooting itself solidly into the Los Angeles scene, industry has placed new burdens on the streets, and increased the responsibility of providing for and maintaining a free moving traffic.

Recreation

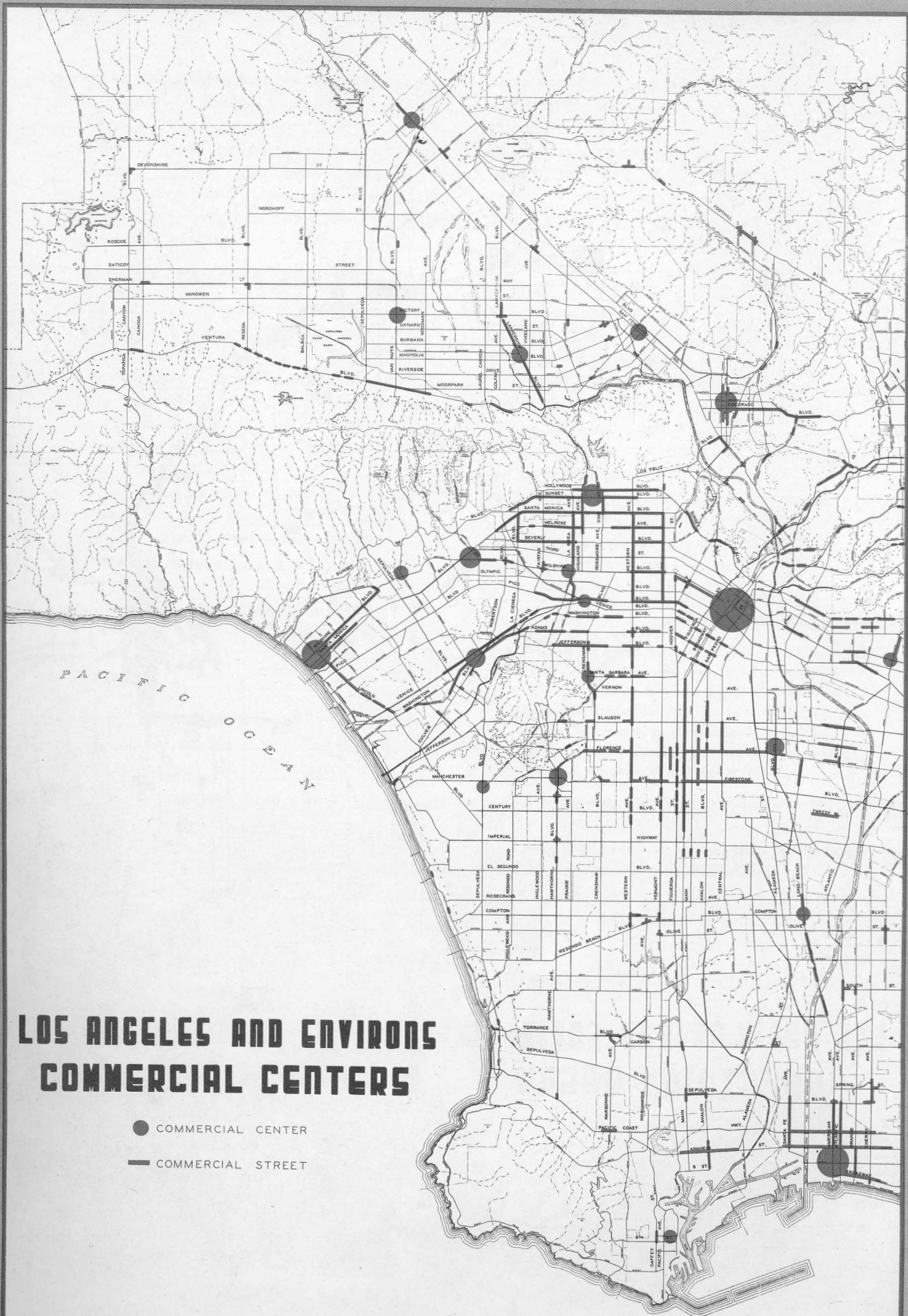
To those who live in Los Angeles, and are not connected with enterprises that deal with touring, recreation is a matter of enjoyment. But to those in commerce, recreation takes on an added meaning, for touring is one of Los Angeles' major businesses.

The multitude of recreational attractions found in Los Angeles and environs is a golden heritage. Probably nowhere else in the world are lodged so many and such a wide variety of natural and man-made attractions. These attractions, however, are scattered widely from the desert and mountains to the valleys and shore. Enjoyable and profitable as they are, recreational attractions generate vast volumes of highway and street traffic which on countless occasions jam many arteries beyond the saturation point.

A measure of the tourist business lies in the out-of-state cars entering California. In 1947, 984,764 cars crossed into California carrying 2,700,719 passengers, a record influx. Cars entering through Southern California stations totaled 527,719 carrying 1,483,507 persons.

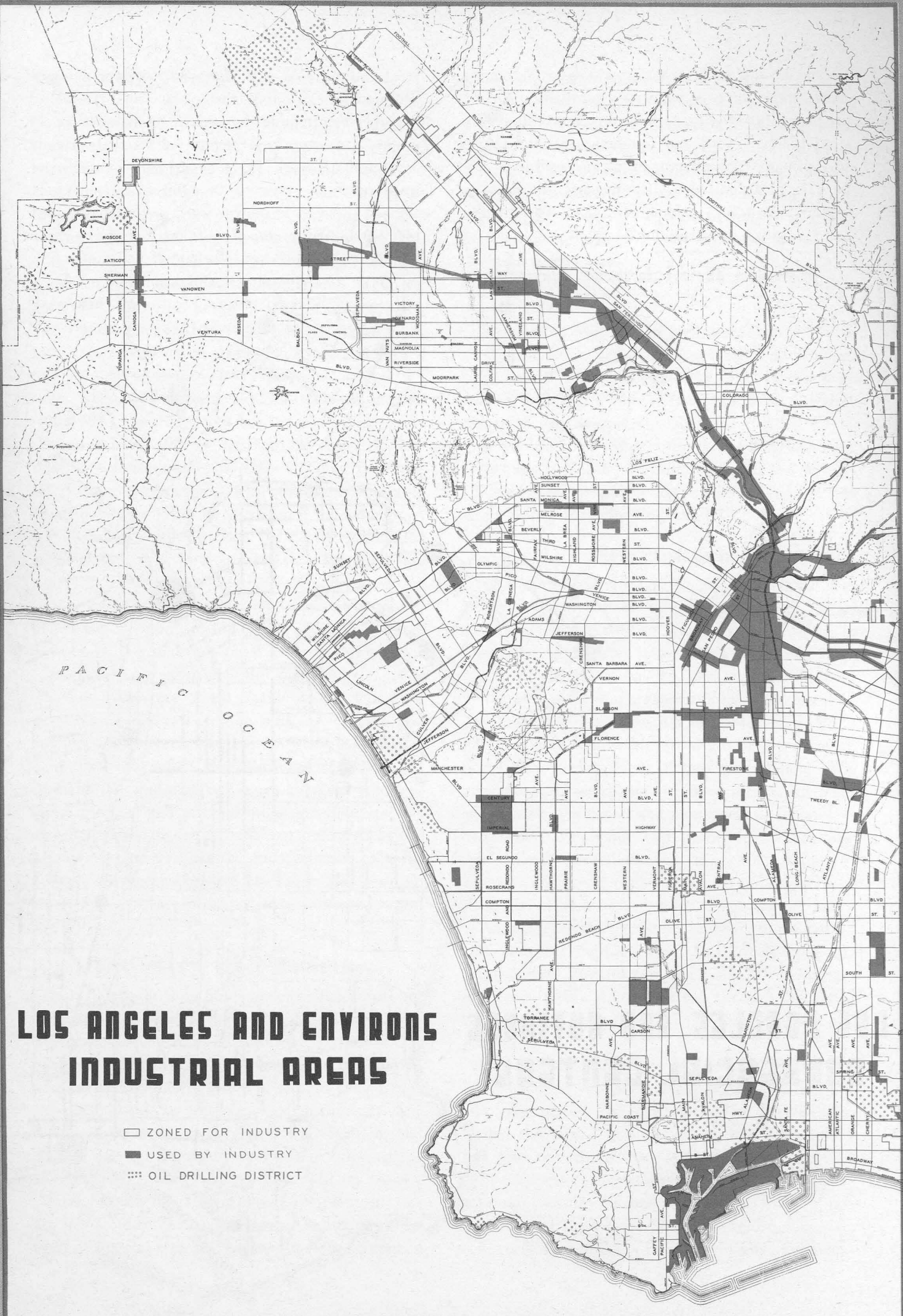
Out-of-state visitors to Southern California in 1947 spent an estimated \$467,000,000. While not all of that money was spent in the Los Angeles area, almost the entire amount was at least exposed to Los Angeles' attractions.

Space does not permit discussion here of the recreational facilities in use or planned for the Los Angeles area. It is important to recognize, however, that recreation beckons in all directions. On week-



LOS ANGELES AND ENVIRONS COMMERCIAL CENTERS

- COMMERCIAL CENTER
- COMMERCIAL STREET



LOS ANGELES AND ENVIRONS INDUSTRIAL AREAS

- ZONED FOR INDUSTRY
- USED BY INDUSTRY
- ⋯ OIL DRILLING DISTRICT

ends and holidays, the resulting shift in traffic volumes, places tremendous demands on thoroughfares which are adequate or lightly used during the working week.

As the city grows and as recreational and tourist travel increases, the trying problems faced today will be greatly accentuated. Here again is found important reason for establishment of the best possible administration and handling of traffic.

Public Health and Safety

Congestion and delay so commonly found on Los Angeles' streets constantly threaten public health and safety.

A leading citizen of a large southern city often declares that if a fire started in any one of several congested districts during rush hour much of the city would go up in flames by reason of jammed streets which prevent quick movement of fire equipment. Whether that would happen in Los Angeles is of course, a matter of conjecture, but the fact remains congestion often delays arrival of fire-fighting and life-saving units.

Present street facilities, inadequate as they are, constantly perform vital services in the many activities which are intensified in a community where populations are so widely spread. During the course of a year, police runs on call total some 900,000. The fire department answers more than 22,000 fire and rescue calls. Emergency calls for ambulance service from Georgia Street Receiving Hospital alone total 36,000 a year. On the average a city vehicle

starts on a mission of mercy or protection every minute of the day and night.

Public health and safety benefits performed by the streets are seen in a review of the City Health Department's work. That department operates one or more of its services in 30 different strategic locations. The nature of the work requires that staff members journey from place to place either by car or by public transportation. Field workers number 534, of which 184 are nurses who make home calls in addition to work at clinics. Sanitation inspectors total 271. Clinics in different parts of the city are served by 79 physicians.

Traveling thousands of miles daily, these workers constitute only a small part of the street traffic stream, yet an extremely important part. The delays suffered by the average citizen bears down to an even more costly degree on those in public or private service who have so much to do directly with the city's health and welfare. Those costs are written in terms of fewer patients visited and served, fewer sanitation inspections, and in higher costs to taxpayers.

It was a big day at the races, but only a fraction of the recreation seekers in the Los Angeles area were there. It was a big day also at the baseball park, at the beaches, in Griffith Park, and in the mountains. Traffic facilities must be operated for the heavy week-day demand, and geared to the needs of an outdoor loving people.



A PERSON may do a lot of driving in Los Angeles, gaze at the city from atop Griffith Park or the City Hall, and pore over a detailed map and still fail to fully comprehend the vastness of Los Angeles' traffic problem. In a recent survey, city people throughout the nation agreed traffic and parking were the most pressing dilemmas faced by cities today. The traffic problem assumes mammoth proportions in Los Angeles where almost everything flourishes that generates street usage.

Population

Of the nation's major cities, none has equalled the rapid growth of Los Angeles. The 1900 city of 102,479 souls expanded to a city of a million about 1925. By 1940 population had soared to 1,504,277. War-time activity brought in hundreds of thousands of new faces and many of them remained. The more than 1,900,000 population of today ranks Los Angeles among the first four cities of the country.

Estimates made by the Department of Water and Power and by the City Planning Commission place the 1960 population at over 2,600,000 and that of 1970 at well over 3,000,000.

As population increased the city has pushed its borders further and further afield. Los Angeles now covers 11 per cent of Los Angeles County. Her 452 square miles are more than is covered by any other city of the United States. But by no means is Los Angeles' destiny written in terms of Los Angeles alone. The city boundaries, except for taxing and political purposes, mean little to a mobile people.

Much of Los Angeles' general well-being, business, and street usage come from contiguous and nearby territory. In Los Angeles County, outside the city, live as many people as do in Los Angeles. The adjoining counties of Kern, Orange, San Bernardino and Ventura make Los Angeles the focal point of 4,500,000 people.

Since Los Angeles is the central core of a lusty growing metropolitan area, sound planning requires consideration not only of her own growth and needs, but also of the commerce and traffic evolving from the expected growth of adjacent areas. In the decade

between 1930 and 1940, the population of Los Angeles County outside the city increased at a rate exceeding that of the city itself. During that period total population of the four adjoining counties almost doubled. The 1960 population of the five counties is expected to be almost 6,000,000.

Total population indicates in general the size of the traffic control problems. In planning for the future, however, it is also necessary to consider the distribution of population within the area and changes which can be expected to occur.

Central Section extends from the eastern city limits to near Beverly Hills and from Glendale southward to the "shoe string" which connects San Pedro with the main body of the city. This area contains the largest number of people. It is estimated that the present population of 1,328,000 will expand by 1970 to 1,560,000.

Valley Section is roughly the area between Glendale and the western city limits and between the northern boundary and Mulholland Drive. Today's population is 195,000 and the 1970 expectancy is 650,000 people.

West Los Angeles Section is situated between the Central Section and the western city boundary, and between Valley Section and the general vicinity of Culver City. Present population is 185,000; the 1970 estimate is 560,000.

Harbor Section embraces the "strip" southward from the Central Section and the San Pedro area. The 1948 population is 104,000 and the 1970 forecast is 250,000.

Venice Section is bounded by Santa Monica, El Segundo, the ocean, over to Culver City and adjacent area which it includes. Here again a large population increase is anticipated, from the 88,000 of today to 360,000 by 1970.

Los Angeles has been and will doubtless continue to be a city predominantly of one-family dwellings. This type of development requires a more extensive street system. At the same time, multi-family dwellings are being built both inside and outside the city which are changing population densities and will contribute more passengers either for motor cars or mass transit on routes already congested.

Motor Vehicle Registration

In the Los Angeles metropolitan area, on a population basis, is found the heaviest concentration of motor vehicles in the world.

As the motor vehicle and the roads and streets improved over the years, registrations mounted rapidly. In 1918 Los Angeles County had what was then considered a sizeable car ownership, about 100,000. By 1924 the total increased four-fold to 410,000, a figure that was more than tripled by 1947 when 1,333,718 vehicles were registered. Of these, 117,283 were trucks and 117,653 trailers. Motor vehicles registered in Los Angeles probably exceed 700,000.

The per capita registration of 2.5 persons per car prevailing in Los Angeles and Los Angeles County is paralleled by the ratios in adjacent counties. San Bernardino County has a ratio of 2.6; Kern County, 2.55; Orange County, 1.93; and Ventura County, 2.5. These four counties had a combined registration in 1947 of 315,737 making a total for the five counties 1,649,455, about one out of every 25 motor vehicles in the U. S.

In considering the over-all traffic problem sight should not be lost of the fact that vehicles in the congestion whirlpool are primarily those from the normal trading area. In Los Angeles' central business district, 60 per cent of the vehicles came from within five miles of the district, and 86.9 per cent from within 10 miles, according to studies of parked cars made by the Los Angeles County Regional Planning Commission in 1941.

Expenditures for Traffic

Provision of traffic facilities, and their management and operation, run into costs that place the street traffic problem in the realm of big business.

The Los Angeles street system occupies valuable land, yet without that system all land in the city would be relatively worthless. Applying assessed valuations for various parts of the system in accordance with real estate values, the right of way worth of streets is roughly \$1,330,000,000.

Grading, draining, bridging, paving, lighting, laying sidewalks and curbs are procedures necessary to convert right of way into useful arteries.

The following table lists expenditures for street improvements and traffic operation for the 22 years between 1923 to 1945.

Street and Traffic Control Expenditures

July 1, 1923 to June 30, 1945

Street Construction	\$170,170,255
Street Maintenance	62,426,254
Special Assessments	
Opening and Widening	39,191,478
Interest on Street	
Bond Issues	8,051,675
Street Lighting	40,874,461
Traffic Control	5,724,873
	<hr/>
Total	\$326,438,996

The value of rolling stock operating over this system in Los Angeles County is itemized in the following table:

Rolling Stock Value of Street Traffic

(Estimate for 1947)

Trucks	\$ 211,000,000
Truck-trailers	177,000,000
Public Transportation	200,000,000
Motorcycles	9,000,000
Passenger Cars	1,100,000,000
	<hr/>
Total	\$1,697,000,000

Los Angeles people have a sizeable investment in their transportation plant. The right of way value, the street expenditures, and the rolling stock value, produce a total worth of more than \$3,350,000,000.

Revenues for Traffic

The following table, supplied by the Bureau of Budget and Efficiency, shows where revenues came from to match the street expenditures tabulated previously.

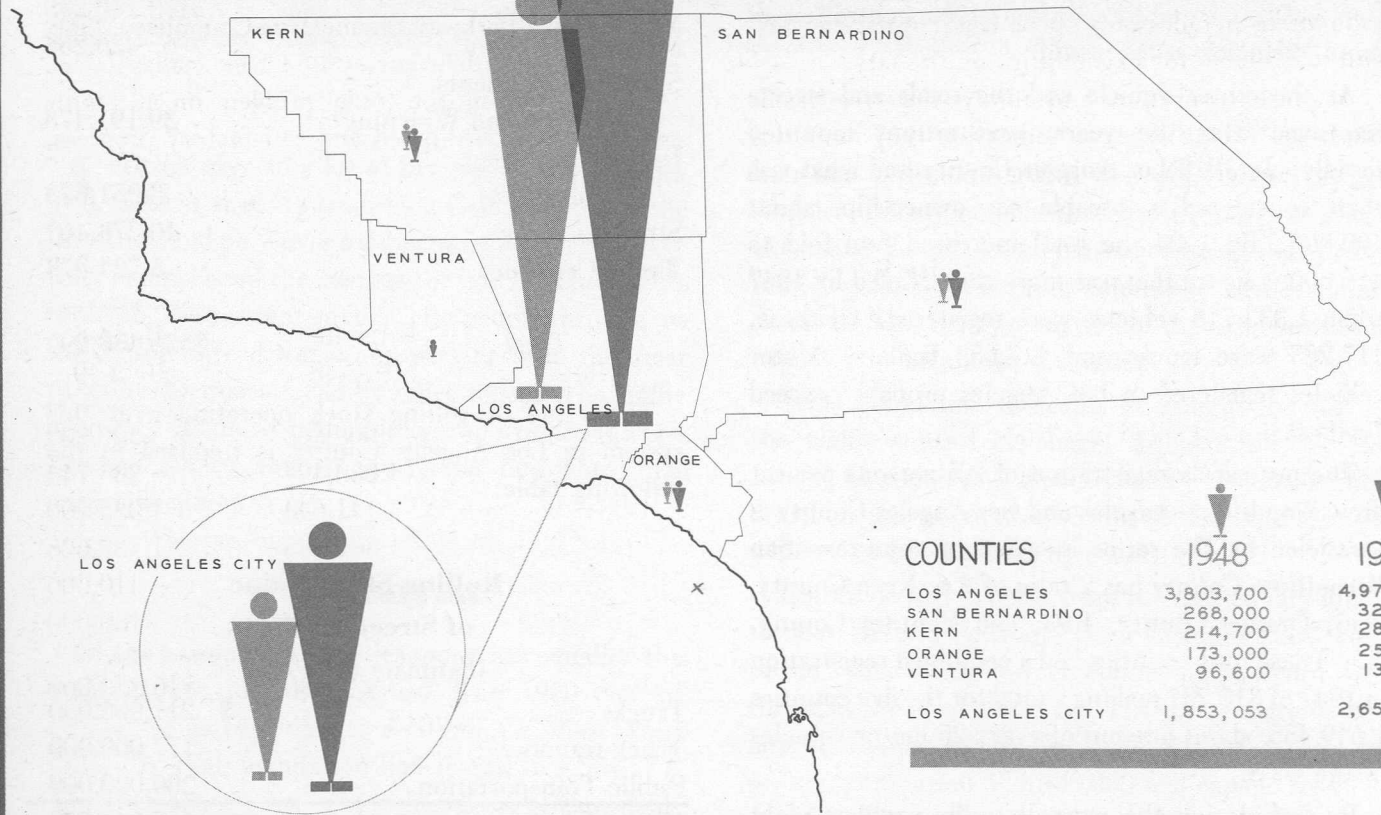
Sources of Funds For Street Purposes

July 1, 1923 to June 30, 1945

Federal Grants	\$ 4,609,031
State Apportionments	32,153,752
County Allocations	29,476,234
Public Carrier Contributions	4,026,402
City Funds	256,173,577
	<hr/>
Total	\$326,438,996

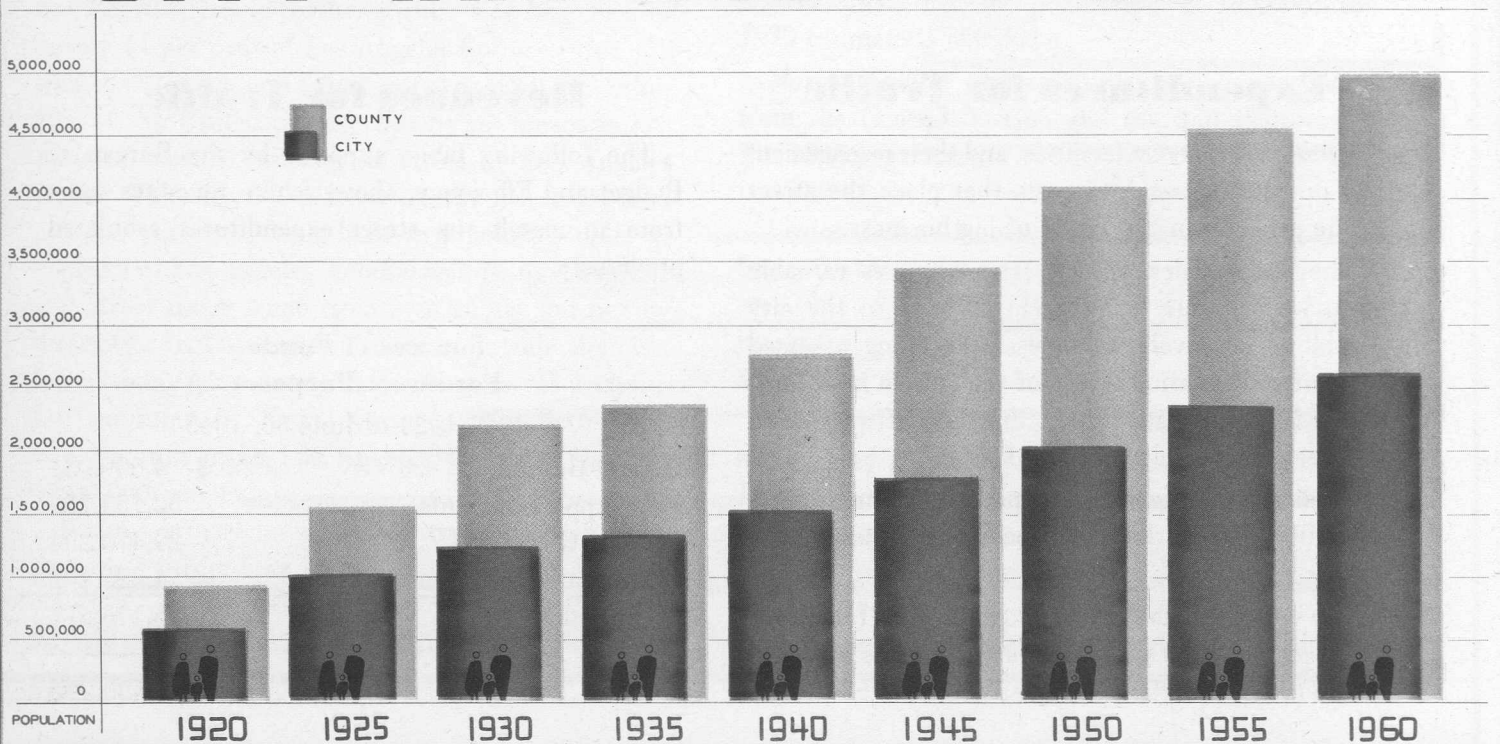
COUNTY

POPULATIONS



Los Angeles' economy—and highway transportation needs—are dictated not only by her own growth but by the mounting populations of the surrounding area. Already a major city function, traffic management must be brought into step with today's needs to cope with the greater needs of the future.

CITY AND COUNTY GROWTH



The table below lists estimates of revenue from several sources, as shown in the City Budget, for the purpose of estimating permissible expenditures. The tabulation includes only those traffic generated revenues available for expenditure by the city.

At present, revenues and outlays for street traffic are large. There is every indication they are going to be greater. Not including freeways and state

highways, critical deficiencies exist in street construction alone, which total in excess of \$88,000,000, according to the 1946 report of the Los Angeles Metropolitan Parkway Engineering Committee. Likewise, there are deficiencies in traffic management. Only by attacking the traffic problem on all fronts can there be coordinated and satisfactory progress, and economy.

City Revenues from Traffic Sources

	1946-47	Estimated 1947-48	Budget 1948-49
Traffic Safety Fund (Fines State Motor Vehicle Code) . . .	\$ 4,884,739	\$ 5,905,563	\$ 3,300,000
State Motor Vehicle Tax Apportionment (In lieu tax) . . .	2,169,455	4,058,494	6,283,744
State Gasoline Tax Apportionment	2,050,963	4,141,644	4,935,700
Gasoline Tax Allocation from Los Angeles County	1,286,420	1,301,835	1,132,625
Fines (City Ordinance)	485,500	410,000	410,000
Truck License Fees	94,690	110,000	160,000
Total	\$10,971,767	\$15,927,536	\$16,222,069

MOTOR VEHICLES IN LOS ANGELES COUNTY



Congestion

Congestion has been increasing on Los Angeles' streets for many years. Long before World War II on some arteries as much speed could be made with a horse and buggy as with a motor vehicle, and a pedestrian sometimes could pass a street car in the downtown area.

Congestion's extent is indicated by the 200 to 250 street intersections estimated by the Traffic Engineering Bureau to have a six-hour traffic flow in excess of 20,000 vehicles. A count made in January, 1948, gave a six-hour volume at Sunset Boulevard and North Figueroa of 34,257 vehicles—sufficient to form a bumper to bumper line of traffic almost 100 miles long. Often as much as five to seven thousand vehicles pass through an intersection in a single hour.

Causes of Congestion

Not only does the Los Angeles region have more vehicles on a population basis, but they are probably used more than in any other community.

On the measure of gasoline sold for motor vehicle

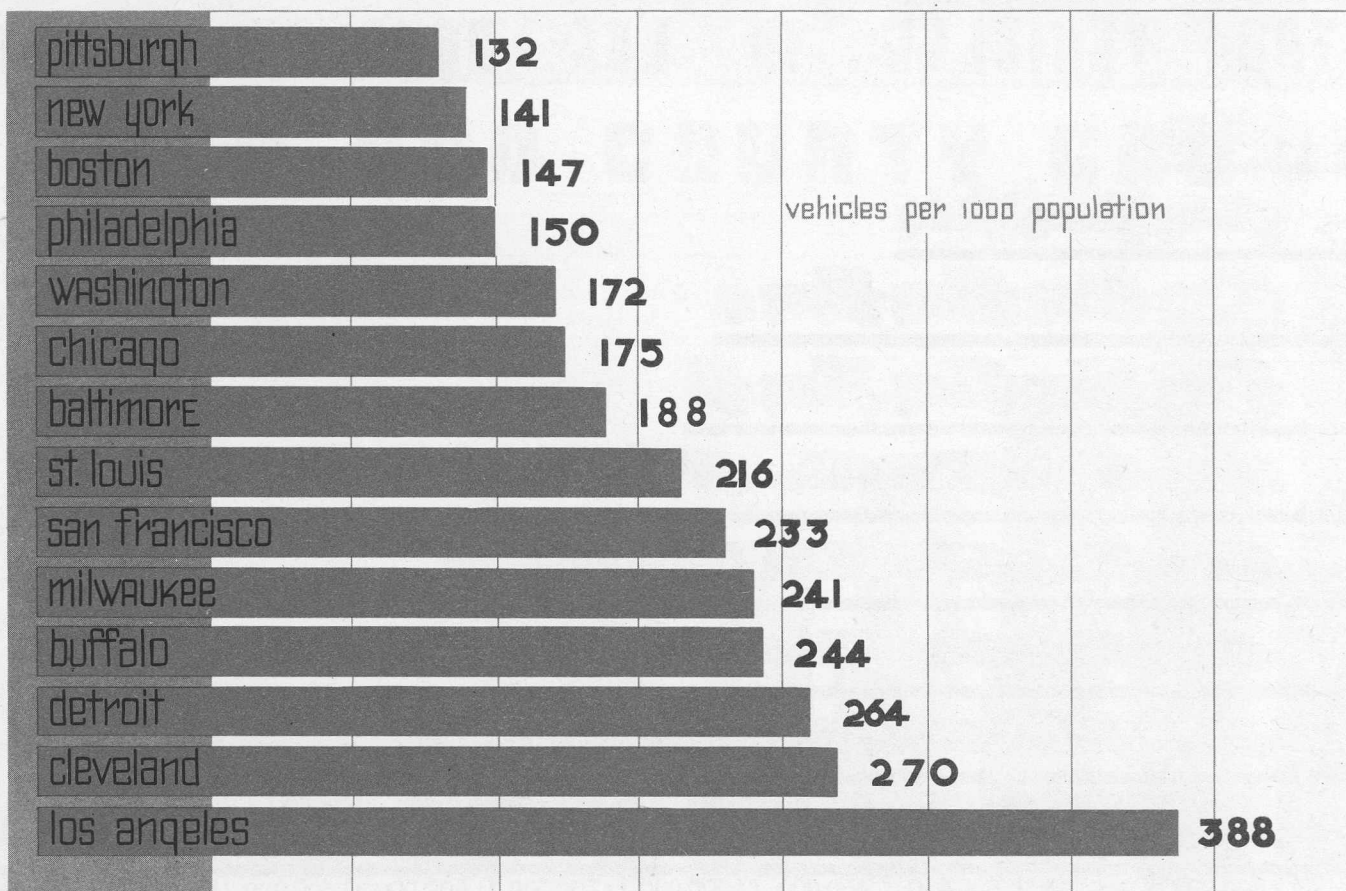
usage in Los Angeles County, in 1947, when 1,126,554,867 gallons were pumped, vehicle miles of travel totaled more than 16.9 billion.

Southern California climate encourages motor vehicle usage. Routine travel continues throughout the year in the Los Angeles region and tourist travel maintains a fairly even pace in all seasons.

Summed up, the causes of congestion, described in detail in this and other chapters, are as follows:

1. Rapid growth of Los Angeles and the consequent huge volume of traffic.
2. Climatic and other conditions which encourage street usage.
3. Scattered concentrations of industry, business and other generators of traffic.
4. Absence of modern system of traffic facilities.
5. Improper use of existing facilities.
6. Irregularities in street pattern.
7. Limiting capacity of street intersections.
8. Promiscuous mixing of different types of traffic.
9. Natural and artificial obstructions to circulation.
10. Lack of off-street parking facilities.

LOS ANGELES CITY LEADS IN MOTOR VEHICLES





Even the best of street traffic management faces a real challenge in congestion which breeds careless driving and accidents, and burns up gasoline for which the motorist gets no return.

Cost of Congestion

Congestion to the average driver is measured in terms of his own discomfort, exasperation and loss of time. Rarely does he calculate the cash cost to him, or reckon that the total charges paid directly and indirectly reach stupendous amounts.

Significant evidence of the toll exacted of all drivers by congestion is contained in special studies made by the California Public Utilities Commission. Recently the Commission made studies of truck travel time, using the resultant data to formulate revised rate schedules. Allowance is made by the Commission for undue delays by reason of congestion, steep grades and other hindrances. Adjustments are made by adding mileage to the actual distance. The

How Congestion Adds to the Mileage And Cost of Hauling Goods

Proposed "Constructive" Mileage Changes

Route	Actual Mileage	Constructive Mileage 1937	Proposed	Increase In Mileage Proposed Over 1937	Increase In Mileage Proposed Over Actual Mileage
Beverly Blvd. to Santa Monica	16.5	17.5	19.5	11.4%	18.2%
Figueroa, Alameda or Long Beach Blvd. to Long Beach	20.45	21.5	23.0	7.0%	12.0%
Garvey to El Monte	12.5	13.5	14.5	7.4%	16.0%
San Fernando Road to San Fernando	21.5	23.5	25.5	8.5%	18.6%
Manchester, Inglewood to Norwalk	16.5	17.5	19.0	8.6%	15.1%

Truck Trips Show Low Average Speed

Area	Length of Trip (Miles)	Time (Hrs. Min.)	Average Speed (m.p.h.)	Possible Distance at 25 m.p.h. (Mi.)	Distance Lost (Mi.)
Downtown	12	2:06	5.7	52.5	40.5
Eastside	36	3:32	10.2	88.3	52.3
San Fernando Valley	72.7	5:44	12.7	147.5	74.8
Suburban (West)	41	4:00	10.3	100.0	59.0

total is called "constructive" mileage. For example, the distance between two points may be 20 miles, but an additional three miles may be granted, making the constructive mileage 23. The miles added depend upon the amount of delay caused by hindrances.

The table on page 17 shows only a few of many proposed constructive mileage increases on Los Angeles streets because of congestion increase since the current rates were adopted in 1937.

Figures in the last column which show the percentage increases in constructive mileage over actual mileage also may be applied to costs. For example, on the run to Santa Monica, delay by reason of congestion, adds 18.2 per cent to the haulage bill.

To determine the recommended constructive mileage changes, the Commission made careful studies of actual delays confronting trucking operations. Observers accompanied trucks on runs, recording actual driving times. The table above gives results on four typical trips. The table also shows distance that could have been covered at legal speed of 25 m.p.h. in the same period of time if there were no congestion.

Another measure of congestion delay is provided in time checks made in 1937 and 1947 by the Traffic Engineering Bureau. Travel by passenger car today on the average is somewhat slower than a decade ago.

Population and vehicle registration increases have counterbalanced progress in street improvement and traffic routing and in such matters as signs, signals and pavement markings. The following figures indicate the resistance of the traffic problem to all but a vigorous attack.

Comparison of Average Travel Time on Test Runs, 1937-1947

	Average Speeds of Random Test Runs (m.p.h.)	
	1937	1947
(From City Hall)		
Inside 1-mile circle	13.9	13.3
1-4 Mile Circle	26.4	25.0
4-7½ Mile Circle	28.2	26.0

Some of the individual test run data used in compiling the above average figures are shown in the table below.

Speeds at rush hours are much slower than the averages shown in the tables.

To obtain a further check on the hidden costs of congestion, the Traffic Survey Committee requested the assistance of the Motor Truck Association of Southern California. That group made special studies at two railroad crossings on principal truck arteries. At one intersection on Washington Boulevard, in a

Individual Test Runs

	Distance (mi.)	Speed—(m.p.h.)		Time 1937	(Min.) 1947	Increase in Time
		1937	1947			
Pico Blvd. from Western to LaBrea	1.5	27.3	14.5	2.3	6.2	170%
Hollywood Blvd. from Cahuenga to Western	1.2	18.9	15.1	3.9	5.05	30%
Alameda from 1st to 6th75	27.9	15.4	1.72	3.1	80%
Third St. from Vermont to Western	1.0	24.0	18.4	2.5	3.3	32%

period of 12 hrs., 50 minutes, 821 trucks of four-ton capacity or larger suffered a total time loss of 1 hour, 4½ minutes. At the rail crossing near 25th and Alameda in a period of 8 hours, 3 minutes, 325 trucks were delayed 15 minutes. Applying the minimum rental rate of \$5 per hour, the total delay cost during the two periods for the two crossings was more than \$4,800.

Actually, delays at railway crossings account for only a small portion of the congestion cost. Unnecessary delays on ordinary streets, through inefficient signals or for other reasons, exact heavy losses of time and money, not only to truck operators but to all street users.

All too often the driver and family or friends sit futilely in the car while the motor eats up gasoline and oil and the clock ticks away precious minutes that could be advantageously used at work, in the garden, for recreation or other pursuits for which at best there is too little time. Multiply the losses of the individual, by the hundreds of thousands who are daily subjected to this trial by torture, and add in the losses suffered by business and industry, and totals are reached high in the millions of dollars. A more extensive study would be required to pin the cost down to a reasonably accurate figure, but the total waste would be sufficient to more than justify an all-embracing program for reducing congestion.

Mass Transit

See Page 27
A stimulant to motor vehicle usage are conditions affecting mass transit, which is slow and overcrowded. Within the city, many local street car and bus lines are fed by buses operating in other cities. Transit companies, therefore, cannot operate sufficient service through the business districts to carry both the resultant transferees and local patrons. Cars on some lines are completely filled at the outer ends of the lines. Local patrons are unable to board the cars and so resort to their automobiles.

While the early pattern of Los Angeles, like that of other American cities, was primarily established by the public transportation lines, the automobile has guided much of Los Angeles' later and faster growth. Car lines were spaced considerable distances apart and ran for relatively short distances. The result was that areas between the lines and beyond the ends were and are served by motor vehicles. With one-family dwellings prevailing, it was not profitable for the transit companies to extend lines. Much of the city has grown without mass transit.

Slow rates of transit travel for many years has

discouraged use of the car lines. Stop signs, traffic signals, slow speed zones, cross traffic, and many other deterrents hold street cars except on a few streets to speeds of about 12 miles per hour, terminal to terminal running time.

The problem is complex. Mass transit conditions are forcing many people to use motor cars and overcrowded streets, yet provision of rapid transit by rail to meet demands for speedy long distance travel imposes problems which have not yet met solution. As described in Chapter III, solution is essential for good transit can materially reduce street congestion.

Parking

Parking in Los Angeles has been a neglected urchin of the streets, with private operators and business firms independently attempting to meet demands. Off-street parking facilities have come and gone. A report published by the Downtown Business Men's Association early in 1945 placed the shortage at 10,000 spaces. The situation today is worse than at any other time.

Lack of parking hampers the city and its people in many ways. Failure to provide parking in a business area is to deny access to motor vehicle users. Insufficient facilities causes cruising and further clogging of streets. It results in high parking charges, delays, long walks to destinations, and, like congestion, works to alter the desired pattern of city development.

Parking shortages and poor locations, coupled with congestion, have caused customers to drift away from both the central city and other established commercial areas. That was forcibly shown in a recent survey made for the Traffic Survey Committee through the cooperation of leading business establishments, most of whom reported they were not only losing old customers but potential customers. Some reported increasing difficulty, because of poor parking, in hiring and retaining employees.

Traffic is forcing the elimination of curb parking despite the growing shortage of off-street facilities. In 1946 curb parking was prohibited along 1,800 blocks, and in 1947, 213 blocks were added. Rush hour restrictions last year were in effect on an additional 692 blocks. The vehicle driver is caught in the middle, for since 1941, off-street accommodations have dwindled by 3,500 spaces in the Central Business District, according to City Plan Commission studies.

Gains in off-street parking are in prospect under the new city ordinance requiring business building

projects to include parking space within 1,500 feet. But those gains are of a long-range nature and slow.

Traffic Accidents

In the 30's Los Angeles was regarded as the nation's most unsafe city for pedestrians and motor car riders, with annual traffic deaths sometimes more, sometimes less, than 500, and injury accidents exceeding 11,000. That reputation carries on, for the records show that Los Angeles still is one of the most unsafe cities.

In 1947, the street traffic death toll was 409, while accidents involving injury or death numbered 13,893. In death total, even though 96 below the 1946 figure, Los Angeles ranked seventh among the cities of 500,000 population or more.

On the commonly used basis of deaths per 10,000 motor vehicles, Los Angeles was ninth. Only twice since 1936 has Los Angeles been under the average death rate, on the motor vehicle basis, of the large cities. Continuously since 1933 Los Angeles has had the highest traffic death rate per 100,000 population in cities of its group.

A part of the traffic problem is mass transit, which must often poke along in heavy traffic and work its way through intersections and other obstructions. The complex transit problem has not yet met solution.

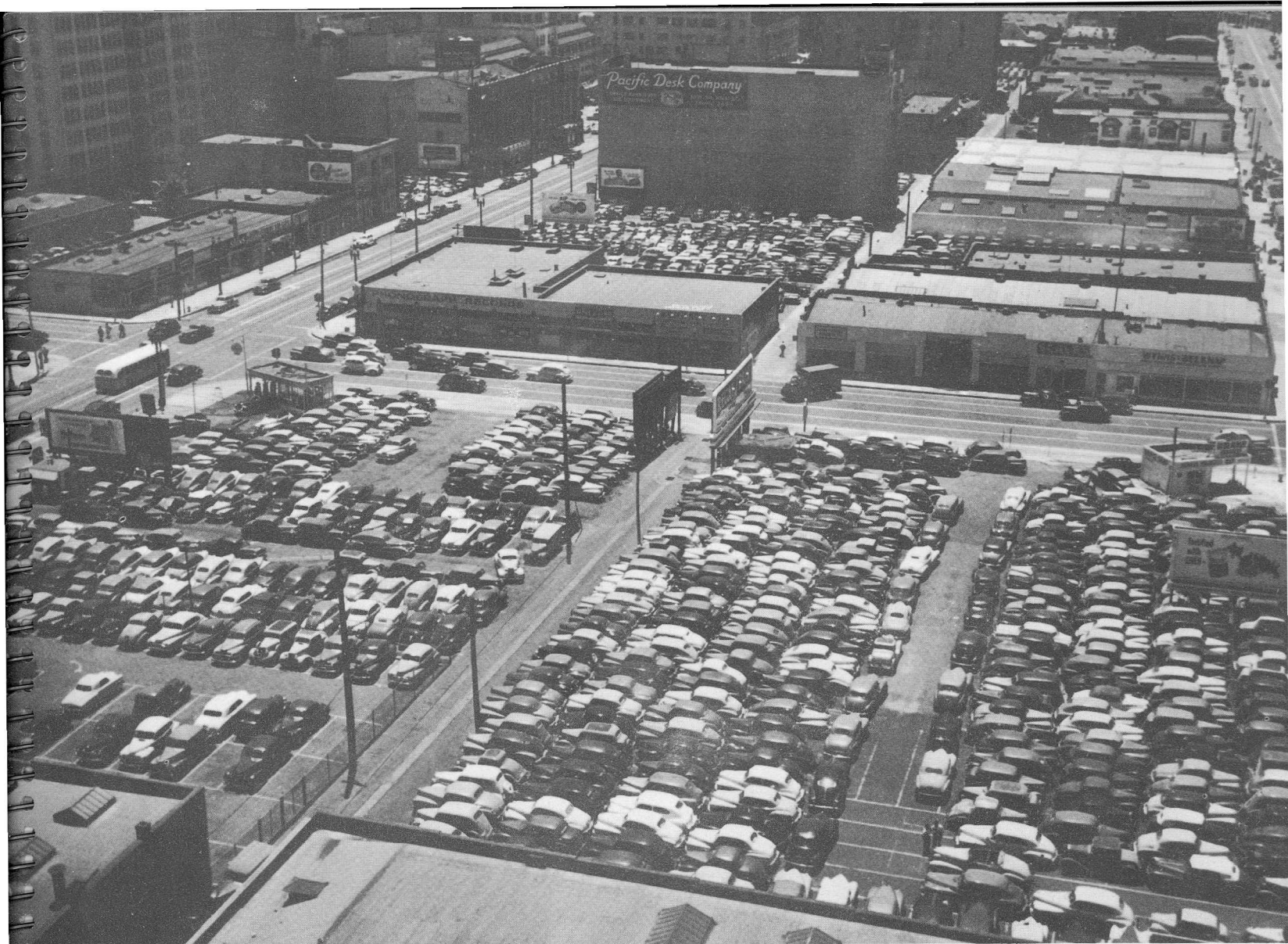
In the 1947 National Traffic Safety Contest, conducted by the National Safety Council, Los Angeles ranked fifth, and was given honorable mention, in the group of 14 cities of more than 500,000 population. Los Angeles' grade was 63.7 out of a possible 100. Large cities, however, generally have much worse records than smaller cities, indicating the failure of large cities to keep in step with intensified and constantly increasing needs. By reason of Los Angeles' extreme dependence upon street traffic, there is little satisfaction in a comparison with other large cities which too have fallen short of their responsibilities.

No appraisal of traffic safety in Los Angeles can be made without regard for the accident potentials which here exist perhaps to a greater degree than in any other city. The far reaches of the city with its 4,800 miles of streets, the high concentration of motor vehicles and the intense use of them, force Los Angeles to seek an extremely high level of efficiency in traffic management and operations.

Some 28,000 street intersections are lurking scenes of disaster, death and injury. Of that total, on the basis of three or more accidents in 1946, there are 1,617 more than ordinarily dangerous intersections located on a dozen streets.

At these intersections there were a total of 7,284 reported accidents involving injury or death, or





Jammed parking facilities force customers to drift away from the central area and from other established commercial districts. Lacking facts and a planned program, Los Angeles is marking time in solution of this urgent problem which is distorting economic and social development.

nearly half of all those reported in the city.

In a special study of street lighting needs, the street lighting bureau found there were 13 streets of varying lengths which by reason of inadequate lighting and other conditions were most hazardous at night for pedestrians.

Things to be done to make travel safe present a formidable array. Location and regulation of traffic signals, determination of street lighting needs, locations of signs and markers, traffic routing, and the use of other tools described in Chapter VI, make it clear that in traffic safety work there is no room for dilly-dallying or uncertainty, personal opinion, special interests, or any but skillful, technically trained administrators and key staff members.

As has been recognized for many years, street traffic safety is the product of effort. On that ground, Los Angeles must work unrelentingly, and on all fronts, to overcome the stigma of being a dangerous city for walking, driving or riding.

Effort expended for traffic safety pays huge dividends not only in the saving of life and limb but in the saving of dollars. Personal liability and property damage insurance rates are determined by accident records; the worse the record, the higher the charges paid by the vehicle owner for his protection. On the basis of national estimates made by the National Safety Council, Los Angeles' citizens are out of pocket some \$35 million a year—through property damage, wage loss, medical expense, and insurance overhead. No cash value can be placed on loss of life, permanent injury, and human suffering.

Traffic safety in Los Angeles has made commendable progress during the last few years. In line with the Action Program of the President's Highway Safety Conference, which was drafted by safety officials and leaders from all parts of the country in 1946, city departments, particularly the police, and private groups have followed safety programs which are bringing progressive accident reduction.



Many elements contribute to the traffic problem of Los Angeles. Natural barriers to traffic, a vast street system, a fast-growing population with homes even hugging mountainsides, and other elements, combine to make traffic management a difficult task.

LOS ANGELES, in government affairs, geography, and population, has the characteristics of a state. Business districts such as Van Nuys, San Pedro, and Westwood are small cities in themselves with community feelings and loyalties which set them apart both physically and psychologically from Hollywood and the Central Business District. The uncommon characteristics of Los Angeles present a galaxy of problems and sub-problems that tend to complicate every administrative phase of the municipal government.

Movement of people and materials with freedom, safety, comfort, reasonable cost, and dispatch are the end results desired in providing city transportation facilities. Ability to give such service is determined by a variety of elements. Some may appear remote, yet when they are studied fully it can be seen that they have a direct bearing on solutions to questions that arise when a city determines to solve the traffic problem. The intent of this chapter is to describe major elements so that the potency of adequate traffic management and operations may stand out clearly.

Disregard of some of the elements not only cripples traffic administration but may jeopardize city welfare. For example, traffic controls applied without consideration to land use, or zoning without heed of traffic needs, likely will result in congestion or traffic bottlenecks, and loss in usefulness and value of property.

The Economic Element

Commercial and industrial areas are widely scattered, as shown on the maps on pages 9 and 10. The vast, complex needs of the downtown and other established business centers, and of the many industrial areas, of which no single one stands out as the major area, are of prime importance in determining any program for improvement of street transportation.

Population

Unused stretches of land, even the bean fields in southeastern Los Angeles, are disappearing as the demands of the growing population persist. More and more homes are hugging hill and mountainside.

Somewhat more than 71 per cent of the citizens live in one and two-family dwellings—another way in which Los Angeles is unique among large cities. Less than 20 per cent live in multiple dwellings, and nowhere are to be found the vast areas of huge, high apartment buildings that mark such cities as New York and Chicago. Angelenos believe in living in their own private domains, and so here is another element vital to progressive traffic management.

Motor Vehicle Registration

With more than 1,500,000 motor vehicles in Los Angeles today, and with expectation of an increase to 2,000,000 by 1960, traffic administration must not only recognize present needs but those of the immediate future. Vehicle increases must be considered not only in terms of numbers but of location and use.

The elements briefed above are more completely discussed in preceding chapters. Other elements explored or treated further in this chapter are land use, the street system, mass transportation, parking, operating elements, and the social element.

Land Use

Natural Barriers

Cities usually have a few natural barriers to a free circulation of traffic. Los Angeles has them all—mountains, hills, canyons, a river and an ocean. These natural obstructions obviously have not been a serious handicap to the growth of the city, but, they have tended to guide land use and to make solution of traffic problems more difficult.

Lying on the coastal plain wedged between the San Gabriel mountains and the Pacific Ocean, the political boundaries encompass 452 square miles with the land used for just about every namable purpose. Administrative matters are made no easier by the Santa Monica mountains which break away from the shoreline to terminate within a short distance of the Central Business District, in the process separating the agricultural and residential areas of the San Fernando Valley from the coastal plain.

Spreading as it does from the mountains to the sea, Los Angeles lies in the path of all north-south traffic which traverses the southern portion of the

state. And that travel must pour over relatively few mountain pass highways.

Mother Nature has a tight grip on much of the land. Of the 1,233 square miles recorded as the Los Angeles Metropolitan Area by the County Regional Planning Commission, more than 100 square miles are occupied by stream beds, lakes, reservoirs, flood control channels or are so ruggedly mountainous as to be unavailable for use by man.

The stern resistance to a free flow of traffic put up by the natural barriers can be overcome, and then only partially, by ingenuity and dollars in building such things as bridges over the concrete paved, sometimes tempestuous Los Angeles River, and expensive tunnels. Highways and transit lines, like the railroads, have been forced to follow along the Los Angeles River northward. Such facilities as the Figueroa Street tunnels and open cuts, Cahuenga Boulevard and Arroyo Seco Parkway, all are costly projects borne of necessity. The topography of the northern part of the city has forced movement of the business district southward and westward, a movement that is still continuing.

Character of Land Use

Careful and intelligent management of traffic must include an understanding of the effects of the various types of land use upon the demands of traffic. All traffic is created by the use of land for business, industry, recreation, public service or residence. Individual trips in the traffic stream are generated by the point and purpose of destination. The ability of sufficient numbers of purposeful trips to be made is a determining factor in the economic health of the traffic generator—and the ability of those trips to be made is measured by the efficiency of the transportation system.

The character of abutting land use directly affects traffic needs, sometimes of a single street, sometimes of a large community. Consequently, efficient traffic administration in Los Angeles must remain abreast of the problems of many streets and of many widely scattered communities. In many instances these communities are separated by topographic features which are traffic barriers. Usually the first concern of these communities is their own problems.

Zoning

In city planning and zoning, prime consideration must be given to the ability of the transportation system to meet the needs of that type of land use created by zoning. Failure in the past to thoroughly

consider this factor is evidenced in the practice of zoning the frontage of all principal major streets for business or industry. Long before all of such property is occupied by gainful business or industry the resultant congestion of the street impedes further development, and so gaps are left of vacant, unsightly, unproductive property.

Adequate management and control of traffic requires close cooperation with the several departments of city government whose work naturally involves traffic. Of particular urgency is close cooperation with city planning and zoning agencies. For instance, the pattern of ground level street usage and of land use will be materially changed by construction of limited access freeways designed to end the inefficiencies created by abutting property. In providing easier access to all areas which they serve, it is to be expected the freeways will rejuvenate much of the land. This makes it doubly important that the city planning and zoning information be given full consideration by the traffic administration and other agencies in determining freeway location. Only by so doing can freeways attain maximum benefit.

The Street System

In reviewing the unique characteristics of Los Angeles it is clear that no set pattern of street operations can be borrowed from any other city. Los Angeles' traffic safety problem, for example, involves heavily congested ground level streets, free flowing freeways, mountain roads, busy recreational roads, and strictly rural roads. No where else in the world can be found a similar proportioning of the several types of streets and highways.

Streets are of three general types: streets of access and distribution, major streets or arterials, and freeways. Each type, either by intent or dedication or by use developed by growing traffic needs, serve a different purpose essential to the over-all traffic movement.

According to the 1946-47 classification by the Los Angeles Bureau of Engineering, Los Angeles' system is composed of:

Access Streets	3,551.39 miles
State Highways	215.44 "
Major Streets	1,044.39 "
<hr/>	
Total	4,811.22 miles
Alleys and Trails	653.41 "



LOS ANGELES

**FREEWAY PLAN
&
MOUNTAINOUS AREAS**

CITY PLANNING COMMISSION

1947

Access Streets

Although composing nearly three-fourths of the entire system, the 3,551 miles of access streets actually carry a relatively small share of the traffic. Their prime purpose is to provide access to abutting property and to give connections to major streets. The pattern and development, management and operation of these streets must be entirely different than that given prime movement arteries. Their character should be preserved and their limitations should be recognized in providing for large volumes of traffic disinterested in abutting property.

Major Streets

Heavily traveled major streets compose about one-fourth of the street mileage. For the most part these arteries follow the Master Street Plan of 1924 on which steady progress has been made. The major streets are the connecting links between concentrations of population and the generators of large volumes of traffic—business, industrial, educational and recreational centers. Carrying the bulk of traffic, it is upon these streets the inefficiencies of the traffic system are most visible. Here are found congestion and the hazardous conditions that produce the majority of accidents and deaths. The job is to preserve these streets as prime movers of traffic, to minimize the inefficiencies, and to recognize and control the elements which limit their ability to serve.

At best, these surface streets are inefficient. Too few of them have continuity of alignment without jogs or bottlenecks. Intersection frequency reduces the potential traffic movement by more than one half. The engineering task of providing adequate controls at the more than 28,000 intersections alone is one demanding the most intelligent administration.

Wide and not so wide street sections join one to another, which coupled with the many places where the rectangular street pattern changes direction, further prevent a free flow of traffic. Illustrative of bottleneck conditions is that of Wilshire Boulevard which was planned for extension through the Central Business District between Sixth and Seventh Streets. But the Wilshire extension ends at Grand Avenue, and there serious congestion occurs when traffic piles up during the peak inbound movement in the morning. Moreover, secondary jams are caused on Figueroa Street both north and south of Wilshire.

Further retarding travel on arterials are the marginal frictions arising from parking at the curb, inadequately controlled access to off-street parking

facilities and the use of curb space for loading and unloading of trucks. Sharing of the same street by the motor vehicle with street railway, heavy truck, bus, pedestrian and even steam railway, has retarded traffic on some arterials, making them practically useless for their intended purpose.

Freeways

Inevitable was the decision of city, county and state agencies to construct a new type of facility, the freeway, which can move large traffic volumes smoothly and safely. Sharing no right of way with pedestrians or mass transit without segregation or design provisions, and having no intersections at grade, with all remedial and marginal frictions eliminated, the properly designed freeway becomes the logical answer, and one that has won general public approval.

The 163-mile "10-year plan" of freeways now being built will give through movement of traffic to and from concentrations of populations and the major traffic generators. Although the ultimate system probably will never exceed one per cent of the street mileage, it will possibly carry as much as 50 per cent of the total vehicle miles.

Less than 20 miles of freeways are in existence today, but heartening progress is being made. Because of the statewide and even national importance of the freeway system, large-scale assistance is being extended the city and metropolitan area, by the California Division of Highways, with Federal Highway Aid. Cost of work done in 1947 and 1948 and scheduled for the current fiscal year is estimated by the District office of the California Division of Highways to be as follows:

Hollywood Parkway	\$17,200,000
Santa Ana Parkway	4,950,000
Terminal Island Parkway	5,585,000
Arroyo Seco Parkway and Harbor Parkway	7,800,000
Total	<u>\$35,535,000</u>

Many problems now existing will be ended or minimized as the freeways are completed. Many more problems will be created or accentuated. Large volumes of vehicles cannot be summarily dumped and left to shift for themselves. Terminal facilities will have to be constructed both for access and egress and for parking.

Construction of a system of freeways is akin to creating a new transportation facility such as was the



Natural barriers and inadequate planning controls have given much of Los Angeles an irregular street pattern which hinders traffic flows and makes traffic management difficult.

system of airlines. When the airlines were formed, travel was created that didn't exist before. Experience here and elsewhere indicates the freeways will induce additional motor vehicle usage, through new and more frequent trips. Major ground level streets, freed of much heavy travel by the freeways, likewise will tend to create new travel, and they will continue to perform the essential function of distributing traffic. The belt of parkways around New York City does not fulfill its true function because access streets and terminal facilities are not available to handle the volumes of traffic the freeways can deliver. The freeways alone by no means will completely solve the traffic problem, but it can't be solved without them.

Mass Transportation

The motor vehicle does not represent the whole traffic problem. Were mass transit to be lost, undoubtedly the motor vehicle would fail to meet demands, as was well evidenced by the transit strike of 1946.

Unlike the motor vehicle which grows with the influx of population, the street railways in Los Angeles were built for the most part before sufficient patronage was available to make them self-liquidating.

The owners of mass transit were also the sellers of real estate. Existence of the rail systems meant the ready sale of property. Actually, this was good planning, with some provision for transportation intergrated into the planning of new subdivisions.

Such has not been the case in recent years when huge new subdivisions became populated almost before the homes were finished, leaving transportation to the individual and his car. At later dates, if sufficient demand appeared to exist, motor coach lines were installed to be operated as profitably as possible and only as long as the operation was self-sustaining.

Mass transit can and should operate wherever desired lines of mass movement exist. It is highly impractical to depend upon the motor vehicle, with the average occupancy of 1.6 persons, to move large numbers of people from the same general origin to the same general destination. Where movements are scattered, irregular, or relatively few it is of course impractical to operate mass transit.

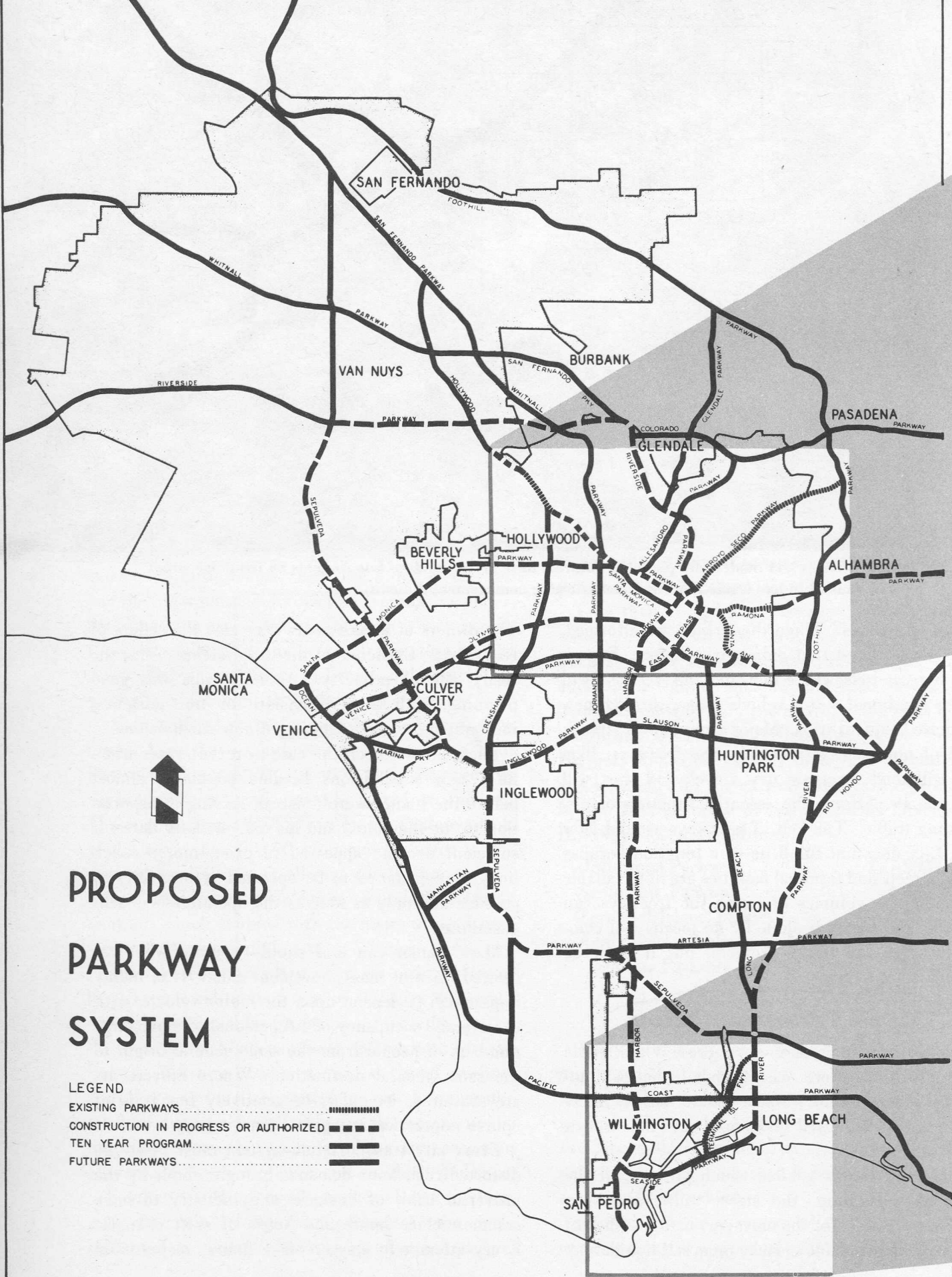
Every city transportation system must meet the distorted rush hour demands brought about by the universal habit of business and industry to have common office hours and hours of shift changes. Every attempt to stagger office hours, recreational

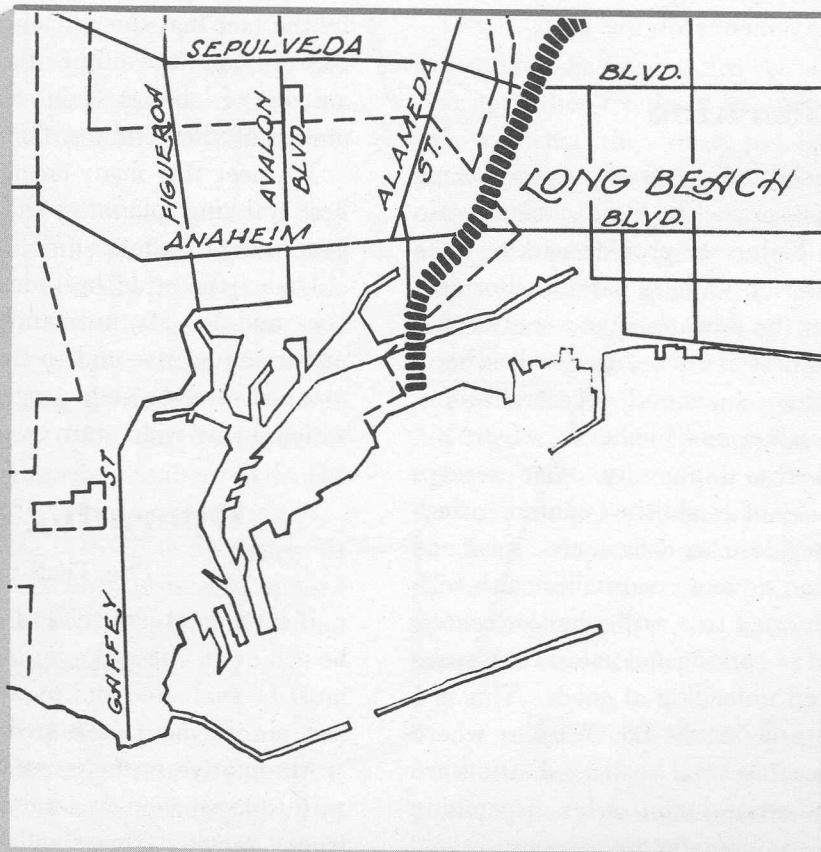
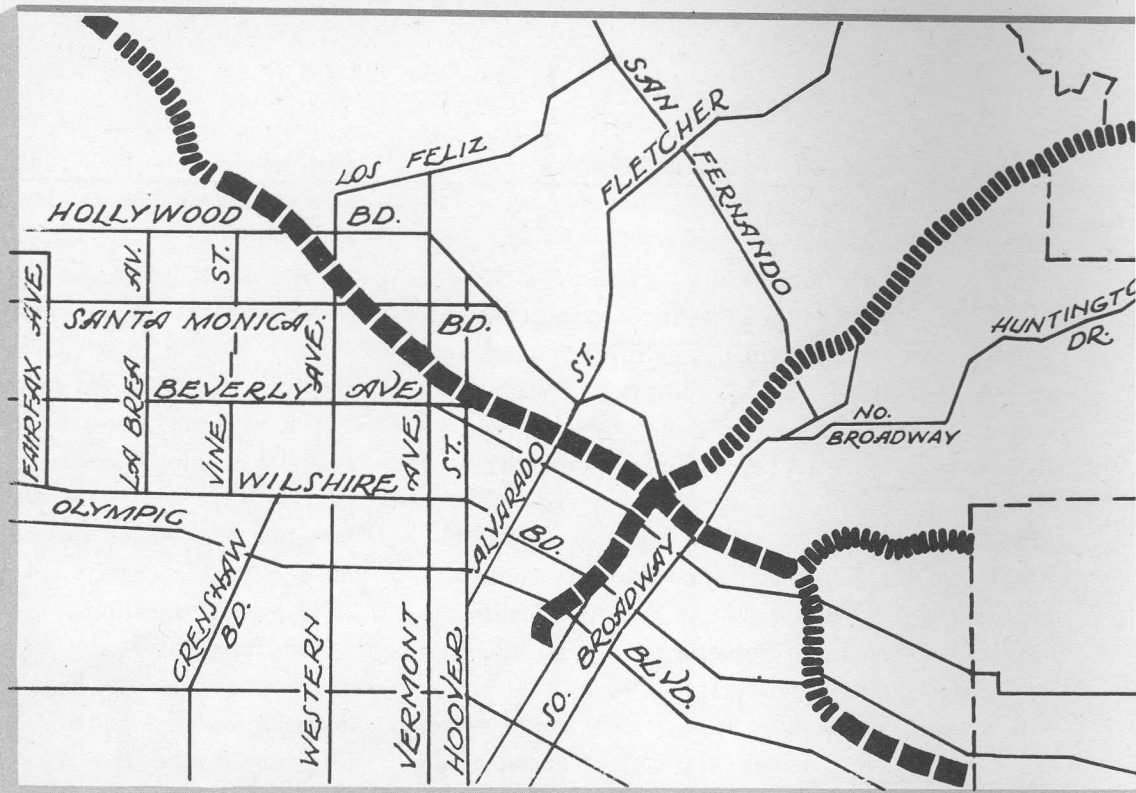
See Page 19

PROPOSED PARKWAY SYSTEM

LEGEND

- EXISTING PARKWAYS.....
- CONSTRUCTION IN PROGRESS OR AUTHORIZED
TEN YEAR PROGRAM.....
- FUTURE PARKWAYS.....





EXISTING PARKWAYS



CONSTRUCTION IN PROGRESS OR AUTHORIZED

periods, and days-off, has failed miserably except perhaps during the war years. But even then Los Angeles' attempt to stagger office hours fell far short of its goal. With ride sharing plans motivated by a call to patriotism and the pressure of gasoline rationing, the highest car occupancy counts recorded were in the vicinity of 1.75 passengers per car. This indicates there is great resistance by the motorist to relinquish the freedom of individual movement which he feels is his. How great this resistance is in the face of growing congestion is perhaps debatable. But there is sufficient evidence that any facility to compete with the automobile in Southern California must offer comparable convenience if it is to lighten the burden upon city streets.

A helpful contribution mass transit could make, aside from serving people who cannot afford or do not desire to own a car, would be the freeing of some off-street parking space now required by the industrial and office worker. The well-defined desire lines built up by these commuters are susceptible to the services of mass transit. The importance of this may be seen when it is realized that a commuting car occupies parking space which in a day could be used by several shoppers who need the flexibility and bundle-carrying convenience of the car.

Parking

No matter how good it is, a street system lacking parking facilities is somewhat like a water main without an outlet. Failure to provide parking is to deny access to a district. Where parking shortages occur, as they do in the downtown and many other areas, potential business is forced to go elsewhere. This is a major factor in wasteful decentralization, declining property values and blight.

Los Angeles, as is true of any city, must preserve the health and vitality of established centers, otherwise the entire city will lose tax dollars, civic spirit and enterprise. A city can no more maintain health with a dried-up core than can a tree with a hollow center.

A problem related to parking and use of curb space is that of loading and unloading of goods. This is a particularly trying problem in Los Angeles where most business houses in several business districts are without adequate off-street facilities for dispatching or receiving goods.

Solution of the parking problem depends upon determination of needs and differentiating between types of parking demand. There are three types: all-day parkers, chiefly workers and employers; the

part-day parkers who visit shops and offices; and errand parkers who can transact their business in a short time.

Several studies made by civic and city agencies focus attention on the urgency of a bold attack and contain helpful information on types of off-street facilities and means of financing.

Yet, with the interests of the three types of parkers often in conflict, with shortages for all types plainly evident, and with deficient loading and unloading facilities, the need stands out for an objective study, on a city-wide basis, to determine the answers to fundamental questions.

This type of study, being made in a growing number of cities with Federal and State cooperation, determines the quantity and location of present facilities, the needs of customers and workers, and the quantity and location of needed facilities. Moreover, the studies relate parking to general traffic needs and trends and to the desired city growth. No such scientific, city-wide study has been made in Los Angeles. Little can be done toward a permanent solution of the street traffic problem, including rapid transit, until the facts are known.

The importance of planned action is emphasized by the fact that the efficiency of the street and free-way system, the volume of sales in a district, and the amount of labor available for a district, rest on the ability of the terminal facilities to meet demands.

To meet this many-faceted problem requires the best thinking, planning and action of business and government leaders.

Under the wide latitude provided by California laws and by city ordinances, the door is open to private enterprise and to the city government for a planned, step-by-step program based on the facts which a city-wide study would disclose.

Operating Elements

The Traffic Stream

If intelligent control and regulation of traffic is to be achieved, the make-up of the traffic stream itself must be evaluated and related to regulation, control and enforcement measures.

Automotive traffic is composed of passenger cars with wide range in size and operating characteristics, trucks varying from small pick-ups to huge truck-trailer combinations, motorcycles and scooters. Adding further to the complexity are requirements of transit vehicles of several types, trolley coaches, street cars and buses. Intermingled with this hetero-



The traffic stream itself with its varying mixture of all kinds of vehicles is an important element in the traffic problem which demands special study and careful use of control measures and devices.

genous collection of vehicles, is, of course, the pedestrian. Where he travels in large numbers, his "operating" characteristics must be analyzed as well.

Traffic Control

Traffic control devices to fully perform their duties must be used in a manner actually fitting the needs of the traffic stream. At some locations the percentages of the various types of vehicles may be extremely important in fitting the facility to operate efficiently, for instance, in provision of progressively-timed traffic signals where large numbers of trucks and combinations may or may not be operating.

Clearly traffic control is an absolute necessity. It is equally evident that those controls must be applied intelligently and in a manner suited to the needs and characteristics of vehicles and people.

Traffic Regulation

When the motor vehicle rolled into the scene, it became necessary to draft a code covering rules of the road to govern its operation. This code began its growth at the turn of the century and today it is a complicated set of rules. Legal responsibilities of ownership and operation are defined by State and Federal law. The California State Code alone lists

five and one-half pages of types of violations. Operation is further regulated by city ordinance.

In contrast, the driver, not having to meet rigid licensing requirements, all too often is untrained and relatively unskilled. Usually he learns by trial and error, perhaps being taught by someone with a heavy foot and a light head. Operation of a motor vehicle is a revokable privilege but too many regard it as an inalienable right.

The traffic enforcement agency, therefore, has inherited an extremely complicated code to enforce upon a great number of individuals with a wide variance in operating ability who use a street system of great complexity and weakness. Here again, efficient traffic administration and control depends upon understanding the limitations of drivers as related to street facilities.

The Social Element

Of the many elements that make up the traffic problem, perhaps none is more important than the habits and customs of the community which might be called the social element. Citizens of Los Angeles and all of Southern California are devotees of outdoor living. This, of course, is directly attributable to favorable climate and the flexibility of the motor



Many Los Angeles arteries perform a dual purpose. U. S. 101 serves as a recreational highway along the shore, and it carries large volumes of through traffic to and from the northern and southern parts of the state. At this intersection the heavy left turn of homeward bound resort traffic creates a problem requiring the special attention of traffic and highway engineers.

car. Of necessary consideration are not only the peak traffic flows at rush hours, but also the peak flows of recreational travel. Consequently, in traffic management and in the provision of facilities, failure to consider the habits of a mobile population and the desired freedom of outdoor living, will cause efforts to fall short of the goal.

The economic element, population, vehicle registration, land use, the street system, mass transit, parking, truck loading and unloading, operating ele-

ments and the social element, each has an important bearing on traffic engineering decisions and programming. To cope with these inter-related elements, traffic administration must be a full-fledged operation geared to the development and use of facts. Traffic administration must possess authority and standing not only to conduct its routine traffic operations, but to carry on the leadership and guidance which traffic administration must assume if the elements of the traffic problem are to be brought into proper focus.

Chapter IV

Present Duties and Functions of Government Agencies

PREVIOUS chapters of this study have depicted the immensity of the street traffic problem and its bearing on the economic and social life of Los Angeles. The welfare of all people, and their very lives, depend in large measure on the way the daily floods of vehicles and people are handled. Traffic management and control, therefore, compose an administrative work of an importance at least equal to many other city functions.

In Los Angeles, traffic management and operation today are far below par. There is a traffic agency, but its responsibilities are limited in vital aspects. There are no provisions insuring cooperation or exchange of information with other city or outside agencies. Lacking the administrative stature such as held by water supply, sewage disposal and other utilities, the traffic agency, even though staffed with engineers and expert technicians, cannot function efficiently.

Under the present arrangement, there are nine city agencies which have, under city charter or ordinance, varying measures of control or activity in traffic operations. In some instances, the traffic duties are properly lodged in these agencies; in other cases they rightfully belong to the traffic agency. The agencies are: the City Council, Bureau of Street Traffic Engineering, Department of City Planning, Department of Public Works, Bureau of Engineering, Bureau of Street Lighting, Bureau of Street Maintenance, Department of Public Utilities and Transportation, and the Police Department. In addition, the city departments must work with state and county agencies.

In order to obtain a true picture of present traffic administrative functions, the Traffic Survey Committee not only analyzed charter and ordinance provisions, but studied activities and responsibilities of the various departments and bureaus involved. This information was gathered by reviewing available annual reports and by interview with department heads or designated representatives.

Charter Provisions

In Section 2, Article I, of the Charter, the City is granted among others the broad powers; to

enforce law and promote the public peace, health, safety and welfare; to grant franchises for the operation of public utilities; to regulate the operation of privately owned public utilities and to compel from time to time reasonable extensions of the facilities for service; to acquire, construct, maintain, operate or sell public utilities; and to provide for the acquisition, construction, improvement or alteration, maintenance, use and control of streets, tunnels, subways, rights of way, and other public or local improvements on, above, or below the surface of the land or water.

Included in these powers, which are as the Charter states, a "partial enumeration and in no sense a restriction or limitation upon the rights and powers of the city," are provisions so far-reaching and so enabling that there is little limitation upon the extent to which the city may go to provide safe and expeditious movement of persons and material throughout the municipality.

For a full understanding, it is necessary to examine provisions of the Charter in implementing these broad powers with organization for execution. Under Article III, The Powers and Duties of The Council, Section 36 provides that

"The Council shall, by ordinance, within ninety days after this charter becomes effective, provide for the study of the problems of street traffic and for the recommendation of rules and regulations in relation thereto. The duty of making such study and recommendations may be conferred upon one of the boards established by this charter, or upon a board created by said ordinance, and the Council may thereafter, by ordinance, transfer all of said powers and duties to a different board therein or by this charter established. The board so created by ordinance shall be appointed and organized, and the business thereof conducted pursuant to the provisions of Article VI of this charter. Said board shall recommend such rules and regulations for enactment into ordinance by the Council which shall vote upon any such recommendation within thirty days from the date of receipt thereof by the Council. It shall be competent for the Council, by ordinance, to provide that said board may, by resolution which shall become effective when published once in a newspaper of general circulation in the city, adopt rules regulating parking or other use of vehicles upon the streets or other public ways of travel, and any other use thereof, when determined by said board to be necessary

to meet an emergency, and to provide in such ordinance a penalty for the violation of any rule so adopted; provided that no rule so adopted shall remain in force longer than thirty days unless incorporated into an ordinance, as herein provided.

"The Council shall not have power to adopt any ordinance regulating the manner of the use of public streets or other public ways of travel by persons, the manner of the use or operation of vehicles upon the same, the making of excavations therein, or the placing of obstructions thereon unless such ordinance shall have first been recommended by said board, or unless two-thirds of the members of the council shall vote in favor thereof; but nothing in this section shall be construed to restrict or otherwise affect the granting of franchises as elsewhere provided in this charter, nor shall any of the provisions of this section apply to the routing or the re-routing of street cars or motor bus lines."

There are several significant features of this section worthy of comment:

1. The problem of providing "for the study of the problems of street traffic and for the recommendation of rules and regulations pertaining thereto" was left unanswered by the Charter. This appears to admit that the judgment of the Council as to what Board of the city could best administer the functions of traffic would be more reliable than the judgment of the Charter framers. Further, there seems to be a prediction that the Council would find the proper solution by trial and error, for if the Council erred in placing this function it could be transferred to another board, and so on.

2. No specific duties are enumerated by this section. Other sections pertaining to other departments outline specific departmental responsibilities. For example, Section 91 provides that the Department of Building and Safety has charge of construction, operation and maintenance of police and fire alarm systems. No such assignment of responsibility in regard to the traffic signal system is found in the Charter. The Council must, therefore, draw on the powers of Section 32 which states that it may provide

by ordinance the duties of all boards where such duties are not defined by Charter.

3. At the present time, the provisions of Section 36 are implemented by Ordinance 73,014 of September, 1933, which places certain duties relating to the study of street traffic in the Bureau of Street Traffic Engineering, with the Bureau reporting to the Board of Police Commissioners. The duties of the Bureau are listed on page 36.

The City Council

By Charter provision the City Council is in the position of being able to grant the powers for the study of street traffic to any one of the city departments and to remove that power at will. Whatever department has had the responsibility for the study of street traffic has been constantly aware of the City Council's interest and of the Council's power to re-establish the functions of street traffic engineering in another or a new department.

As outlined in the next section, the history of the Traffic Bureau indicates its almost constant adjustment. Under at least one of the ordinances enacted under Section 36 of the Charter, the City Council assumed direct responsibility for that Bureau.

Broad matters of policy, such as restriction of street parking, are determined by the City Council on the advice of the Traffic Engineering Bureau through the Police Commission and enacted into ordinances. Such matters as contractual agreements with the State involving construction of freeways requires the Council to seek the advice of the several city departments and bureaus. In many instances the city departments are not in agreement. This places the Council in the position of having to make decisions without the technical background to weigh the conflicting departmental viewpoints.

The City Council operates as 15 committees, including Committees on Planning, Public Works,

Among Los Angeles' traffic headaches requiring special study and coordination of various city and private agencies are those involving mixed traffic. Here on Alameda private cars, mass transit and railroad share the same right of way.



and Police. The Police Committee handles street traffic engineering functions. The diverse and varied interests, functions, and responsibilities of the Police Department makes it difficult for the Council's Police Committee to develop a specialized background in traffic.

Evolution of Traffic Agency

How the city has dealt with traffic administration is well shown in a condensed review of ordinances since 1924, which traces the evolution of the Bureau of Street Traffic Engineering from its beginning as the office of city electrician. Clearly manifest is the failure of Section 36 of the Charter to provide adequately for the study of street traffic problems. This chronological review, furnished by the Traffic Bureau of the Police Department, is recommended reading for all who believe in adjusting governmental functions to meet today's problems efficiently.

1. 1924—May. Installation of traffic signals executed under the supervision of the *City Electrician* of the Department of Electricity.
2. 1925. City Charter Adopted.
 - A. One provision consolidated the Department of Building and the Department of Electricity into what is now known as the Department of Building and Safety.
 - B. Section 36 of the Charter directed the Council to provide, by ordinance within 90 days, for the study of the problems of street traffic and for the recommendation of rules and regulations in relation thereto. The section further provided that the duty of making such study and recommendations could be conferred upon one of the boards established by the Charter.
3. 1925—October 14. Ordinance No. 52,995 adopted as a result of Section 36 of the Charter. This ordinance provided for the study of the problems of Street Traffic and authorized the Board of Police Commissioners to make such study and to make recommendations of rules and regulations in relation thereto. It further authorized the Board of Police Commissioners to adopt temporary rules regulating parking and other uses of the streets.
4. 1925—November 6. Ordinance No. 53,191 adopted which provided for the number of persons to be employed in the Department of Building and Safety. Maintenance of traffic signals is retained under the *Chief of Electricians* in the *Department of Building and Safety*.
5. 1927—December. *Traffic Signal Division* of the *Department of Building and Safety* established with an *electrician* in charge as *Chief* of the *Division of Street Traffic Signals*.
6. 1928—March 2. Request made by the Department of Building and Safety to the City Council for creation of the following position: Chief of Traffic Signal Division.
7. 1929—April 24. The position titled "Chief of Traffic Signal Division," Code 8285, created by Ordinance No. 63,557. The Council over-rode the veto of the Mayor in creating this position.
8. 1930—June 19. Ordinance No. 66,883 approved. This ordinance repealed Ordinance No. 52,995 (Item 3 above.) Under the terms of Ordinance No. 66,883 a Bureau of Street Traffic Engineering was created and placed under the administrative control of the Board of Police Commissioners. The Bureau was headed by a Street Traffic Engineer and all its personnel were to be appointed by the City Council, subject to Civil Service. The Police Commission thus replaced the Building and Safety Commission as a body to make recommendations covering traffic regulations.

To the newly created Bureau of Street Engineering was assigned all the duties formerly performed by the Traffic Signal Division under the Department of Building and Safety as well as the installation and maintenance of traffic markings.
9. 1930—July 28. Ordinance No. 67,187 approved. This ordinance provided for the number of persons to be employed in the Bureau of Street Traffic Engineering of the Police Department of the City of Los Angeles.
10. 1931—October 8. Ordinance No. 70,380 passed by the City Council over the Mayor's veto, created the Department of Street Traffic Engineering under the jurisdiction of the Council.

This ordinance provided for the appointment of a Chief Engineer by the Council, subject to civil service provisions. Operation of signals was left under the jurisdiction of the Police Department and the Board of Police Commissioners retained the power to make recommendations on traffic matters.
11. 1931—November 25. Ordinance No. 70,611 was approved. This ordinance placed the operation of signals under the Department of Street Traffic with the provision that the times of turning them on and off was to be designated by the Police Department. It further provided that the Chief Engineer of the Department of Street Traffic Engineering was to be appointed direct by the City Council, subject to Civil Service rules and regulations.

Employees of the Department were to be appointed by the Chief Engineer, subject to Civil Service rules and regulations.

12. 1933—September 14. Ordinance No. 73,014 was approved. This ordinance repealed those provisions of Ordinances 70,380 and 70,611 which were inconsistent with No. 73,014. Ordinance No. 73,014 provided for the study of street traffic problems and authorized the Board of Police Commissioners to make such study and to make recommendations of rules and regulations in relation thereto; established a Bureau of Street Traffic Engineering as a part of the Department of Police of the City of Los Angeles; authorized the Board of Police Commissioners to conduct studies, prepare plans and make recommendations and other investigations relative to street traffic signals, signs, markings, etc.; and provided for the transfer of the personnel of the Department of Street Traffic Engineering to the Bureau of Street Traffic Engineering of the Department of Police. Section 5. of this ordinance states "it shall be the duty of the Board of Police Commissioners, acting through the said Bureau of Street Traffic Engineering of the Department of Police, to conduct studies of street traffic accidents and congestion, and other conditions affecting the safe and convenient use of the streets, etc."

Section 6 of this ordinance states "Said Bureau (of Street Traffic Engineering) shall perform such other and further duties as may be from time to time delegated to it by the Chief of Police of the City of Los Angeles. Any of the aforementioned work shall be done by said Bureau under the management of the Chief of Police."

13. Prior to 1943, the Board of Police Commissioners, under Sections 80.07 and 80.08 of the Municipal Code, was authorized to maintain traffic control devices, and to install and maintain traffic signals, safety zones and lane markings—ALL OF THE ABOVE SUBJECT TO THE DIRECTIONS AND APPROVAL OF THE CITY COUNCIL.

14. 1943—March 18. Under the terms of Ordinance No. 87,515, Sections 80.07 and 80.08 were amended and sections 80.07.1, 80.07.2, 80.07.3, 80.08.1 and 80.08.2 were added to the Municipal Code. The amendments and additions gave the Board of Police Commissioners the sole and exclusive responsibility and authority for the installation and maintenance of traffic signals, stop signs, crosswalks, parking signs, limitations and markings, directional signs, lane lines, turning buttons and any other traffic control devices. Section 80.7 (c) reads "Authority of Commission Exclusive. No other officer, board, or department of this city and no 'private' agency or person shall install, place or maintain any traffic control device within the purview of this chapter, except upon the order of the Commissioners."

The most recent arrangement provided by ordinance has resulted in sufficient confusion to inspire at least one request for the legal opinion of the office of

the City Attorney (9-12-46) which in brief stated:

1. Under Ordinance No. 73,014 the Principal Street Traffic Engineer is required to report directly to the Board of Police Commissioners on matters of street traffic accidents and congestion, and other conditions affecting the safe and convenient use of the streets, etc.
2. On matters which are not inherently police work and are under the province of the Traffic Engineer it is "required that the Board seek the advice and counsel of the Traffic Engineering Bureau and avail itself of the services of the Bureau. The Board is not bound by any recommendation of the Bureau."
3. The activities of the Board, the Chief of Police and the Bureau may be duplicated in many instances because of the dual source of authority.

Bureau of Street Traffic Engineering

The present effective ordinance (73,014) provides that it shall be the duty of the Board of Police Commissioners acting through the Bureau of Street Traffic Engineering:

1. To conduct studies of street traffic accidents and congestion and other conditions affecting the safe and convenient use of the streets.
2. To collect facts regarding the effect and operation of regulations controlling street traffic.
3. To conduct street traffic studies and other investigations relative to the location or placing, maintenance and operation of all street traffic signals, beacons, flashers, signs, and markings.
4. To prepare recommendations and plans for the installation, relocation or removal of all signs, signals, beacons, markings, etc.
5. To install, relocate or remove or cause to be installed, relocated or removed signs, signals, beacons, markings, etc.
6. To maintain or cause to be maintained all signs, signals, beacons, markings, etc.
7. To operate all traffic signals.
8. To recommend rules and regulations pertaining to parking or other use of vehicles upon the streets and public ways.

Other important functions of the Bureau not specifically enumerated by charter or ordinance are:

1. Investigation of traffic complaints.
2. Consultation service on traffic matters to the other several departments of the City.
3. The keeping of records pertaining to all functions and duties of the Bureau.

4. The maintenance and repair of automotive and other equipment used by the Bureau.

A rough classification of the personnel of the Bureau as listed for the calendar year 1947 in the annual report of the Police Department is as follows:

Clerical	14	Construction super. . .	1
Laborers	42	Checker-investigators .	13
Painters	63	Traffic engineers	8
Auto Mechanics . .	5	Electrical engineer . . .	1
Electricians	43	Principal traffic eng'r .	1
Total — 191			

The 1948-49 Budget contains provision for increasing the number of employees in some classifications, to give the following totals:

Clerical	20	General Foreman	1
Laborers	59	Checkers-investigators.	19
Painters	77	Traffic Engineers	10
Auto Mechanics . .	5	Radio technicians	1
Electricians	66	Principal traffic eng'r .	1
Draftsmen	7		
Total — 266			

Although many of these positions are not now filled it is contemplated to materially increase the number of employees in the skilled, semi-skilled and unskilled classifications with only slight increases in the clerical and professional classifications. (See chart of organization recommended in Chapter VII.)

One of the current problems lies in traffic signal installation. It has been estimated by the Traffic Engineer that if no additional signal installations were authorized by the Police Commission it would take approximately two years for the outstanding authorized installations to be completed at the present rate. There are at least two primary limitations to the number of crews that could be assigned to accelerate the present rate of installation—the shop, warehouse, and equipment facilities of the Bureau, and the availability of traffic signal equipment for installation.

Most traffic signal installations authorized by the police commission are the result of a citizen's complaint investigated and recommended upon by the Traffic Engineering Bureau. Many requests have been made through city Councilmen who have naturally carried the interests of their constituents directly to the Traffic Engineer. In this way pressures are brought to bear upon the Traffic Engineer and the Police Commission which result in authorization of signals which on the basis of need could not compare

in priority with other installations either already authorized and not yet installed, or not yet authorized. Some installations have been authorized for as long as two years before installation, while others have been completed and in operation prior to approval by the Police Commission.

In a city where the variety of traffic problems is so serious, and where the city lags in the provisions of controls, it is doubly important that such controls be placed in use so that the utmost benefit is realized with each installation.

Considerable time is spent by the Principal Traffic Engineer in advising other city departments on traffic matters. In every case this is entirely a voluntary cooperation and no other department is obligated to abide the Traffic Engineer's advice or judgment. Although cooperation between city departments is close, at times there is failure to coordinate activities through oversight or through disagreement, which means no action or possibly bad action.

Department of City Planning

As provided in the Charter, (Sec. 94) the "Department of City Planning shall have and exercise all the powers and duties which are now or may hereafter be granted to or imposed upon City Planning Commissions or Departments by State law." Consequently, certain powers are granted and imposed by the Conservation and Planning Act of 1947. These powers deal mostly with the master plan and its enforcement. For example, Article V requires that each planning commission shall prepare and adopt a long-term general plan for the physical development of the city, such plan to be known as the "master plan." All or portions thereof may be adopted by the legislative body (council). It is required that the master plan include a Streets and Highway Plan and a Transportation Plan including a comprehensive transportation system, and a Transit Plan, including a proposed system of transit such as street cars, motor coaches, etc.

A significant provision of Article VII requires that whenever the legislative body of a city or county has adopted a master plan, no road, street or highway or other public way shall be acquired or abandoned, or any public building erected until the location thereof has been submitted to and reported upon by the Planning Commission.

Section 95 of the Charter provides that the Director of Planning shall:

1. Subject to direction of City Planning Commission, prepare the master plan for the physical development of the city.

2. Prepare all proposed zoning regulations.
3. Investigate and report on the design of all proposed sub-divisions.

Despite the close affinity between traffic administration, planning and land use, as described in Chapter III, and despite the fact that probably the most important consideration in the master plan is traffic, too little has been done in coordinating these activities. The Charter (Section 95½) provides for a Coordinating Board composed of at least 11 officers of the city to advise with and assist the Director of Planning in preparing the master plan. Absent from this important board is the Chief of Police and the Principal Street Traffic Engineer.

Under Charter provisions, no council action may be taken on the following matters unless the ordinance, order or resolution has been submitted first to the Planning Commission for report and recommendation concerning the relation of the matter to the master plan:

- "1. The acquisition, establishing, opening, widening, narrowing, straightening, abandoning or vacating of any public street, road, highway, alley, square, park, playground, airport, public building site, or other public way, ground, or open space.
- "2. The location and appearance of any bridge, viaduct, subway, tunnel or elevated roadway

for the use of pedestrian or vehicular traffic or any public building.

- "3. The creation of districts or zones for the purpose of regulating the use of lands, density of population, the height, bulk, location or use of buildings therein, or the size of yards, open spaces or setbacks adjacent to buildings, or the changing, amending or altering of any such zones, districts or regulations."

In the Annual Report of the City Planning Commission entitled "Accomplishments" 1947, 10 of the 48 pages are devoted to the Highway Plan, Freeways, and Parking. This indicates an awareness of the importance of the traffic problem to the proper development of the city, and through zoning, subdivision design, and the master plan, a certain amount of the management of the traffic problem is in the hands of the Planning Commission. In discussion with the Planning Commission, it was found that there is a considerable interchange of information between the Principle Street Traffic Engineer and the Commission, but that there is a growing need for coordination.

In the report referred to above it is indicated that the Planning Commission is conducting its own off-street parking study. Listed among the objectives are: to establish a sound basis for determining the amount of parking space required in relation to

Gaps in Los Angeles are rapidly filling in. Here a new development is shoving its way into the bean fields of southwestern Los Angeles.

Only through coordination of zoning, provision of traffic facilities, and traffic management can the interests of the city be best served.



merchandising floor areas; and to determine the relative amount of parking space required by different types of commercial businesses. An off-street parking study on a broader basis is needed. Properly this function should be handled by traffic administration, since off-street parking is a major factor in meeting the responsibility of providing efficient street operation.

Under provisions of the Conservation and Planning Act of 1947 the master plan must include a Plan of Highways. The outstanding feature of the highway plan, is the freeway principle as applied to a 10-year, 163-mile program of freeways for the Los Angeles area. Under present conditions the City Planning Commission actually places only a stamp of approval or perhaps aids in the origination of the general plan. In the planning of detailed location, where there is a choice of alternate routes of a freeway of the general plan, the City Planning Commission has little or nothing to say as to that location.

Nothing now in progress is so significant to the development and future pattern of the City. Freeways are the framework upon which the City will grow. They assist in rehabilitation and redevelopment of blighted areas. The planner has the information and ability upon which can be based judgment as to specific locations insofar as each will affect land use. Engineers, of course, have knowledge of other factors bearing on actual construction which must be considered in choice of specific locations. But only when all factors, including land use and service to traffic, are considered in proper balance will the freeways bring maximum value to the community.

Department of Public Works

The Department of Public Works created by the Charter is under the management of the Board of Public Works composed of five full-time members.

The Charter provides that the Board of Public Works shall have charge, superintendence and control of the construction and maintenance of all streets, avenues, alleys, lanes, boulevards, crossings, bridges, viaducts, subways, tunnels and other subterranean avenues for travel, public places, rights-of-way, etc. The Board shall have charge of all work and improvement in, on, over or under all such, streets, places and properties. Also, the Board has charge of the cleaning, sprinkling and lighting of all public ways.

Powers and duties of the Board of Public Works of specific interest to this study are performed by three Bureaus—The Bureau of Engineering, the

Bureau of Street Lighting, and the Bureau of Street Maintenance.

Bureau of Engineering

In addition to his position as an officer of the city as named in the Charter, the City Engineer serves as head of the Bureau of Engineering.

The Bureau of Engineering operates through four district offices—Central, Harbor, Valley, and Western—and is divided into the following divisions: Administration, Special Projects and Co-ordinating, Maps and Surveys, Street Opening and Widening, Street and Parkways, Bridge and Structural Design, Beach Design, Storm Drain Design, and Sewer Design. The District Offices perform most of the functions of the Bureau in a decentralized operation.

The Street and Parkway Design Division has charge of all design of parkways in the entire city. In the cases of State highway projects within the City, the Division functions as an agency of the State for designing the projects. Other functions of this Division, however, apply only to the Central District. These include the design of all surface street and highway improvements including intersection re-design. Even though this division is staffed with men with specialized experience in modern design for traffic, it is not permitted to perform surface street design functions for the District Offices.

Through its various districts and divisions, the Bureau of Engineering finds it advantageous to consult the Traffic Engineer frequently on matters involving traffic. Design functions often require as a prerequisite knowledge of traffic volumes, character, etc. In many instances, the Traffic Engineer does not have the information, and makes special studies. However, because of staff limitations, this cannot always be done, and the Bureau of Engineering often must proceed with inadequate information.

Bureau of Street Lighting

Under the direction of a Street Lighting Engineer, the Bureau of Street Lighting is responsible for the lighting of all public ways. The Bureau, however, has been unable to cope with lighting needs, and has reported that of the 1,000 and more miles of major streets, approximately 300 miles are lighted and less than 50 miles have lighting which meets the minimum standards of adequate lighting for traffic needs.

The principal reason for difficulty in lighting for night traffic is in the method of financing. Maintenance of lighting systems comes from the assessment of abutting property owners, and can only be done

where assessment Lighting Districts exist. At one time this was proper, when major benefit from street lighting was received by the abutting business. But now good lighting is a necessity for safe movement of both vehicles and pedestrians at night.

Some so-called "safety lighting" is installed by the Traffic Engineer at hazardous locations. A considerable amount of intersectional lighting is also installed by the Street Lighting Engineer as a treatment of high accident frequency locations where numerous pedestrian fatalities had occurred. This work has been effective.

Throughout the United States, street lighting has demonstrated its effectiveness in reduction of night accidents to vehicles and pedestrians. Street lighting should be gauged to the needs of traffic and not merely to ornament a neighborhood. Adequate intersection lighting has been proven particularly beneficial.

Bureau of Street Maintenance

The Bureau of Street Maintenance is responsible for street maintenance, resurfacing, and replacement or excavations, and for the installation and maintenance of street name signs.

The Bureau utilizes a combination of traffic volume figures with a roughness test to determine priority of resurfacing and for projecting annual budgets. The Traffic Engineer usually is unable to participate in planning the scheduled resurfacing, thus eliminating the possibility in many instances of developing some streets as heavy carriers. Traffic, in these instances, must be attracted to poorly surfaced streets before the justification for resurfacing is demonstrated.

Through the use of the "formula" for determining priority for resurfacing, the Street Maintenance Bureau is able to circumvent pressure in the distribution of its services.

When a street is to be closed or its use impaired by a resurfacing operation, the needs of traffic are considered through a discussion with the Traffic Engineer, or the Chief Engineer of Public Utilities in some cases. The recent resurfacing of 5th and 6th streets was worked out with cooperative planning by city agencies and the abutting property owners and operators. This particular project necessitated night and Sunday work to minimize interference with traffic.

State and national aspects of Los Angeles' traffic problem are emphasized by busy arteries such as Cahuenga Freeway, a cooperative project of the Federal government, state and

city. To better serve traffic, it is essential that city traffic administration be fitted to work more efficiently and authoritatively with other government agencies.



Department of Public Utilities and Transportation

Since 25 agencies provide local transportation, and with four major lines alone carrying a half billion passengers yearly, the traffic responsibilities of the Department of Public Utilities and Transportation are heavy.

Charter provisions for the Department are broad. Its duties cover everything from granting mass transit franchises to determining proper services and charges with major decisions, of course, subject to Council approval or veto. Through the Motor Vehicle Division, operation of motor vehicles for hire is regulated. This includes examination of drivers and issuance of identification cards and permits.

One trying problem faced by the Engineering Division of the Department evolves around the sharing of the same right of way by transit operators and other motor vehicles. A variety of factors interfere with the desired free flow of traffic when that traffic is interspaced with mass transit vehicles—a few are: location of car stops with respect to signalized locations, location of bus stops, and location and design of loading zones.

Location of bus routes, for example, is a problem which calls for the continual interchange of views between the Engineering Division and the Traffic Engineer. Here again, agreements are reached cooperatively and voluntarily; there is no mandatory provision for consultation on common problems. When routes cross city boundaries the approval of the California Public Utilities Commission is required.

Considerable time has been devoted by the Department to planning for the future, with emphasis on the working out of an integrated rail rapid transit system. Much of the Department's work has been in cooperation with other interested agencies and with consideration to independent studies. In its annual report for 1946-47, the Department points out:

"The need for a rail rapid transit system for the full and proper development of the Los Angeles Metropolitan Area has been recognized in all mass transportation reports in this area in the last fifteen years. The practical solution to the problem of routes is the establishment of rail rapid transit facilities within the freeway rights of way.

"The problem is particularly pressing now because of the rapid development of the program for freeway construction throughout the area. The freeways will further add to the already serious traffic conditions in the business and shopping

districts if they are not augmented by an adequate rapid transit system capable of competing with the private automobile."

An increasing tendency is noted in the city to distinguish between providing adequate facilities for private automobile traffic and of providing for mass movement by private carriers. The two problems, in the opinion of the Traffic Survey Committee, are identical in the end result desired, the safe and expeditious movement of persons and material. Only by attacking the problem with a basic factual approach, determining total volumes to be moved and with accurate knowledge of the lines of travel desired by people, can there be economy and an end to guesswork. Such information does not now exist, and it can be obtained only by fact finding such as is done through the origin and destination study outlined in Chapter VI.

Police Department

Enforcement of traffic laws is a particularly vexing problem in cities where street accommodations fall far short of needs. In Los Angeles the problem is accentuated by large volumes of rush hour traffic which if it did not move with fair speed when it could, would result in even more hopelessly clogged streets. The shortage of adequate street facilities emphasizes the need for the closest of coordination and cooperation between the Police Traffic Bureau and the Bureau of Street Traffic Engineering.

The Police Department, under the Board of Police Commissioners, handles traffic enforcement through the Traffic Bureau, headed by a Deputy Chief of Police. After this Bureau was carefully studied by the International Association of Chiefs of Police, many resulting recommendations for organization and operation were adopted.

It should be noted that while the Bureau of Street Traffic Engineering is technically in the Police Department, the Traffic Engineer reports directly to the Police Commission. In contrast, the Deputy Chief of the Traffic Bureau reports to the Chief of Police.

Parking regulations often are posted which cannot be enforced because of manpower shortages, or are not enforced because they are believed unreasonable. This leads to a growing disrespect by motorists for posted regulations.

Since the Traffic Bureau at times receives no notice of new regulations, signal or other installations, traffic officers are instructed to report new developments so that headquarters' records may be

kept. Motorists have the right to expect ample warning of changes in traffic control, but this cannot transpire when the police are caught unaware also. Without a "breaking-in" period, motorists feel they are unjustly cited for violations.

Through the Accident Investigation Unit and the Statistical Unit of the Traffic Bureau, an excellent compilation of accident records is maintained. The enforcement agency uses the data for applying selective enforcement, covering driving habits as well as locations. The traffic engineering bureau uses the data for processing complaints and in making special studies.

In an administrative study of this kind, it is impossible to measure the cost, in accidents and in barriers to free travel, resulting from lack of cooperative effort between enforcement and traffic administration and control. It is clear, however, that were full cooperation to exist, benefits to motorists and taxpayers would be huge in safety and time savings.

Los Angeles County Regional Planning Commission

In making a complete inventory of present duties and functions, it is necessary to list several governmental agencies which are not part of the city administration, but work with it. Of considerable importance in this category is the County Regional Planning Commission. Provided for by the Conservation and Planning Act of 1947, the Regional Planning Commission is responsible for the master plan of the region. This interest overlaps that of the City Planning Commission when consideration is given to streets and highways of regional character, arteries which carry traffic through the municipality from an origin and to a destination outside. There is close conformance between the Regional Master Plan of Highways and the City Master Plan.

An important activity of the County Regional Planning Commission is that of making special county-wide studies on such problems as land use, parking, and traffic circulation. Consequently much data of interest and value to the city has been gathered by this agency. With these data gathered for planning purposes and by the county rather than by a city agency, it is doubtful that their full potential value has been utilized by departments concerned with the management of traffic. On the other hand, absence of such data in a city agency has made it necessary for the county to conduct studies. A

closer coordination and a better planned approach no doubt would result in considerable savings in overlapping activities.

The Regional Planning Commission is also a cooperative agency in discussions which result in the location of freeways for the region. There must, of course, be continuity of the freeways through the area and the Regional Planning Commission contributes greatly toward this end.

State Division of Highways

The State Division of Highways has the responsibility of the maintenance and control on State Routes through cities. This makes possible uniformity of control and greater efficiency of movement of regional traffic through the cities of the State.

In all but the largest cities, State Highways are the most important and heaviest traveled thoroughfares. In Los Angeles, however, recognition has been given to the need for the primary consideration of the overall urban problem of movement where State highway routes are of lesser importance and must be carefully integrated into the City's master plan. This recognition has resulted in a revocable agreement between the City and the State which provides for the City to maintain the operation and control on State routes and to be reimbursed for its work with State funds. The City, therefore, of necessity follows State standards for uniform control and operation on State routes, and by choice on all other streets and highways of the City. As new work gradually replaces the old, non-uniform treatment, there will be noticeable gains in the uniformity of traffic control devices.

The State Division of Highways retains the primary supervision of construction and design and maintenance and operation of new State freeways through the city. In construction of the freeway program it is necessary for the City to enter into a contractual agreement covering the location, routing plans at interchanges, etc. The Division of Highways by reason of its organization is able to funnel all of its functions related to location, rights-of-way, design, lighting, construction, through one contact—the Assistant State Highway Engineer located in the District Office. The City, however, by reason of present scattering of responsibility for street and highway matters, is unable to offer a single office of contact to the State.

In the present program the City Engineer has

coordinated the activities of the Bureau of Engineering, the Bureau of Street Traffic Engineering, the Public Utilities Commission, the City Planning Commission, the Bureau of Street Lighting, the Bureau of Maintenance, and of all departments having jurisdiction over underground structures such as water, gas, electricity.

A Substructures Committee of city departments has been asked to assist and considerable improvement in State-City relationships has been achieved. However, the city situation caused difficulty in reaching an agreement. This necessitated frequent changes and delays. Such conditions add to cost considerations in construction bids received by the State Division of Highways. The Substructures Committee, while only improvised, demonstrated the need for, and value of, coordination on a continuing basis for all matters having to do with traffic operation.

Los Angeles County Road Department

Another county agency concerned with traffic is the Road Department organized more inclusively of highway and traffic functions than is any city department, and paralleling more closely the organization of a state highway department.

The three functions of traffic control, highway construction, and highway maintenance are under the Road Department. It is the Road Department that provides continuity of control and maintenance at the city boundaries. With the exception of the functions of the County Traffic Engineer, there appears to be little need for consultation and discussion between the Road Department and the various departments of the city. No special County-City problems appear to be created by reason of the divided traffic administration of the City.

Freeways such as Arroyo Seco impose terminal problems—ingress, egress and parking—which can be solved only through special and continuing studies, and through planning.

The picture below shows congestion on an approach to Arroyo Seco. Traffic flows evenly and freely once it reaches the freeway.



ALTHOUGH sole responsibility for management and control of traffic rests with the city government, over the years substantial assistance has been given by private agencies. This cooperation takes many forms, through special studies, through aid directed at better public understanding of specific traffic problems, through provision of helpful data on business and industry, and through general education work in traffic safety.

Only through continued active interest of non-official groups, and the great body of thoughtful and aggressive individuals of which they are composed, can come success in meeting any city-wide problem, whether it be in education, park development, or in traffic. Los Angeles is particularly fortunate in the vast amount of time devoted to traffic by a wide variety of groups. The activities of some of these groups are briefly discussed in alphabetical order.

Automobile Club of Southern California

This non-profit organization has the primary function of serving its motorist-members, and so contributes heavily to solution of general and specific traffic problems. As the natural repository of volumes of complaints and suggestions, the Club has been particularly helpful in supplying useful information, and in conducting continual programs of traffic safety education. Its work toward a uniformity of laws and of regulatory devices has been of outstanding value throughout the Los Angeles and Southern California area. The Club's report in 1937, one of many special studies, proposing a motorway system in its overall plan was a vital step in the current freeway program.

Central Business District Association

Although originally this association of general membership devoted its attention to central district problems only, it has expanded its interest to cover the welfare of the entire city and metropolitan area. This group was co-sponsor with the Traffic Association in 1927 in organizing the Citizens Transportation

Survey Committee which resulted in completion of a two-year study and report on both the Parkway System and the accompanying rapid transit plan of that period.

Chambers of Commerce

Throughout the Los Angeles area, local Chambers of Commerce have long taken an active interest in street traffic matters, many of them following through in supporting official programs. Although primarily interested in their own neighborhoods, a gratifying amount of cooperation with other area groups is evidenced.

Major effort is directed through the Los Angeles Chamber of Commerce which serves as a coordinating agency. In 1946 the Chamber formalized its work seeking street traffic betterment through the creation of the Metropolitan Traffic and Transit Committee. Today that Committee consists of some 200 members from every segment of Los Angeles County. These members represent business, industry, transportation and government and include technical advisors from private and civic organizations. To expedite its work the Committee studies the various parts of the traffic problem through five sub-committees. In addition to the Committee, the Chamber generates aid and advice through its long established Transportation Department which provides information on the services of railroads, steamship lines, aviation and trucking.

Downtown Business Men's Association

Representing major retail stores, the Downtown Business Men's Association has recognized the importance of a free-flowing traffic and of adequate parking through special studies conducted by the organization's operating personnel. Provision of adequate parking is a major interest of this group which in 1944 issued a stimulating report on parking needs and solutions which won both local and nationwide recognition.

Los Angeles Chapter of the National Safety Council

Reflecting the high standards and goals of its parent organization, this non-profit group covers all fields in its accident prevention work. A full measure of attention is leveled at traffic safety. Composed of public-spirited leaders from industry, business, government, schools and the professions, the Council has made material contributions to traffic accident reduction, particularly through its educational work and analyses of accident causes and costs.

Traffic Association

The Traffic Association, continuously active in the effort to improve traffic conditions, is the successor to the Los Angeles Traffic Commission formed in 1924 to prepare a plan for a system of major thoroughfares. The Association in 1933 contributed what is known as the Baker Plan for a rapid transit system. In 1937 it organized the Citizens Transportation Survey Committee which sponsored an exhaustive study of traffic and transportation to formulate definite plans for accomplishing traffic improvements throughout the entire metropolitan area.

Transit Companies

With their vehicles composing a substantial part of the traffic stream, transit companies have been active participants in solution of a wide variety of traffic problems both of a general and engineering nature. They have given extensive assistance in seeking more efficient use of streets in cooperative work with traffic officials and civic groups.

Trucking Companies

Similarly, trucking companies have an all-important stake in easing traffic flows and making travel safer

which they recognize in cooperative work. In addition to cooperation given public officials many of the trucking companies conduct driver training programs and follow policies aimed at improving street traffic conditions.

General

Many other organizations in various ways make vital contributions to traffic problem solutions. The All-Year Club, for example, supplies helpful information on tourist travel and expenditures. Service clubs, often through special committees, women's clubs, fraternal societies, insurance groups, all are potent forces. The Women's Auxiliary of the Los Angeles Chamber of Commerce and the Junior Chamber of Commerce, in assisting with "Operation Safety," the Parent-Teachers Associations, in their continuous concern with school child pedestrians and high school driver training, are likewise key spokes in the traffic wheel. Invaluable publicity and promotion comes through newspapers, the advertising profession, radio and the motion picture producers and theaters.

Cities owe much to public interest in civic affairs made vocal through organized groups which provide common meeting grounds for discussion, agreement and action. The groups mentioned above are essentially public support groups, the local centers that have helped make Los Angeles the great city it is. Yet they must look to their city government for official programs which they can accept, amend or deny. It is incumbent upon the city to conceive sound programs, and of equal importance, is the responsibility of the city to provide the public with full knowledge of those programs. Solution of the overall traffic problem in Los Angeles is dependent in extremely large measure on the continuing support that only organized groups can give.





Los Angeles' destiny is controlled by many factors. An important function is maintaining a free-flowing, safe traffic. This is the immediate responsibility of the city, and it is the concern of all citizens. Organized groups must continue to aid in the development and establishing of sound, planned traffic management programs. One-way traffic on Fifth and Sixth Street illustrates one of the traffic engineering devices used.

IN A NATION surpassing all others in scientific achievement and standard of living, it is difficult to understand why cities have been fumbling and groping in solution of their traffic problems. Failure to meet traffic needs is manifest not only in huge losses in life, injury and property, but in distorting the pattern of urban development and economy.

To find out if Los Angeles people really were concerned about the traffic problem, and to get a measure of thinking on cures, the Traffic Survey Committee asked a civic group to query its members. Questionnaire response was excellent, with many leading businessmen contributing lengthy, studied comments. All were worried over traffic conditions; nearly all suggested one or two solutions. Only one expressed the need for a broad factual approach on all fronts.

Since controls used in traffic management appear simple and are relatively few, many are inclined to think traffic pains can be treated with a few signals, signs and a paint brush. In actuality, all tools must be used with care and in a scientific, planned manner.

Proven controls and methods must be uniformly applied, with facts forming the foundation for all

standards and policies. Facts should determine: ways to make most efficient use of today's facilities, location and design of new facilities, needs and methods of attack on the parking problem, and needs of rapid transit. Again, only through facts can divergent views be reconciled. Facts are necessary to obtain public understanding and support and to answer complaints and pressures.

In this area during the next decade, expenditures of about \$300,000,000 will be made for freeways alone, and additional huge sums will be needed to complete the system. Other large amounts will be spent for routine street construction and maintenance. The city cannot afford to spend unwisely a single dollar for traffic.

Moreover, whatever is invested in freeways, or for rapid transit, will not bring the traffic problem to conclusion. Each development is urgently needed, and each will perform a vital task in the general solution pattern. But freeways will create new problems and generate more travel, as will rapid transit.

In view of all factors, it would be folly not to make the best possible use of the streets that are here today and will be tomorrow.

Section 1. Traffic Operations

To obtain utmost benefit from each control device and regulation, sound traffic management will follow a procedure such as is outlined:

1. Evaluate the problem by analysis of traffic, including a qualitative study as well as quantitative.
 - a. Volume studies
 - b. Origin and destination of traffic
 - c. Analysis of traffic characteristics of specific location
2. Locate the source of the difficulty by analysis of experience
 - a. An accident analysis in detail
 - b. A careful study of the physical characteristics of the area in question as they relate to movement of traffic
3. Apply treatment on the basis of priority of need
 - a. Apply available regulations or devices on the basis of priority placing treatment where the need is greatest and where most can be accomplished
4. Evaluate results and adjust standards and policies on the basis of experience
 - a. An accident analysis comparing "before" and "after" experience
 - b. An analysis of volume and flow characteristics "before" and "after"
5. Report
 - a. To the City administration so it can more intelligently and confidently support sound traffic management
 - b. To the public through various media so that greater public confidence and support will accrue to the administration and to the soundness of traffic management

Control Measures and Devices

Traffic signals, signs, and pavement markings are the chief links between motorists and pedestrians, and traffic administration. Unless properly used, of clear meaning, visible, and convey instructions that are reasonable, they fail of their purpose.

The need for facts and their planned usage, for both individual installations and for a general overall planned approach, can be made clear by understanding the purposes of devices and control methods and how these can be applied most effectively.

Traffic Signals. These have the purpose of assigning right of way and regulating traffic so that it will flow smoothly and safely. At this writing there were 1,220 signalized intersections in the city, of which 724 were of the semaphore type, now being gradually replaced, and 496 were of the standard three-lens type.

During 1947 the Street Traffic Engineering Bureau was authorized by the Police Commission to install 297 signals at intersections and to remove signals at four others. A total of 135 new installations were made at intersections and replacements were made of outmoded equipment at 12 other locations. The box score for the year was a lag of 154 intersections. In terms of time, the Bureau was seven months farther behind at the end of the year than at the beginning. This incongruity results from the tendency to grant approval for installations more rapidly than equipment can be purchased and installations made. Under this procedure a lack of priority exists, with recent demands often met in advance of earlier requests without regard to comparative benefit.

While progress has been made in synchronized signals, most signals are not inter-connected. Outside the central traffic district, Sunset to Pico and Figueroa to Los Angeles, which are predominantly inter-connected, there are about 30 miles of cable connected traffic signal systems. The value of inter-connection lies in the fixed time relationship which can be kept between various signalized intersections so that traffic may move smoothly. On streets such as Wilshire, where modern equipment operates, the flexibility of timing permits adjustments to meet fluctuating traffic demands at any time during the day and on any day of the week. A factual study undoubtedly would indicate justification for immediate extension of inter-connected, flexible-progressive traffic signal systems, and rapid replacement of all present outmoded equipment.

For years Los Angeles has followed the policy of

placing signals on arterials at every quarter-mile point wherever possible and where the traffic justifies signal control. This policy is based on the fact that a checker-board system of signals at quarter-mile intervals provides a progression of traffic at 30 mph in all directions when a 60-second cycle is used. However, this cannot be achieved in Los Angeles for the street pattern is such that intersections are not always available at quarter-mile points, and sometimes a quarter-mile point does not require signalization as much as do other points not so conveniently located. Traffic troubles are caused by the city's religious adherence to the quarter-mile points, whether a signal is really needed or not, and by the practice of stretching the green light where the street pattern interferes. Speeding results, and pedestrians who have a top speed of about four miles an hour have difficulty crossing the arterial when the red lights are short.

An advanced traffic engineering approach would not zealously stick to the quarter-mile system, but would place signals with flexibility of timing at locations of greatest need to provide utmost progression of traffic.

To meet city-wide traffic demands, a priority system of signal installation should be followed. The priority of treatment should result from factual studies—of traffic volumes and accidents and deaths. This, of course means first attention to the heavy volume arterials. However, at the same time there should be a sister program aimed at expanding arterial signal systems and for meeting, as they arise, serious intersection problems at isolated locations. Any availability of equipment and manpower above the first priority should be used for the latter schedule, again on a priority basis.

Such a program, geared to needs and with its factual basis and established priorities, would minimize unwarranted installations.

Traffic Signs. Traffic signs cover a wide range of uses which fall under three classifications, informative or warning, directional, and regulatory. The latter includes stop signs, speed signs, turning movement controls, parking and kindred signs. All signs should be used in a consistent manner, on the basis of established "warrants" or reasons, and only after factual consideration. Judiciously used, traffic signs offer the greatest benefit to traffic at the least cost. Traffic signs of various kinds are indispensable in effectuating major traffic control measures.

Stop Control. Promiscuous and inconsistent use has been made for many years of stop signs in Los Angeles, the abuse being greater than that of the traffic signal. No accurate inventory of stop signs can be made at present without a special study covering the files of the traffic engineering bureau, and field research. Again, the abuse stems from the administrative system which tends to encourage assent to complaints without factual study.

Improper uses of stop signs include installation for speed control, for school child pedestrian protection, to discourage travel on a street, and to satisfy exaggerated and mistaken opinions of citizens in regard to hazards at intersections. A basic weakness in such cases is that for all or most of the time traffic should not be stopped. When that happens, motorists become heedless of the signs. Often, other types of treatment should be used.

Stop signs should be considered as an intermediate step between no control and signalized control. The three general warrants for stop signs are:

1. To designate a through artery and to protect traffic on that artery from encroaching traffic.
2. To assign right of way at hazardous, low-volume intersections.
3. To protect traffic at intersections of poor visibility.

Trucks may be described as the red corpuscles of Los Angeles' traffic stream. Yet they impose special problems in routing, signal installations,

Speed Control. At present, speed signs in Los Angeles are of little value. Signs posting a limit of 25 mph are violated by most motorists in all but the most congested areas. The basic reason for violation is motorists will not tolerate unreasonable limits, such as they find when 25 mph signs are placed in many locations where higher speeds are proper and permitted by present enforcement practices.

In many cases, the 25 mph speed is proper, but believing the sign indicates an approximation, the motorist is led to travel at a speed unsafe for actual conditions. Similar conditions prevail in rural areas where properly a 45 mph limit has been posted but the disrespect created in the minds of motorists by the "approximation" type speed sign reduces obedience of the posted limit.

Until recent amendment of the code, for years speed limits under state law were inflexible, varying by type of district—business, residential, school, and rural. The vehicle code now permits changing speed limits to meet varying traffic conditions within a district.

The only possible cure for the chronic and city-wide ailment of heedless speed is an extensive speed zoning program, to produce fair and reasonable speed limits that can and will be enforced.

and other matters, which can be met only through study, planning and intelligent action.



Pavement Markings. Los Angeles is noted nationally for its extensive and able use of pavement markings. In 1947, for example, the Traffic Engineering Bureau used 56,528 gallons of paint on the streets which included the painting of more than 3,000 miles of lane and center lines. Areas of need in the execution of this function are, however, development and evaluation of standards and warrants for painting and marking cross-walks, and for application of special plans for pavement markings at specific intersectional locations where unusual conditions exist. It is the general practice to paint cross-walks almost indiscriminantly at the request of citizens. In the minds of the pedestrian there has arisen a false feeling of security when walking in a painted cross-walk. The motorist has wrongfully been led to the false impression that pedestrian right of way as defined by California law exists only in painted cross-walks. An objective study of this problem is needed with the adoption of rigid standards and policies.

Maintenance of Control Devices. Maintenance of signs, signals and markings is of paramount importance, for a burned out signal lamp, illegible traffic sign, or indiscernible pavement marking, may impede traffic, or cause accidents, for which the city may be held liable. In maintenance, the traffic engineering bureau has an excellent record, for rarely are indications of neglect sighted. At all costs this maintenance performance must be held at its present high level.

Traffic Movement Controls

In a city of the variegated street pattern such as is possessed by Los Angeles, traffic administration can often accomplish startling results in freeing the movement of traffic. However, such procedures as banning turns, designating one-way streets, and using off-center traffic lanes at rush hour, must be wisely used. Unwisely used, such control measures can cause more confusion than ever, perhaps transferring an equally serious problem to another location.

Turning Controls. Although good progress has been made in Los Angeles, there are several turning control problems yet to be met.

At present, prohibiting left turns is accomplished by the use of portable pedestal signs without the complete prohibition by artery or area. Before permanent prohibition can be achieved or before intermittent turning movements can be well applied, careful consideration should be given the incon-

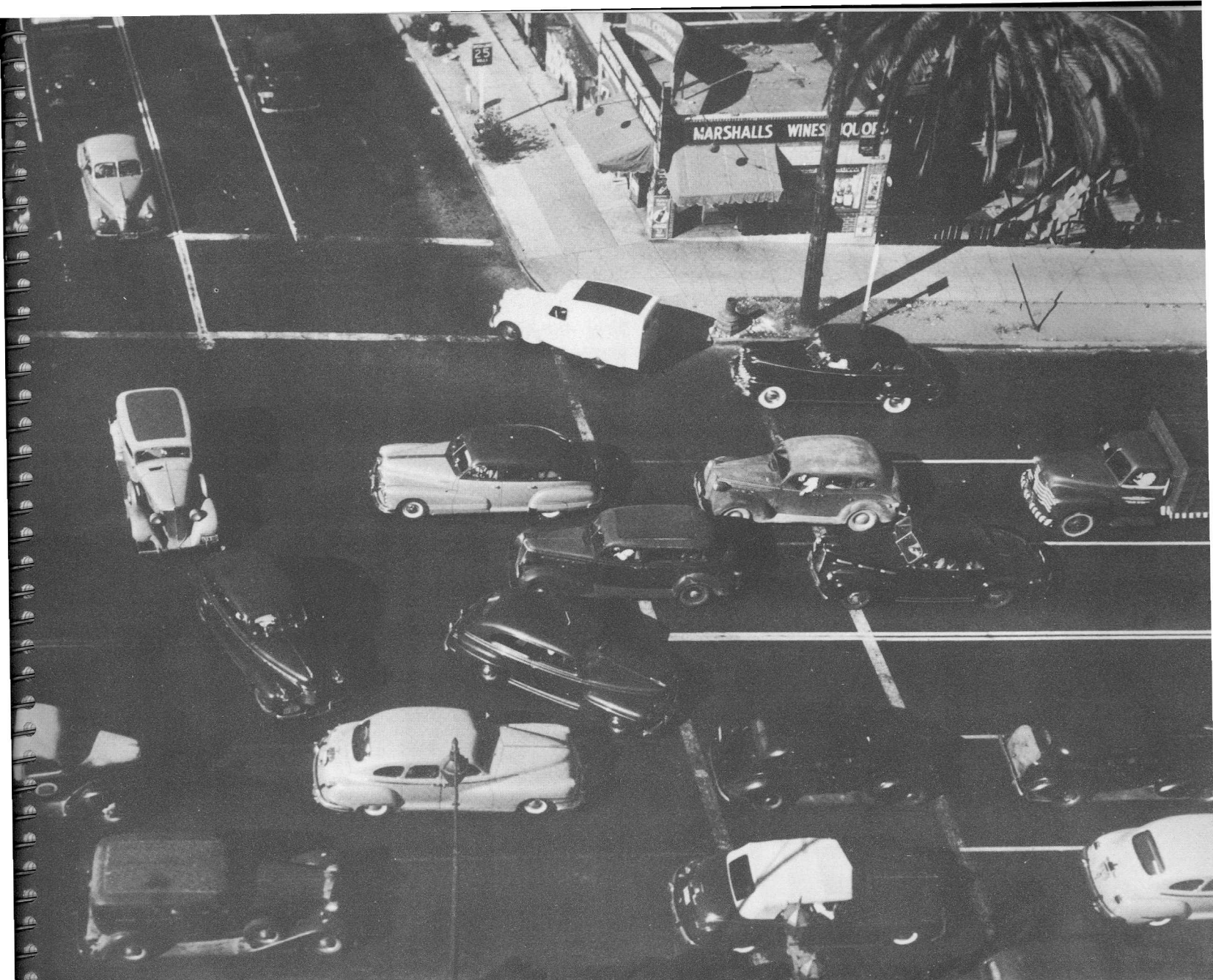
venienced traffic. Los Angeles' irregular street pattern does not always lend itself to left turn bans without disruption of traffic desiring to turn. No attempt has been made in Los Angeles to apply a factual evaluation of the inconvenienced traffic. Moreover, no informative signs are placed in advance of the banned area to warn motorists of the no left turns or to tell him how to proceed. Correcting this deficiency would add greatly to the respect of motorists for the traffic administration.

Another turning movement problem exists at the many tee intersections, where all traffic turns right or left. While basic provisions of the motor vehicle code make it illegal to turn from any lane but that nearest to the turn direction, there is provision made, however, for traffic engineering by sign posting to legalize turns from additional lanes as justified. Little use has thus far been made of this traffic expediting measure.

One-Way Streets. Although one-way streets are widely used throughout the United States and have proven their ability to speed up flows, Los Angeles has only one pair running for short distances. These are on fifth and sixth Streets in the Central Business District. Their success has resulted in popular demand for other pairs of east-west one-way streets, and for north-south flows on such streets as Figueroa and Flower.

One-way streets, when properly designated and controlled, will alleviate congestion, provide increased capacity and average speed, reduce accidents and lessen parking and signal timing difficulties. Yet they have requirements and disadvantages which must be carefully weighed.

To be effective, one-way streets should be in pairs and have continuity with frequent inter-connecting cross streets. Their full advantages can be reaped only when, rather than isolated pairs, a system of one-way routes is designated. The street pattern, itself, is a hindrance, as for instance in the Central Business District where there are few opportunities for one-way operation without some physical changes. Transit adjustments, possibly replacement of rail equipment with buses or trackless trolleys, must be considered. Inconvenience to motorists, too, must be weighed for on one-way streets many motorists must travel longer distances. A considerable amount of signing is necessary to insure one-way operation, and enforcement duties are heavy during the first few months until motorists become acquainted with it.



What may appear to be little things often are big factors in creating congestion and delay.

Here left-hand turns block traffic movement on the intersecting street.

Nevertheless, one-way streets have a definite place in the traffic control kit of tools. With the advent of the freeways, and their increased loads, Los Angeles has but little choice in the broadened use of one-way streets, particularly in the Central Business District. To meet present and pending needs, a special study should be made to develop a one-way street system, a study that would consider the needs of all elements of the traffic stream, the pattern of the street system, and the needs for physical changes. Developing this system would require the cooperation of the Board of Public Utilities and Transportation, the utility companies, the Board of Public Works and the City Engineer, the Board of Police Commissioners, the Traffic Engineer, and others. Carefully laid plans

would vastly increase the capacity of the street system without undue cost.

Off-Center Controls. Los Angeles is one of the pioneers and perhaps leads in the use of off-center or unbalanced control, which provides traffic with an extra lane in the needed direction at rush hour.

Off-center control minimizes delay and hazards caused by left turning movements where they must be permitted, and generally results in attracting greater volumes of traffic to the arterials on which the measure is applied.

In order to be effective, however, off-center operation must be incorporated in conjunction with prohibition of curb parking during the time of its

employment. In this necessity probably lies the greatest obstacle to more extensive use. It has been the practice of abutting business to violently object, particularly in districts on the fringe of the central area.

In Los Angeles the control of unbalanced flow has been accomplished by the use of portable pedestal signs which are placed and removed manually. This results in the need of unskilled labor during only a few hours of the day, who must have automotive equipment for transportation, and whose efficient employment during the remainder of the day is minimized. Costs are not great during a month, but they are continuing. Consequently, any control measure which could accomplish the same purpose, that of moving greater volumes of traffic more rapidly during peak hours, at a reasonable initial cost, would be more economical in the long run.

In order to accomplish the most judicious and beneficial use of the off-center or unbalanced flow principle, the following procedure is suggested:

1. Determination of policies and warrants
 - a. What ratio of unbalanced flow warrants consideration of off-center
 - b. What lane-density of the predominant flow warrants consideration of off-center
 - c. What lane-density of minor flow is to be the allowable maximum
2. Application of same policies and warrants adopted for the prohibition of curb parking during rush hours
3. Factual determination of traffic characteristics related to above warrants
4. Application of off-center movement only where warrants are met
5. Evaluation
 - a. Determining benefits to movement on a "before" and "after" basis, on the artery where off-center has been applied
 - b. Determining the effect on the movement of parallel arteries
6. Report
 - a. To city administration
 - b. To abutting property owners and operators

Control to Assist Transit. Street cars, buses and trackless trolleys have speeds and needs that differ from those of passenger cars and trucks. Constant attention must be given to the conflicting types of vehicles and adjustments made in proper balance for the greatest mutual benefit. This applies to location and timing of traffic signals, location of street car and bus stops, regulation of parking, and design of

streets and intersections. Closest objective cooperation must be achieved between management of utilities, the Utilities Commission, enforcement and traffic engineering agencies.

At present, authority is divided, resulting, for example, in frequent placing of street car and bus stops at unsignalized intersections a block removed from the protection of signalized control. The location of bus and street car stops is closely related to efficient street use and their determination should be participated in by the traffic engineering agency.

Intersection Re-Design

There isn't much that can be done about the inefficiency of the right-angle intersection of the ordinary pair of streets, but when more than two streets intersect often times it is possible to materially improve over the original layout.

When streets cross in irregular patterns or form multiple intersections, traffic movements are often complex and hazardous, such as at San Vicente, Fairfax, and Olympic, at Figueroa, Hoover, and Exposition, and at Alvarado and Glendale. These and many more form bottlenecks which ordinary treatment with traffic signals and stop signs cannot fully correct.

At complex intersections, the remedy is intersection re-design which would accomplish the channelizing of traffic into the smallest number of points of conflict.

The principle obstacle to re-design of intersections in Los Angeles is the complexity of the channels through which agreement can be reached between the engineering bureau, the traffic bureau, and the Public Utilities Commission (if transit operations are involved) and other departments of the city. The Traffic Engineer cannot affect the re-design of an intersection if the district engineer will not complete the construction or if the Public Utilities Commission or the transit operator will not agree to the necessary adjustment of operation whether bus or rail. Implementing the technique of intersections re-design, by placing the work in the traffic administration agency, many long-standing hazardous and congested intersections could be corrected.

Street Lighting

In the early years of street lighting, benefits were considered to be reduction of crime and general enhancement of property. Much of the light went skyward; too little fell on the street. Now, however,

movement demands of modern traffic are such that adequate vision must be maintained at all times if there is to be safety. Urban lighting has developed from an ornamentation to an integral part of the street traffic facility.

But street lighting has yet to grow up in Los Angeles because archaic methods of financing still exist. As pointed out in Chapter IV, maintenance of street lighting is financed by abutting property owners, so much needed lighting is not installed. Abutting property owners frequently, and properly, refuse to pay for a traffic feature of major benefit to passing traffic. On the majority of arterials, traffic has no interest in property along the way, but it does want light on the pavement.

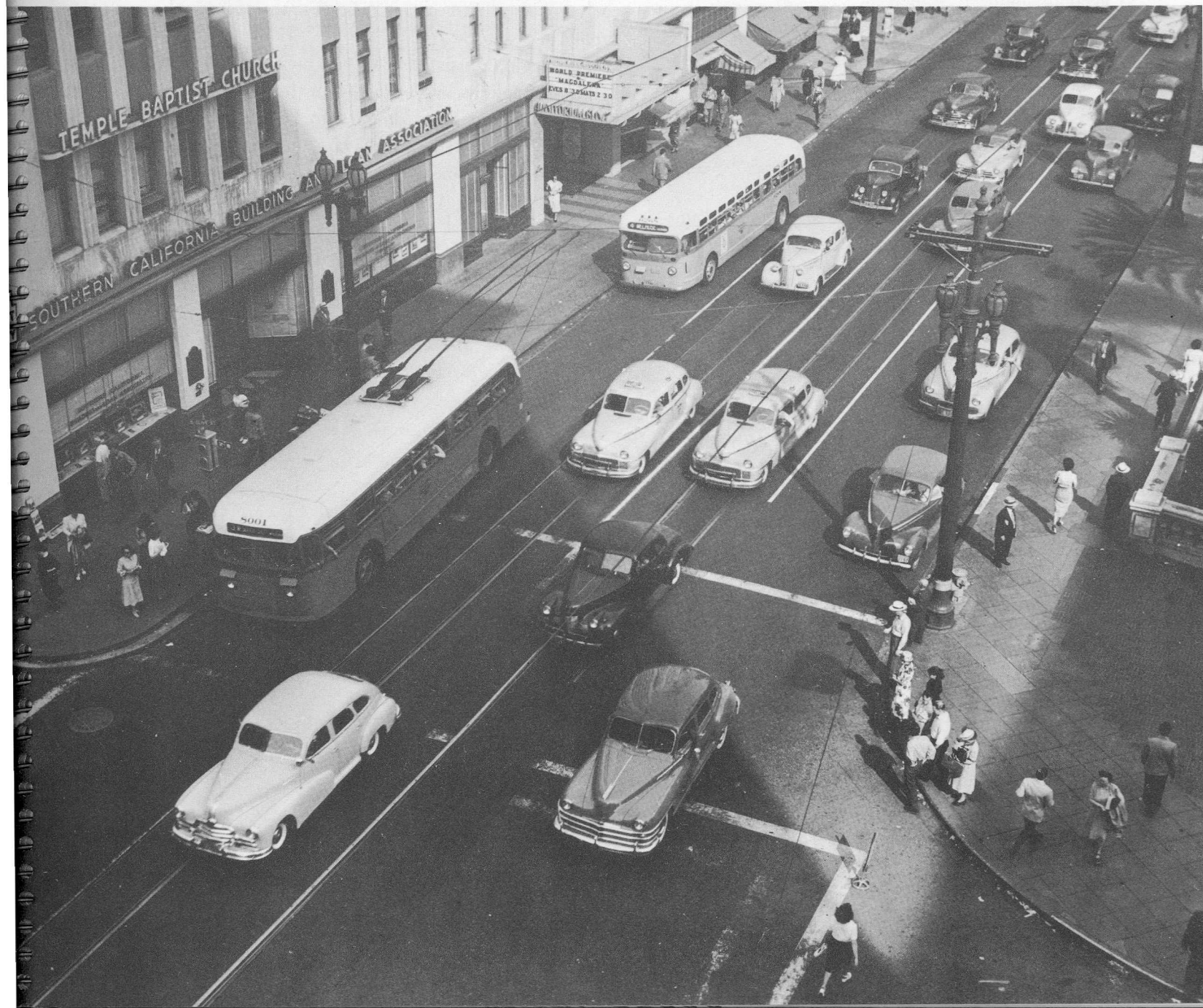
Since street lighting is so closely related to traffic control, a growing number of cities, including Kansas City, Mo., Milwaukee, Wis., and Syracuse, N. Y., are placing lighting in the hands of the traffic administration agency.

Accident Analysis

Excellent records of all reported accidents are maintained through the Accident Investigation Division of the Police Department and the Statistical and Analytical Units of the Department. In Los Angeles where in 1947 there were reported 393 fatal traffic accidents, 13,665 injury accidents, and an estimated 60,000 property damage accidents, a wealth of data

Full benefits of one-way streets can be obtained only when a system of one-way routes is designated, with the streets selected in pairs. Los

Angeles has only one pair, on Fifth and Sixth Streets.



is accumulated to show location, causes, time and date of accidents, and traffic conditions.

Yet full use of this information has not been made. Enforcement has been selectively employed, but positive corrective measures have not been applied on a broad scale to the most hazardous locations. A special tabulation of the most hazardous locations for 1947 indicated that 7,284 fatal and injury accidents occurred at 1,617 intersections. Fifty-nine intersections experienced more than 10 fatal or injury accidents and three had more than 20. Such a worst corner list should be compiled each year. Engineering, education and enforcement tools should then be applied in full force at these killer corners.

Parking Controls

The parking problem isn't one problem, but several related problems. All of them stem from the simple fact that there just isn't enough space along curbs to accommodate all vehicles.

Traffic administration, for the present at least, is stymied. More and more street space is needed for moving traffic, and at the same time need is increasing for terminal facilities. The problem is sharpened by the lack of commercial loading and unloading facilities. Matters aren't helped by the reservations that must be made for transit vehicles. All of these are legitimate and necessary uses of the street and must be accommodated in an equitable manner.

Since supplying off-street parking is costly, and there is lack of agreement as to responsibility, traffic administration must make the best of a very few bad choices. When regulatory decisions are made, ample warning should be given so that people affected may have time to adjust themselves to the changes. This has not been a standard practice in Los Angeles.

Elimination of Curb Parking. This is a drastic step, and when it becomes necessary to consider a permanent ban, or prohibition during rush hours, every effort should be made to balance conflicting interests. Careful analysis must be made of facts relating to volume of traffic, street capacity, parking demand, and parking supply for those discommoded. The recommended procedure is:

1. Determination of policy and establishment of warrants for the elimination of curb parking.
 - a. What lane density (volume) warrants consideration of elimination?
 - b. What exceptions, if any, will be made and on what basis?

2. Factual determination
 - a. Of current volumes and lane densities with parking at the curb.
 - b. Of estimated volumes and lane densities with parking prohibited.
 - c. Of numbers of vehicles currently parking at the curb during period of proposed elimination and the purposes of their business.
 - d. Analysis and evaluation of what provisions are available for discommoded vehicles.
 - e. Analysis of estimated improvements in movement vs. loss to abutting property.
3. Posting the regulation
 - a. After assurance that enforcement is available.
 - b. After abutting property has been notified of facts, warrants, impending changes and anticipated results.

Time Limit Controls. Sharing curb space through time-limit controls is the only efficient way to utilize curb space where parking begins to exceed the supply of space.

Here again, consistency should be practiced, consistency in policies and warrants for time restrictions, and above all, in enforcement. In Los Angeles, extensive areas of time limit parking are subject to no enforcement at all, or it is given spasmodically. There is only one way to correct this deplorable condition, and that is by a complete re-examination along the following lines:

1. An inventory of all existing posted restrictions.
 - a. Location and type of restrictions.
 - b. Evaluation of present enforcement practice of each location.
2. Adoption of policies and warrants for the posting of time limit controls.
3. Factual determination of those locations which meet those warrants.
4. An adjustment of all present posting.
 - a. Removing those time limit controls where warrants are not met.
 - b. Extending time limit controls to new locations meeting the warrants.
5. Consistent enforcement of all posted controls.

Parking Meters. In considering parking meters for Los Angeles, advantages and disadvantages should be realized. Important is the fact that meters do not bring miraculous results; they do not provide more curb space. They are an aid to enforcement but they do not replace enforcement.



(Above) Off-center or unbalanced routing gives predominant traffic an extra lane during rush hours. Off-center controls should not be established until careful study has been made.

(Below) Ordinary street intersections are inefficient, but sometimes traffic movement can be greatly improved by re-design of intersections, such as shown here at Fifth, Sixth and Beaudry.



Many cities are using meters to enable enforcement officers to cover somewhat larger areas. Enforcement, however must continue, else violators will go uncaught, and drivers will place subsequent coins in the meters to circumvent time limits.

Some cities use meters as a means of deriving additional revenues for general purposes, but there is a logical and growing trend to dedicate the fees paid by motorists to traffic betterment and off-street parking.

Were it decided to use meters in Los Angeles, the following policies should be considered:

1. Parking meters should only be used
 - a. Where a factual study indicates the unquestioned warrant for time limits.
 - b. Where effective enforcement can be employed.
2. Parking meters should not be used
 - a. Where in the foreseeable future there will be the need for either a partial or total prohibition of parking.
 - b. Where at the present it is necessary to prohibit parking during rush hours.

3. The income from parking meters should be expended
 - a. For the amortization of the parking meters.
 - b. For the operation and enforcement of the parking meters.
 - c. For the purchase of off-street parking facilities in the areas where the funds were collected.
4. The income from parking meters should not be allowed to be diverted from the expenditures enumerated above. When sufficient off-street facilities have been provided, parking at the curb should be eliminated.

Loading Zones. So long as provisions for off-street loading and unloading facilities are not required by law this operation will be continued at the curb. A number of restrictions may be applied, however, governing the locations of loading and unloading and establishing hours. The most effective approach to the problem would be:

1. Establish policies and warrants
 - a. Governing location, size, etc. of loading zones.

"Full" signs at lots cause store customers to feel they are not wanted. Solution of the parking problem can come only through special city-wide studies that determine customer needs, desired locations and capacity, and other basic facts.



- b. Governing time restrictions of commercial loading and unloading in congested areas
 - (1) Determining what lane densities or volumes warrant elimination of curb loading operations.
 - (2) Determining what concentration of curb loading and unloading is the practical maximum to impose by time limits.
 - (3) Determining what exceptions will be made, if any, and on what basis.
2. Factual analysis of specific locations to determine if warrants are met.
3. Report to abutting property owners and commercial operations.
 - a. Notifying them of anticipated restrictions and factual reasons.
 - b. Soliciting their objective approach to a solution of the problem.
4. Apply consistent enforcement.

Angle Parking. Angle parking has ceased to be a serious problem in Los Angeles, except in outlying business districts where street traffic has grown after

angle parking has developed by custom. The current city policy of restricting angle parking to streets of greater than 72 feet in width is proper, but should be implemented with firm policies restricting angle parking even on the widest thoroughfares where there is considerable traffic movement.

Angle parking provides some additional parking spaces at a cost too great to movement in terms of street space required for parking and maneuvering and in terms of vehicle property damage resulting from hazards of the practice. Where angle parking still exists, its further elimination could be approached by a factual study tabulating accident experience, current volumes and lane densities, parking spaces to be eliminated, and traffic volumes and reduction of lane densities to be gained.

Off-Street Parking. Traffic administration has a direct concern in off-street parking for a number of reasons. Adequate off-street facilities relieve streets of cruising drivers seeking a place to park. Ample off-street space will free curb space where parking is allowed because of parking shortages. Off-street

A chronic traffic pain is the loading and unloading of trucks at the curb. This problem, too, requires special study to determine relief measures, such as time restrictions, and the location and size of loading zones.



facilities pose movement problems attendant with rush hour surges of large volumes. In some cases, off-street parking may disrupt mass transit loading zones and areas. Finally, there is this important reason. All that traffic administration can do to relieve congestion, and make travel to congested districts easier, will be of limited value unless at the same time terminal facilities of far greater capacity than exist today are made ready.

The proposed parking garage under Pershing Square offers an example of why the city must be concerned with the problem and cannot rely on private enterprise to make all decisions. The proposed garage would provide 2,500 car spaces. On the basis of the experience with the Union Square underground garage in San Francisco, an average of about 1.5 vehicles per space per day will be parked, or a total of 3,750 cars per day. This estimate is on the assumption that all-day parking is permitted. If only shopper parking were accepted in the garage this estimate might be doubled and the impact in terms of congestion on the surface streets be spread through the day. If all-day parking is provided, a rush hour problem of considerable magnitude will be generated in the vicinity of entrances and exits. Simultaneously, present use of Pershing Square as a terminal for mass transit bus operations will be disrupted.

Consequently on this one current problem there is need for a fact-finding study, conducted or supervised by the city which would:

1. Evaluate the parking needs in the Central Business District separating
 - a. The problem of the all-day parker
 - b. The problem of the shopper parker
 - c. The problem of the errand parker
2. Estimate rather accurately the impact of the garage on the surface streets
 - a. If all-day parking and hotel parking is accepted
 - b. If only shopper parking is accepted
 - c. Determining the ability of surface streets to handle the impact of the garage as designed.
3. Provide for the re-location of mass transit routings which now terminate at Pershing Square.
4. Recommend how the garage should be built and operated.

A procedure such as the above, of course, should be followed on other proposals in any of the various congested districts. However, parking needs cannot be met on a piecemeal, unguided basis. Fact-finding studies, city-wide, must provide the framework of an overall parking program. The City Planning Commission and the County Regional Planning Commis-

sion have made helpful studies, but a broader approach is vital as outlined in the ensuing section under Traffic Planning.

Investigations and Complaints

Problems of traffic management probably are the source of more complaints from citizens of Los Angeles than is any other area of city government. This is not a desirable situation for several reasons. First, if the city is to move ahead with concerted effort toward solution of its vast and complicated traffic problem it must have the support of the citizenry. Second, problems encountered by a motorist or pedestrian in traffic frequently give him his only first hand contact with either the police or other functions of the city. In his mind is formed an erroneous opinion of the overall administration based on his traffic experience. Third, if complaints and resulting pressures are allowed to interfere with a sound engineering approach to the traffic problem, little lasting progress can be achieved.

The Traffic Engineering Bureau answers and rather thoroughly treats every traffic complaint received which has to do with its function. Complaints are so numerous, a greater portion of engineering time is spent answering complaints than in preventing them.

Factual studies and plans for future controls should be far enough ahead of the problem that all requests and complaints regarding establishment of controls could be answered in relation to existing plans. Routine investigation of complaints about existing controls should be separated from and not allowed to disturb the objective application of traffic engineering on a city-wide basis.

Manpower having no other duties should be assigned to the function of investigating complaints, proceeding as follows:

1. Relate the complaint, in the office, to a knowledge of the location and plans for pending improvement. If improvements are pending on a priority basis, so notify complainant.
2. If recent factual data are needed to properly answer the complaint, make the necessary field investigation and secure the facts.
3. Relate factual findings to the established policies and warrants.
4. Report with recommendations to the Department head or Commission.
5. Answer complaint relating factual findings to policies and warrants regardless of source of complaint.

Section 2. Traffic Planning and Research

The business of installing traffic signals, stop and speed signs, lane markings and the many other traffic control devices requires a factual, planned approach.

In Los Angeles, many special and costly studies have been completed—and filed. Only a few have resulted in activated programs. Some studies have pointed to the absence of factual data upon which to base sound recommendations for future traffic needs. This need was clearly brought out in the engineering study made in conjunction with the Legislature's Joint Fact-Finding Committee on Highways, Streets and Bridges, and studies of the consultants to the Mayor's Transportation Clinic of 1944. Absence of facts undoubtedly has resulted in objections to and criticisms of such proposals as the locations of freeways, and the recent rapid transit plan of the Metropolitan Traffic and Transit Committee.

Accumulation of facts is not enough. To be useful, the facts must be analyzed and interpreted by competent, skillful, painstaking personnel. The work must be a continuing function of the city. Facts must always be readily available for meeting day to day exigencies and for solution of broad traffic problems. This function, properly performed, should enable

Los Angeles to rely on the engineering abilities of her own technical personnel.

Area-wide studies which should be maintained continuously are of several types. These are discussed briefly.

Origin and Destination Studies

Engineers the country over regard as an important step the conducting of origin and destination studies. These studies reveal such things as the volume, origin and destination of traffic, purpose of trip, the proportion of traffic forced to use various arteries because of the absence of better ones, and the "desire lines of travel" which simply means the routes drivers would prefer to use.

That sounds like an almost impossible task, but through scientific sampling techniques the job can be

Guesswork cannot possibly cope with the needs of the some 750,000 motor vehicles of all kinds, plus transit vehicles, owned in Los Angeles. Alert traffic management, which plans scientifically, can greatly minimize congestion and hazards by moving the vast hordes of vehicles smoothly through balanced application of devices, controls and measures.



done with a reasonable outlay of time and money. This method was developed by the U. S. Public Roads Administration in cooperation with the U. S. Census Bureau, and state and local highway officials. By reason of the lasting values of these studies, and their fundamental character, Federal Highway Aid funds are available on a cost-sharing basis when the studies are made with state highway department approval. Some 100 cities, of all population ranges, have made these cooperative studies.

Such a study in Los Angeles would give accurate measures for answering many problems. Determination of the desire lines of travel would throw a powerful searchlight on the needed improvement of ordinary streets and of designation of freeways and their interchanges and entrance and exit ramps. Accurate knowledge would be obtained of the proportion of traffic to be attracted by good rapid transit. Establishment of truck routes, and determination of overall parking needs, are other almost priceless benefits.

Once conducted, this type of study could be kept up-to-date at relatively low cost, and thus provide Los Angeles with the constant store of needed facts. Under no consideration should origin and destination studies, which take time to organize and complete, be permitted to interfere with the well conceived current freeway program. Later portions of the freeway program, on which no binding commitments have been made, properly should be reviewed with regard to the developed facts, and whatever changes appear practical and reasonable should be incorporated in plans of the future.

Parking Studies

In conjunction with the origin and destination study, a special parking study is needed to round out the picture of parking needs. Many cities are now expanding the Origin and Destination study to embrace parking.

Since parking needs are evident throughout the city, only through a broad factual study can the problem be met on even terms, with a determination of locations of demands, type and time characteristics of demand, and the current and ultimate needs. An inventory of available facilities should be kept up-to-date, for frequently parking sites are withdrawn for more profitable commercial use. Evaluation of parking needs and trends is essential to private enterprise and the city, whether they work singly or in cooperation. Today's needs are such that a factual

summation of them might well jar private business and the city into action.

Engineering Accident Analysis

Advantage has not been taken of the story that accidents tell. Although a vast amount of guiding accident data is available, the use of it has been confined largely to enforcement, to answering of complaints, and to making special studies. There is real need for engineering analysis and engineering treatment of high accident locations. Accident reductions may be achieved easily and cheaply by a study of the causes.

Currently, the Traffic Engineering Bureau is studying locations of high accident frequency for 1947. Limitations of technical manpower, however, result in making only a gesture toward the accident analysis needed.

Speed and Delay Studies

While an accident analysis can measure how safely the traffic stream moves, speed and delay studies are designed to measure the speed of the traffic streams and the causes of delay. The present program of the Traffic Engineering Bureau in speed and delay studies is primarily interested in determining the average speed at random times of several test runs of a vehicle "floating" with traffic between control points on a given thoroughfare. Such figures are helpful, perhaps, in getting a rough measure of traffic movement in Los Angeles. But present studies should be overhauled and placed on an extensive and objective basis. Causes of delay should be carefully tabulated, for here will be found clues as to how to facilitate movement. Cruising speeds should be determined at various times of the day and studied separately, for the average of several runs made at different times gives a meaningless average speed which does not exist.

A continual city-wide program of speed and delay studies would give a ready evaluation as to how well traffic is moving throughout the city. This would be a factual basis for establishing priorities of improvements.

Traffic Volume Studies

It just isn't in the books to do a good job of meeting traffic needs unless you know how much traffic there is and where it flows. Such data are not available for Los Angeles.

Innumerable widely scattered volume studies are made each year by the Traffic Engineering Bureau as a part of the function of investigating complaints and special problems. Even the volume counts of traffic entering and leaving the Central Business District are estimates based on spot volume counts of relatively short length.

Area-wide volume data, if kept up-to-date, would end the necessity for the many random intersectional counts. The data would be available for all special purposes as well as for consideration of parking restrictions, street lighting, one-way streets, maintenance, and arterial improvements. Moreover, the data would be useful in evaluating new improvements and newly installed traffic measures and controls.

Physical Inventory Studies

Accurate, city-wide inventories of signs, signals and markings of various types should be readily at hand. Such information is available but not until searches are made, causing belated use.

Inventory maps should be maintained at a central source which would clearly show locations of traffic control devices and measures. These maps, too, should picture the streets used as through arteries and as feeder streets, and the locations of traffic generators. Having all such information would be of extreme value in handling complaints, in assisting enforcement, and in developing plans for handling traffic at special events and in emergencies.

Coordination With Enforcement

The traffic problem is highlighted by the annual traffic accident toll and the tremendous numbers of citations for traffic violations—371,021 in the first half of 1948 alone. The number of citations and amount of money collected is not a measure of enforcement effectiveness. What is needed is a measure of whether improvement of driver behavior has been achieved.

Since observance of regulations differ greatly, and since traffic conditions vary widely, observance studies should be made which would enable both enforcement and engineering to do a better job. While the problems of traffic violations are primarily the concern of enforcement, the evaluation of control devices are the function of the traffic engineering bureau which should extend every cooperative effort to improve traffic law observance.

Coordination With Planning

In traffic planning, there are related factors falling outside the province of highways yet which are of vital importance. Much of this related data must be supplied by studies made by the city and county planning departments. In this class are data on topography, land use, zoning regulations and population. The closest of cooperation must be continued between the planning and traffic agencies, not only in meeting routine problems, but in special ones involving relationship of traffic to economic trends, and integration of street traffic with the terminals of airports, railways and the harbor.

Coordination With Transit

Since mass transit for the most part shares the same facilities as motor vehicular traffic, the two must be closely coordinated. Such transit operations as turning movements, streetcar and bus stops, and terminal lay-overs, create special problems related to movement of vehicular traffic. Conversely, location and timing of traffic signals and physical design of facilities may seriously impair efficient operation of transit.

To minimize the detrimental effects of the conflicts of the two types of operation, it is essential that the closest coordination exist between the Public Utilities Engineer, the Traffic Engineer, and the Planning Engineer. Much of the same data obtained by the Traffic Engineer is of value to the Transit Engineer in the planning and projecting of surveys.

Special Studies for Location And Design of Improvements

In the section on traffic operations, stress is placed on the value of intersection re-design and the treatment of hazardous and congested locations. Such re-design necessitates special studies and a continual improvement in method and technique. Plans for such improvements should be under consideration and on the drafting boards prior to their actual need.

The freeway program requires that the city enter into contractual agreements with the State Division of Highways, with particular reference to location and operation of entrance and exit ramps. The location, geometric design, and operation of these ramps, should be based upon special studies which would forecast future traffic demands in relation to the new facilities.



The special and continuing studies needed to meet Los Angeles' traffic needs are not the kind conducted within a remote office. Modern studies, such as the origin and destination of traffic, extend out onto the streets, sometimes in people's homes, where bed-rock data is collected at the source.

Research and Evaluation

Effectiveness of traffic control devices is frequently limited by the dominant factor in traffic—the human element. Continual research is necessary to obtain the best possible operations and to guide the planning and design of new facilities. Los Angeles has expended large sums of money for pedestrian underpasses, for example, which have proved unsatisfactory in many occasions because of reluctance of pedestrians to use them.

Los Angeles' traffic problem is so severe that the city can afford to employ, where a choice exists, only the most effective traffic control measures. In order to select wisely, therefore, traffic administration must continually evaluate and compare the experience of the various types of devices utilized.

Research studies are needed to determine the effectiveness of all types of traffic facilities and equipment.

Development of Standards, Policies, Warrants and Techniques

Repeated mention has been made of the necessity for adoption of clearly defined policies and warrants for the installation and operation of control devices

and measures, and for development of sound standards and techniques. Experience will indicate the need for readjustment of such policies. Frequency of adjustment will be minimized by objective factual studies upon which can be based the most practical of standards, policies, warrants, and techniques.

Citizens of Los Angeles in all walks of life are aware that a severe traffic problem exists. Traffic complaints flood the departments of city government involved. Each motorist, each housewife, each businessman, each public official, seems to have an opinion based upon his or her personal experience in a limited phase of the extensive traffic stream as to where, when or how, traffic should, or will, perform. What is needed is factual knowledge as to where, when, and how, it does perform.

The city administration must determine upon what level it chooses to meet the traffic problem. If the decision is to act upon requirements of traffic as facts indicate, then clearly defined policies and standards must be adopted. All traffic management functions should then be based upon the factual information necessary to place into operation those policies and standards. Simultaneously, there must be an objective evaluation of those functions. There must be constant projection of trends so future needs and requirements may be anticipated and met.

THE PREVENTION of fire and crime are age-old problems, and long ago were fitted into the structure of municipal government in a manner that has made possible a high degree of administrative efficiency.

But the problem of managing street traffic is relatively new. This phase of municipal activity, born only a generation ago, has not yet been given the respect and care accorded to its older brothers. In Los Angeles, as in most other U. S. cities, street transportation is still wearing hand-me-downs.

Already the problem of traffic has reached severe proportions affecting every enterprise and every individual. It is measured in the loss of life and limb and in the staggering economic burden imposed on the community by traffic congestion, accidents and delay.

With population, motor vehicle registrations and mileage of street travel all increasing steadily the problem will continue to grow. It can be efficiently solved only through well planned and well coordinated street and traffic management, in which duties and responsibilities are clearly fixed, and the job received the benefits of the very best of administrative practices and talent.

Opportunity exists in Los Angeles to treat its traffic problem over such a wide area that benefits will accrue to all of Southern California. Likewise, strong management of street traffic problems within the City will greatly aid the County and the State in coordinating their traffic relief measures with those of Los Angeles.

Summarized here are the Committee's findings with respect to this problem, together with its recommendations, both general and specific, as to the steps necessary to provide the kind of street transportation essential to the future welfare of Los Angeles.

General Findings

Dependence on Street Traffic

Los Angeles' economy is almost entirely dependent upon movement of people and goods over the streets. The \$5,000,000,000 annual County retail trade, the

8,100 industrial establishments, the vast recreational demands and public health and safety requirements, all point to the urgency of providing traffic facilities and management commensurate with need.

Growing Population

Los Angeles, soon to become the sixteenth largest city of the world and headed for a 1960 total of 2,600,000 persons, is today the focal point of 4,500,000 people living in the city and contiguous counties. How well and solidly the city grows is dependent in major measure on how well traffic is administered.

Intensified Use of Streets

Los Angeles has one of the heaviest per capita concentration of motor vehicles of any large city in the world, one car for every 2.5 persons. Usage made of motor vehicles in the Los Angeles area probably exceeds that of any other section.

Huge Transportation Investment

Street right of way is valued at \$1,330,000,000. In 22 years \$326,000,000 has been expended for street construction, maintenance, lighting and operation, the latter composing less than two per cent of the total. The value of private and public transportation vehicles probably exceeds \$2,000,000,000.

Huge Congestion Cost

Although difficult to measure accurately, congestion is exacting vast sums from all citizens of Los Angeles, as indicated by the studies of the California Public Utilities Commission which is recommending increases in "constructive" mileage up to more than 18 per cent on commonly used arteries in Los Angeles. This added mileage for trucking charges, over actual distances, is a formal recognition of the wastes bred by congestion.

Mass Transit

Slowness of mass transit, and its absence in many sections of the city, force many people to use private motor vehicles. This contributes in large measure to congestion and to parking shortages. Any facility to

compete with the private car must offer comparable convenience if it is to lighten the burden on city streets.

Parking Far Short of Needs

Inadequate parking, like congestion, is altering desired city development. Downtown and other established business districts are suffering loss of business. Increasing demand for traffic movement is rapidly reducing curb parking.

Accident Toll Can Be Cut

For many years Los Angeles' traffic death and accident record has been one of the worst, although improvement has been made recently in accordance with a continuing program. Traffic accident costs in 1947 are estimated at \$35,000,000. The appalling suffering and cost can be reduced only by applying all proven remedies embraced in engineering, education and enforcement.

Freeways Accentuate Other Needs

The freeway program well underway, to cost \$300,000,000 in the next 10 years, justifies the highest level of administrative efficiency. In serving their invaluable purpose of carrying scores of thousands of vehicles daily, freeways impose traffic distribution and collection problems which can be met fully only by constant planning and coordination.

Must Integrate Land Use With Traffic

Much use of land is at cross purposes with traffic movement. Long established as well as new industrial and business areas are widely scattered. Commercial enterprises are permitted by current zoning practices along heavy volume arteries, resulting in ribbon developments; resultant congestion causes gaps of unproductive property.

Complicated Street System

Geographic barriers, land use abuses, and the inefficiencies of ordinary surface streets combine to make traffic operations extremely complicated and difficult in a city spread over 452 square miles and served by 4,800 miles of streets.

No Single Cure

Freeways, rapid transit and off-street parking are basic in any program for traffic relief in Los Angeles. Equally important is the applying of all controls and

measures that will obtain the greatest service from present streets. Traffic administration must meet the popular demand for flexibility of travel, the certain increases of population and traffic, and the continuing need for integration of existing streets into the developing freeway program.

Must Consider All Elements

Successful traffic administration must rest on a firm foundation of knowledge and a breadth of view covering all elements which directly or indirectly affect not only the movement of people but their welfare and desires. Principal elements which compose the traffic problem are population, motor vehicle registration, land use, the street system, mass transit, parking, traffic control, traffic regulation, and the social element.

Need for Continued Public Support

Organized groups, which have helped build Los Angeles, should continue their interest in traffic matters. It is a duty of the city to provide official programs and to furnish full knowledge of them, so that public support groups may better work for the common good.

Traffic Administration Findings

Need for Authority and Standing

Possessing a subordinate status, with responsibility in traffic matters divided among nine city agencies and with each of them lacking adequate traffic facts and unavoidably subjected to opinions and pressures, traffic administration in Los Angeles cannot be expected to meet satisfactorily present or future needs. Over the years, the several city departments have been granted or have assumed duties in the traffic administration field which should be lodged in a single traffic administration department, equal in standing to other departments.

Need for Coordination

Under the present loosely organized machinery for handling traffic matters, the several city departments too often operate independently of each other. One department may not inform other departments of its action or plans, despite the fact the work of other departments is directly affected. Without complete and assured cooperation, it is futile to anticipate noteworthy improvement in traffic conditions.

Should Augment Fact-Finding Personnel

The Bureau of Street Traffic Engineering, the city's present traffic administration agency, has an inadequate staff of engineering personnel to conduct the several types of fact-finding studies essential to set up and execute an overall sound traffic relief program.

Factual Data Needed

Today in Los Angeles, there is an absence of adequate city-wide factual data, making it difficult and hazardous to arrive at conclusions affecting large numbers of people and large sums of money. The complexity and vastness of the traffic problem requires continuing factual study of wide coverage.

Need for Planned Program

The needs of a 4,800-mile street system and millions of road users cannot be met efficiently without an overall planned program, which in turn should be composed of integrated programs involving all controls and measures. No overall planned program integrating new and existing facilities exists in Los Angeles. None can be expected under the present complex administrative organization with its divided authority and lack of essential facts.

Full Use Not Made of Controls and Devices

Although much very effective traffic engineering work has been done, traffic control devices and measures in Los Angeles fall far short of the benefits they can be made to produce. Installations are not made on an actual priority basis and not in accord with factual data. Congestion and delay can be relieved considerably, and accidents reduced, by planned application and extension of such things as one-way streets (to form a system), turning controls, progressive traffic signaling, and a planned system of preferential streets.

Objectives

In consideration of the immensity and complexity of street transportation, and to the need for maximum efficiencies of traffic administration, the Committee therefore recommends the following general objectives:

Centralize Authority

Place functions of traffic operations and traffic planning in a traffic administration department.

Department Status

Give traffic administration equal rank, authority and responsibility with other city departments.

Expand Functions

Implement and expand present functions of traffic engineering with more emphasis on factual studies and planning.

Coordinate Departments

Coordinate functions of various city departments whose secondary responsibilities relate to traffic.

Apply Planning

Establish traffic operations and traffic planning on factual determinations of needs on a city wide basis.

Coordinate Program

Integrate area-wide activities, through policies, warrants and standards, with regard to adjacent cities and counties, and to the State.

Basic Recommendations

Although there is wide divergence between present practices and the objectives outlined above, fortunately, as described in Chapter IV, the Charter grants broad authority to the City Council for administering traffic, including the choice of conferring traffic responsibility on either an existing agency or one newly created. Nearly all of the recommended action can be obtained by ordinance. However, to insure permanency of the traffic administration structure and to relocate certain responsibilities, some Charter changes should be made.

Charter changes take time, so the Traffic Survey Committee has separated procedure into two steps:

I. Immediate Action

- 1. Traffic Commission.** Creation of a five-member traffic commission appointed in accordance with present Charter provisions.
- 2. Department of Traffic Engineering.** Establish a Department of Traffic Engineering, with the Director to be appointed by the Commission in accordance with Civil Service standards and procedures.
- 3. Technical Coordinating Committee.** Establish a Technical Coordinating Committee of city officials concerned with traffic.

II. Action By Charter Change

1. Insure permanency by incorporating provisions for the above structure in the City Charter. This should be done as promptly as possible following adoption of the ordinances.
2. Provide by Charter amendment for the transfer to the Department of Traffic Engineering the duties of
 - locating transit stops
 - street lighting
 - design of channelization and re-design of intersections.

Detailed Recommendations

Traffic Commission

Members selected to serve on the Traffic Commission should have a broad interest and knowledge of street traffic and its needs. The Traffic Commission should serve in a policy determining capacity as do other city commissions, referring matters requiring Council action to that body, such as standards and warrants for installation or removal of all traffic control devices. A new Council Committee on Traffic Engineering should be created to handle all such matters. As provided in Article III, Section 36, of the Charter, the Traffic Commission may, by resolution, adopt rules regulating parking or other use of vehicles upon the streets, and any other use thereof, when determined by the Commission to be necessary. Such rules shall become effective upon the erection of the necessary standard signs or devices, provided, however, that no rules shall remain in force longer than thirty days unless incorporated into an ordinance of the City of Los Angeles.

Technical Coordinating Committee

Members of this committee should be composed of representatives of the various departments whose work involves traffic, as follows: Deputy Chief of Police in charge of traffic, (Chairman); Director of Traffic Engineering, (Secretary); and the following or their designated representatives—Director of City Planning Commission, City Engineer, Engineer of Department of Public Utilities and Transportation, General Superintendent Bureau of Street Maintenance, Engineer of Lighting Bureau (until lighting is transferred), and the City Attorney. Representatives of State or local governments should be invited to attend meetings in an advisory capacity whenever matters are under consideration involving their interests.

The Coordinating Committee should recommend

policies, warrants and standards to the Traffic Commission whose action, in turn, should be approved by the Council. Thereafter, installations would be in accordance with the adopted standards, and no exceptions could be made without a two-thirds vote of the Council. The Coordinating Committee should govern bases of approval for all traffic regulations and control devices.

Traffic Engineering Department

Functions

All work concerning the movement of street traffic should be handled directly or participated in by the Traffic Engineering Department, drawing together existing loose ends and coordinating all traffic operations so the greatest possible use may be made of all streets. The following functions should be lodged in the Department: (See accompanying Function Chart)

1. *Collection, Analysis and Interpretation of Factual Data.* This includes all studies measuring present and future street traffic characteristics and needs, such as:
 - Origin and Destination
 - Volumes
 - Speeds
 - Effectiveness of regulations
 - Traffic control devices, signs and markers
 - Intersection re-design and channelization
 - Accidents (Utilizing Police Department data)
 - Congestion
 - Parking
 - Pedestrian use of streets
 - Economics of street design, operation and losses.
2. *Traffic Planning and Research.* Planning should apply to all projects involving location, function, and operation of routes and terminals, and to other operational functions. This means use not only of traffic study data shown above, but data from land use and population studies, etc., made by other agencies. Research should be carried on in driver and pedestrian characteristics, equipment, development, and other matters to improve traffic handling.
3. *Review of Design of Traffic Facilities.* The authority to review plans for structures dealing in any way with traffic movement and safety is essential as a double-check for eliminating future bottlenecks and hazards. Suggest channelization and re-design of intersections.
4. *Signs, Signals, Markings and Lighting.* Installation,

operation and maintenance of devices controlling movement and safety in traffic. (Lighting advisory only until Charter transfers function.)

5. *Review and Act on Requests.* All requests for driveways, curb cuts, transit stops, cab stands, loading zones, and other matters, prior to issuance of permits.
6. *Cooperation in Traffic Safety Education.* Since drivers and pedestrians are controlled by the measures and devices applied by the Department, it is vital that every cooperation be extended to stimulate and assist public and private traffic safety work.
7. *Cooperation in Use of Traffic Data.* All data derived by studies of the Traffic Engineering Department should be made available to other city departments and used in making recommendations.
8. *Cooperation with Other City Agencies.* In those fields where secondary functions of other city departments overlap functions of the Department, methods of close cooperation should be developed and maintained through members of the Technical Coordinating Committee.

Central and District Offices

Because of the large area of the city, it is recommended as a matter of greater efficiency, that a Central Office be supplemented by four District Offices, as shown on the accompanying organization chart. This arrangement would insure speed in handling installations and emergency cases, reduce delay in routing maintenance, and would foster a better knowledge of the individual district needs.

The Central Office would supervise and coordinate the work of the District Offices, maintain records and inventories, handle administrative matters and assist in policy determination. In addition it would conduct city-wide studies and traffic planning, develop standards and warrants, make city-wide signal installations, and coordinate the work with other city departments.

Each District Office, under a District Traffic Engineer, would make necessary field investigations, handle complaints and requests, install and maintain signs and markings, and make special studies relative to District Office work. The District Office would determine warrants, type, specific location, and priority for signs and markings. The sign crews and marking crews assigned to each District would receive direction and supervision from the central sign

shop on work methods and mechanical processes. This will assure technical judgement on application of devices and uniformity in work methods.

Director

Selection of the Director of the Traffic Engineering Department, of department head status and compensation, is one of the greatest responsibilities confronting the Traffic Commission. Civil service requirements should be adhered to rigidly. The person appointed to this extremely responsible position must be a capable, energetic leader, as well as thoroughly technically qualified.

Personnel

Traffic administration is largely a technical work. Consequently, to meet the functions described in the text and in the accompanying chart, emphasis has been placed on technically trained men. The recommended organization calls for a considerable increase of professional and semi-professional men over those now employed, yet the total employment and the salary budget need be little if any greater than that of today.

Under the streamlined structure depicted in the organization chart, sufficient employees probably are now in the sign, signal and marking crews to carry on the work program. Some shifts in duties and work locations can be made to fill initial positions in the new organization. Consolidation of traffic operation activities carried on by other city agencies also should minimize the need for added total personnel.

The most urgent need is for expansion of the engineering staff to conduct fact gathering, warrant and standard determination, planning and programming.

To obtain an index of traffic engineering staffs, the Institute of Traffic Engineers, through its postwar planning committee, made a survey of 17 cities. Those cities averaged about 15 employees per 100,000 population, including all classes of personnel. This average included in some cases, personnel in street lighting and certain transit matters, and other functions. On that basis the number of traffic employees in Los Angeles would be about 300. However, under the proposed immediate program, all of those functions are not included, and so a smaller staff can probably meet requirements for the present.

Herewith is a listing of 199 suggested positions required as a minimum staff to activate the recommended immediate program in Los Angeles. Personnel determinations should be flexible so that the

Traffic Engineering Functions

DEPARTMENT OF TRAFFIC ENGINEERING

TRAFFIC PLANNING AND RESEARCH

Plan layout and execute field studies such as traffic volumes, traffic movements, cordon counts, parking, speed delay, origin & destination, efficiency comparisons, etc. of city-wide importance to traffic planning.

Analyze field data and prepare reports.

Analyze accident records of hazardous locations & prepare spot maps, collision & condition diagrams.

Prepare suggested geometric designs for streets & intersections, channelization, driveways, etc.

Prepare plans for traffic routing, one-way streets, turn controls, curb & off-street parking and other major remedial measures.

Assist and advise with other official agencies responsible for planning & constructing traffic facilities.

TRAFFIC OPERATION

Traffic control devices - determine need, establish standards & warrants, program improvements.

Design, erect, time and maintain traffic control signals. Supervise signal shop & erection crews.

Study need for, design and schedule pavement and curb markings.

Design, fabricate & recondition traffic signs and related devices.

Cooperate in establishing bus and street car stops.

Review requests for permits for curb cuts, driveways, routing, parking lots and other matters affecting traffic operation.

Direct & supervise activities of District Traffic Engineers. Establish policy & standards, supply traffic signs.

Establish loading zones, cab stands, truck routes, detours and other street use regulations.

Coordinate work with Police Dept. for effective enforcement.

STREET LIGHTING

When this function is transferred to Dept. of Traffic Engineering it should develop standards and warrant for traffic safety lighting, plan and program improvements, supervise installations and perform all functions now being carried on by the Bureau of Electricity.

ADMINISTRATION

Maintain records of costs, inventory of control devices, dates of installation, etc.

Provide stenographic, typing, clerical & statistical service.

Maintain files of correspondence, information, minutes of meetings, etc.

Maintain technical reference library.

DISTRICT T. E. OFFICES

Investigate complaints.

Make spot field studies & reports.

Establish local control measures and erect traffic signs.

Conduct pavement marking program.

Study hazardous locations and congestion points.

Advise with local groups and citizens on traffic and safety matters.

Make recommendations to central office.

Director of Traffic Engineering may build the organization on a sound and efficient basis. Adjustments, especially in the non-professional positions, will be necessary to meet changing conditions. Temporary employees may be needed to make special studies-from time to time.

In addition to those positions listed, it may be desirable for the Director to select an Administrative Assistant as provided for by Charter. His duties would be to carry out functions prescribed by the Director, assist in the general administration of Department affairs, represent the Director at meetings when necessary and perform other functions appropriate to this position.

Suggested Office and Field Personnel

<i>Professional and Semi-Professional Positions</i>	<i>Number of Employees</i>
Director of Traffic Engineering	1
Principal Street Traffic Engineer (Sr. Assoc. Tr. Engr.)	1
Associate Traffic Engineer	2
District Traffic Engineer (Sr. Asst. Tr. Engr.)	4
Assistant Traffic Engineer	6
Assistant District Traffic Engineer	1
Junior Traffic Engineer	6
Traffic Checker	10
Traffic Investigator	10
Senior Traffic Checker	1
Office Engineer	1
Draftsman	4
	—
	47

<i>Skilled, Semi-Skilled and Unskilled Positions</i>	<i>Number of Employees</i>
Chief Electrician	1
Signal Shop Supervisor	1
Electrician Foreman	1
Electrician Sub-Foreman	1
Traffic Signal Electricians (Signal Shop and Signal Crews)	40
Sign Shop Supervisor	1
Sign Shop Foreman	1
Sign Shop Sub-Foreman	1
Sign Painters	2
Traffic Equipment Mechanics (1 each in the 5 Sign Crews and 1 each in the 4 Pavement Marking Crews to act as boss of the crew. 4 in Sign Shop)	13

Traffic Equipment Mechanic Helpers (2 each in the 5 Sign Crews, 5 each in the 4 Pavement Marking Crews, 10 in the Sign Shop and 15 in the Signal Crews)	55
Equipment Mechanic	1
Equipment Mechanic Helper	2
Janitor and Watchman	3
	—
	123

<i>Clerical and Stenographic Positions</i>	<i>Number of Employees</i>
Secretaries	5
Stenographers	12
Typists	4
Clerks	6
Accountant	1
Statistician	1
	—
	29
Total Employees	199

Suggested job descriptions and qualifications are shown in the concluding section of this chapter.

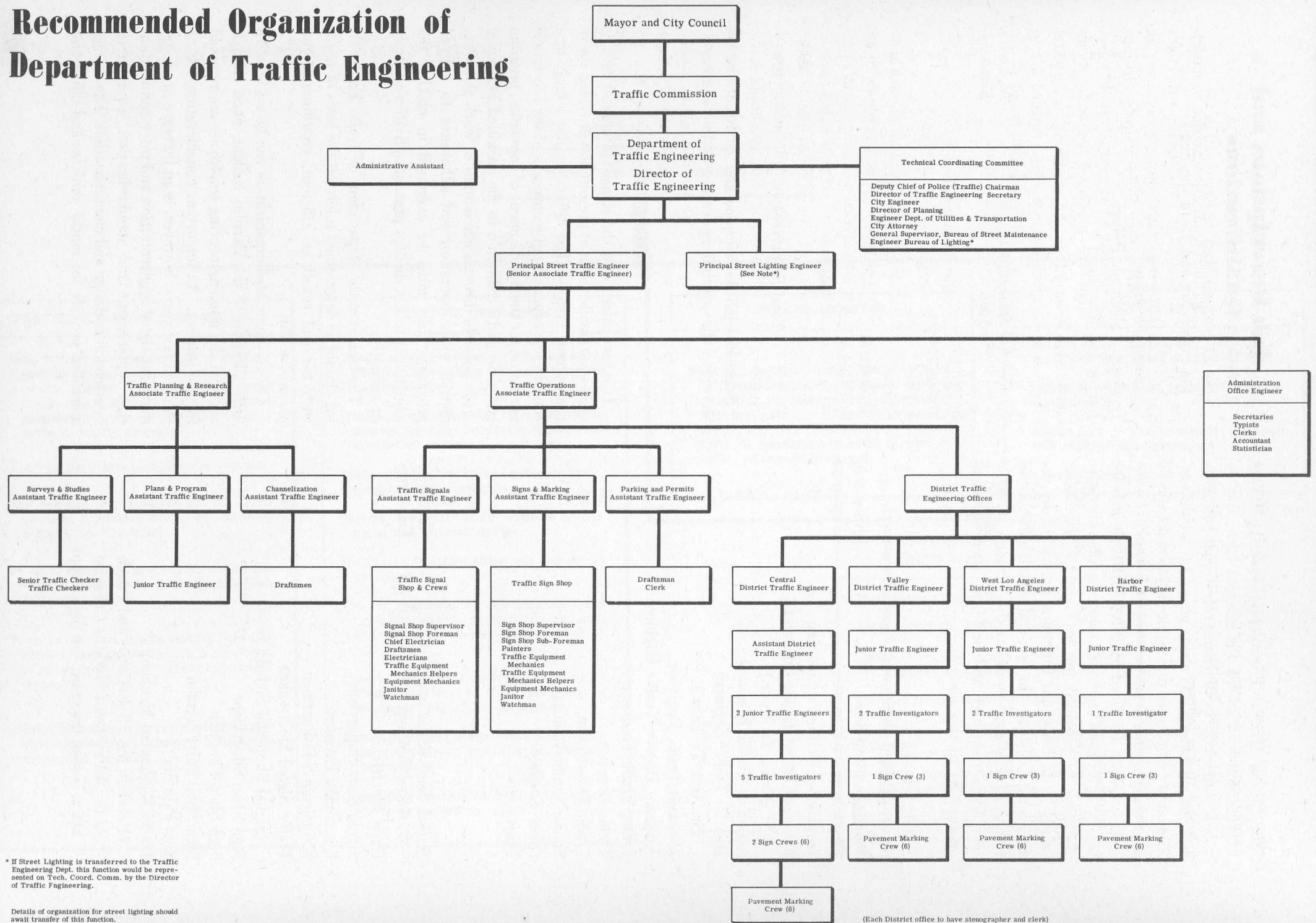
Budget

It is recognized that the suggested organization is somewhat smaller than at present and provided for in the current budget. The difference lies largely in a considerable expansion of technical and semi-technical personnel for the development of standards, program and plans and a reduction in the unskilled personnel made possible through efficiencies in work planning, district office operation and adherence to a fixed program. Care must be exercised in making the adjustment to not disrupt present activities severely or abruptly.

The budget of the Department of Traffic Engineering should be determined solely on the basis of need, with the end result an efficient, coordinated and planned action.

The recommended organization can be set up with little addition to the current budget, even though many of the non-engineering employees are retained for the present. An important consideration during the next few years, however, is an increase in capital items for signal modernization and inter-connection, sign replacement and standardization, equipment, intersection re-design and channelization. The budget must also provide for motor vehicles and office and

Recommended Organization of Department of Traffic Engineering



* If Street Lighting is transferred to the Traffic Engineering Dept. this function would be represented on Tech. Coord. Comm. by the Director of Traffic Engineering.

Details of organization for street lighting should await transfer of this function.

(Each District office to have stenographer and clerk)

shop space. These capital items are apart from a normal annual operating budget.

Personnel costs, applying current rates of pay, are estimated as follows:

	<i>Number of Employees</i>	<i>Approximate Annual Cost</i>
Professional and Semi-Professional	47	\$200,000
Skilled, Semi-Skilled, and Unskilled.	123	380,000
Clerical and Stenographic	29	70,000
	<hr/>	<hr/>
Total	199	\$650,000

With consideration to all items, not including street lighting and certain non-recurring capital items, the probable annual operating budget for the next few years becomes:

Operating Costs

Salaries and wages	\$ 650,000
Materials and supplies	250,000
Electrical power	175,000
	<hr/>
	\$1,075,000

Capital Costs

Maintenance and modern- ization of signals	400,000
Channelization	100,000
	<hr/>
	\$ 500,000

Grand total \$1,575,000

The element of cost is not a serious one in modernizing traffic administration in Los Angeles. Although technical staff is greatly expanded, economies are produced by the more efficient operations that go with a district office set-up and with adoption of a fixed, efficient program. The current 1948-49 budget of the Bureau of Street Traffic Engineering is \$1,328,200, exclusive of estimates for new traffic control equipment. The total estimate of \$1,575,000 for the recommended organization contains \$500,000 for signals and channelizing. Personnel and operating expenses, therefore, are less under the proposal than they are at present. The cost of the recommended program amounts to less than \$1 per capita, and only about \$2 per motor vehicle registered in the city.

Job Descriptions and Qualifications

In determining the organization needed to modernize traffic administration in Los Angeles, the Traffic Survey Committee naturally found it necessary to give careful consideration to principal positions upon which the strength of the structure depends. Accordingly, here are presented general recommended job descriptions and qualifications, several of which cover positions not now provided for in the city government. All personnel should be selected under Civil Service provisions.

Director of Traffic Engineering (City Traffic Engineer)

The person selected for this position should have a high level of executive ability, be a graduate of an accredited college, with at least a B.S. degree in Engineering and, have at least 15 years of experience in traffic engineering or the equivalent in related fields. His is the job of administering all functions and activities of the Department, and so should have sound technical knowledge and experience in administration, traffic design, street pavement design and maintenance, survey methods and techniques, traffic control measures, traffic planning and street lighting. Other requisites are writing and speaking ability, talent for progressive thinking, ability to lead, and knowledge of public relations.

Senior Associate Traffic Engineer (Principal Street Traffic Engineer)

In this position should be a graduate of a recognized engineering college or an engineer with at least 10 years of experience in responsible charge of traffic engineering work. He should be familiar with problems of traffic control and with the methods, equipment and principles involved in solution of traffic problems. A reasonable knowledge of statistical principles and practices is essential. He should have ability to direct field studies of traffic conditions, using the data obtained for effective traffic control through electrical and mechanical devices. He should possess leadership and tact in dealing with subordinates.

Associate Traffic Engineer

In the jobs in this classification, should be engineering graduates who have specialized in fields related to traffic engineering. Particularly important is experience in the study and installations of controls in

urban areas. He should have reasonable experience in conducting and supervising statistical analysis and reporting of traffic data, and should be otherwise fitted to carry on the following important work:

Supervising the investigation of traffic conditions and problems through field surveys and study of existing statistical data; developing traffic survey techniques; assigning investigations to subordinates, advising them as to objectives and procedures; analyzing and critically reviewing the reports and recommendations of subordinates as to their adequacy and feasibility; in specific situations, devising methods of control including signals, signs and other control devices; designing or selecting and preparing specifications for such devices and inspecting them for workmanship and suitability both during manufacture and upon delivery; studying the efficacy of existing traffic regulations and formulating and recommending desirable revisions or innovations; assembling traffic and related data in report form and arranging for their dissemination; as aids to traffic studies and control directing the preparation of maps and layouts of proposed traffic structures with indications as to their general characteristics.

Senior Assistant Traffic Engineer

(District Traffic Engineer)

In these positions should be graduate engineers. Each District Traffic Engineer should have specialized in college and have reasonable experience in practice in fields relating to traffic engineering. Experience should include study and investigation of traffic and related transportation problems in urban areas, with some experience in a supervisory capacity. He should be reasonably familiar with problems of traffic control and with the methods, equipment, and principles involved in their solution.

He should have reasonable knowledge of statistical principles and practices as applied to engineering data; reasonable ability in conducting field studies of traffic conditions, in analyzing the data, in designing methods and in utilizing mechanical and electrical devices for effective traffic control. He should possess good powers of observation; be physically active; have tact in dealing with subordinates and others; and initiative and resourcefulness in solving complicated problems of traffic control.

District Traffic Engineers should be in all ways capable of conducting this work:

Investigating traffic conditions in designated areas or at specified locations through field surveys and study of existing pertinent data, determining traffic flows, locations and causes of accidents, and efficacy of existing control devices, marking and regulations; receiving and investigating complaints or reports on undesirable traffic situations such as hazards, accidents or impeded flow; assigning and outlining detail work to subordinates, instructing them on procedures, and reviewing their work during process and upon completion; devising standard methods and forms

for collection and presentation of traffic data; preparing detailed reports on investigations and traffic conditions and formulating detailed recommendations as to methods of improving conditions in specific locations; studying a variety of traffic control devices with respect to their applicability in improving specific conditions and recommending the installation of appropriate equipment; preparing maps and layouts or rough sketches of existing or proposed traffic structures and devices with adequate indications of their general characteristics and features.

Assistant Traffic Engineer

In his college work, the engineering graduate selected for this position should have specialized in traffic engineering or a related field. He should have some experience in engineering field or office work and have reasonable knowledge of the basic engineering subjects as taught in accredited schools. Reasonable familiarity with practices in traffic engineering should be required.

His work will involve responsible assignments of a minor professional nature in both field and office.

Junior Traffic Engineer

Qualifications similar to those established by the Civil Service Commission for Junior Engineer in other professional fields but preferably with some traffic engineering training or experience.

Draftsman

Qualifications as prescribed by Civil Service Commission.

Office Engineer

Qualifications similar to those now prescribed for this position or that of Assistant Civil Engineer.

Traffic Investigator

In this job education should be equivalent to graduation from an accredited four-year high school, and preferably completion of two years in a college of recognized standing. He should have schooling and background to enable him to perform these tasks:

Making field studies of traffic conditions including traffic flow, traffic speeds, street and curb layout, parking needs, traffic hazards, and effectiveness of traffic control devices; interviewing persons, suggesting or requesting traffic control changes; recommending changes in traffic control devices or physical conditions to overcome traffic difficulties; assembling data and writing concise reports substantiating the recommendations; making measurements and preparing work requisitions specifying location, standard messages, and types of erection for traffic signs; consulting with superiors with respect to traffic conditions and solutions of traffic problems. Age limit, 24-45.

Senior Traffic Checker

The minimum requirement to fill this job should be education equivalent to graduation from high school, with preferably some business or clerical experience which has demonstrated a sense of responsibility. He should have knowledge of traffic rules and practices in Los Angeles. He should be capable of handling this work:

Analyzing assignments, determining and obtaining equipment and supplies required; assigning subordinates to posts, instructing them in their duties, seeing that they are properly equipped; observing and evaluating employee performance and attitudes; spot-checking to determine accuracy; inspecting report forms to see that they are properly filled out, reporting on equipment, supplies and progress and performance of employees; individually, performing any or all of the traffic checker duties. Age limits, 24-45.

Traffic Checker

For this position, the minimum education requirement should be completion of two years in, and preferably graduation from, an accredited high school. The checker should possess superior powers of observation and memory. His aptitude and experience should fit him to doing the following:

Making field traffic checks of various types, such as running time check, traffic light check, traffic volume check, speed check, observance check, and pedestrian and vehicular check; making pertinent observations dependent upon the type of check, and recording such observations on a standard form; occasionally making house to house canvasses to determine origin and destination of traffic. Age limits, 18-35.

Sign Shop Supervisor

For this position the education requirement should be equivalent to high school graduation and preferably completion of two years in college, with specialization in business administration or engineering.

It is desirable that he have had experience in management of a small manufacturing or construction enterprise. He should be familiar with the methods, equipment and materials used in traffic control sign fabrication, erection and maintenance. Essential is familiarity with methods of cost accounting, purchasing and stores handling, ability to plan and direct the activities from blueprints and specifications, ability to prepare pertinent records and reports, and tact in dealing with subordinates and general public. His duties consist of:

Planning and coordinating the activities of a moderately large group of employees engaged in fabricating, erecting, and maintaining signs and paint markings on the streets for traffic control; assigning specific work projects to

subordinates, developing and outlining work procedures for the shop and field work; making or supervising tests on paint and other materials used in sign construction; preparing purchase orders for new materials and equipment; making contacts with the purchasing department and vendors and seeing that materials are delivered; making field inspection trips to see that work is performed according to instructions; estimating costs on jobs for other departments and agencies; preparing monthly reports on new signs for approval; preparing monthly activity reports; preparing special reports on various phases of traffic sign work; supervising the cost accounting and billing of other agencies and departments for sign work performed.

Sign Shop Foreman

The holder of this job should be a graduate of an accredited high school. He should have reasonable experience, including supervisory, in sign shop work. He should be able to work from blueprints and specifications and otherwise qualified to handle the following duties:

Supervising a large group of employees engaged in fabricating, erecting, and maintaining traffic control signs, involving both field work, such as washing signs, installing posts, hanging signs and painting street markings, and shop work, such as cutting sign blanks, making brackets and hangers, painting signs, posts and hangers; assigning skilled workmen and others to specific crews and designating the leadman in each crew; dispatching crews to field assignments and assigning workmen to shop work; inspecting work during process and upon completion; advising and instructing subordinates as necessary; seeing that necessary materials are on hand; devising new or improved methods of sign fabrication and erection; designing and laying out the parts for new types of signs and new equipment; instructing subordinates in the new work, the use of safety devices and shop cleanliness; keeping simple time records and records of materials used.

Sign Shop Sub-Foreman

The person qualifying for this job should be a high school graduate, or equivalent. He should have reasonable experience in fabrication and or erection and in maintenance of traffic control signs, and be able to work from blueprints and specifications. His duties are:

Working with and supervising a moderate sized group of employees engaged in the fabrication and painting of traffic control signs by: seeing that workmen are performing the job to which they are assigned; inspecting work in progress and upon completion to see that the quality is satisfactory; shifting employees from job to job according to the work load; instructing new employees in shop procedures and the various wood and metal working and painting operations. Individually he should perform some of the more difficult shop work such as laying out and

assembling new jigs and fixtures, laying out and making samples of new sign blanks and brackets, repairing and trying out shop equipment, trying out new paint materials or methods of application.

Chief Electrician and Traffic Signal Electrician

Qualifications as prescribed by Civil Service Commission.

Signal Shop Supervisor and Signal Shop Foreman

Qualifications similar to those for sign shop supervisor and foreman, except experience should be in electrical field rather than in sign fabrication and metal working.

Objectives of this study did not encompass an appraisal of the qualifications of the present staff of the Bureau of Street Traffic Engineering. No attempt was made to correlate present staff with the recommended job descriptions; rather effort was confined to describing the jobs and qualifications of the personnel necessary to carry out the functions of the recommended traffic engineering department. The task of fitting present personnel to the recommended organization properly is the responsibility of the Civil Service Commission and of the Director of Traffic Engineering.



The End Result

Adoption of a modern street traffic management program in accordance with the recommendations of the Traffic Survey Committee will result in more efficient use of the streets, in lessened congestion, and in fewer accidents.

Under a traffic administration fitted to needs and faithfully carried out, with emphasis on professional and technical standards, the gains should far out-balance the cost. Gains, however, will not be spectacular; rather they will come gradually. But the gains will be accumulative and permanent.

As shown in the Budget section of this chapter, operating expense of the recommended program would be in the neighborhood of present costs. Consequently, if value is to be placed on prevention of death and accident, on reduction of congestion, and on a more free-flowing traffic, there is but one answer. That is adoption of a forward looking traffic administration and its placement on a firm foundation comparable to that of other well established functions of city government.