



610.8

# DOWNTOWN LOS ANGELES

S.C.R.T.D. LIBRARY

# PARKING STUDY

# DOWNTOWN BUSINESS MEN'S ASSOCIATION

TL  
175  
.D68

# DOWNTOWN BUSINESS MEN'S ASSOCIATION *of* LOS ANGELES



## O F F I C E R S

NEIL PETREE, President  
President, Barker Bros. Corporation

FRANK SIMPSON, JR., Vice President  
Chairman, Savoy Hotel Company

W. J. BRUNMARK, Chairman of the Board  
Vice President, The May Company

B. O. MILLER, Vice President  
President, W. I. Hollingsworth & Co.

WALTER H. ROLAPP, Vice President  
Vice President, Pacific Mutual Life Insurance Co.

A. L. LATHROP, Treasurer  
Vice President, Union Bank & Trust Co.

WALTER J. BRAUNSCHWEIGER, Chairman Finance Com.  
Vice President, Bank of America

RAY W. SMITH, Secretary and General Manager

## TRANSPORTATION DEPARTMENT

### *Directing Committee*

P. G. WINNETT, General Chairman

W. H. ROLAPP, Vice Chairman

CARL BUSH, Director

WALTER J. BRAUNSCHWEIGER

E. E. DUQUE

GEORGE O'BRIEN

C. A. RUDE

T. E. IVEY, JR.

### *Sub-Committees*

#### **PUBLIC TRANSPORTATION**

E. E. DUQUE  
Chairman

BARNEY C. SLAVIN  
PORTER BRUCK

#### **TRAFFIC REGULATION**

T. E. IVEY, JR.  
Chairman

C. R. KNAPP  
FRED S. HILPERT

#### **HIGHWAY**

GEO. J. O'BRIEN  
Chairman

WALTER J. BRUNMARK  
ROBERT L. McCOURT

#### **LEGAL**

JAS. L. BEEBE  
Chairman

S. F. MACFARLANE

#### **FINANCE**

C. A. RUDE  
Chairman

#### **PARKING**

W. J. BRAUNSCHWEIGER  
Chairman

EUGENE P. CLARK  
WM. H. SCHUCHARDT

### *Public Information*

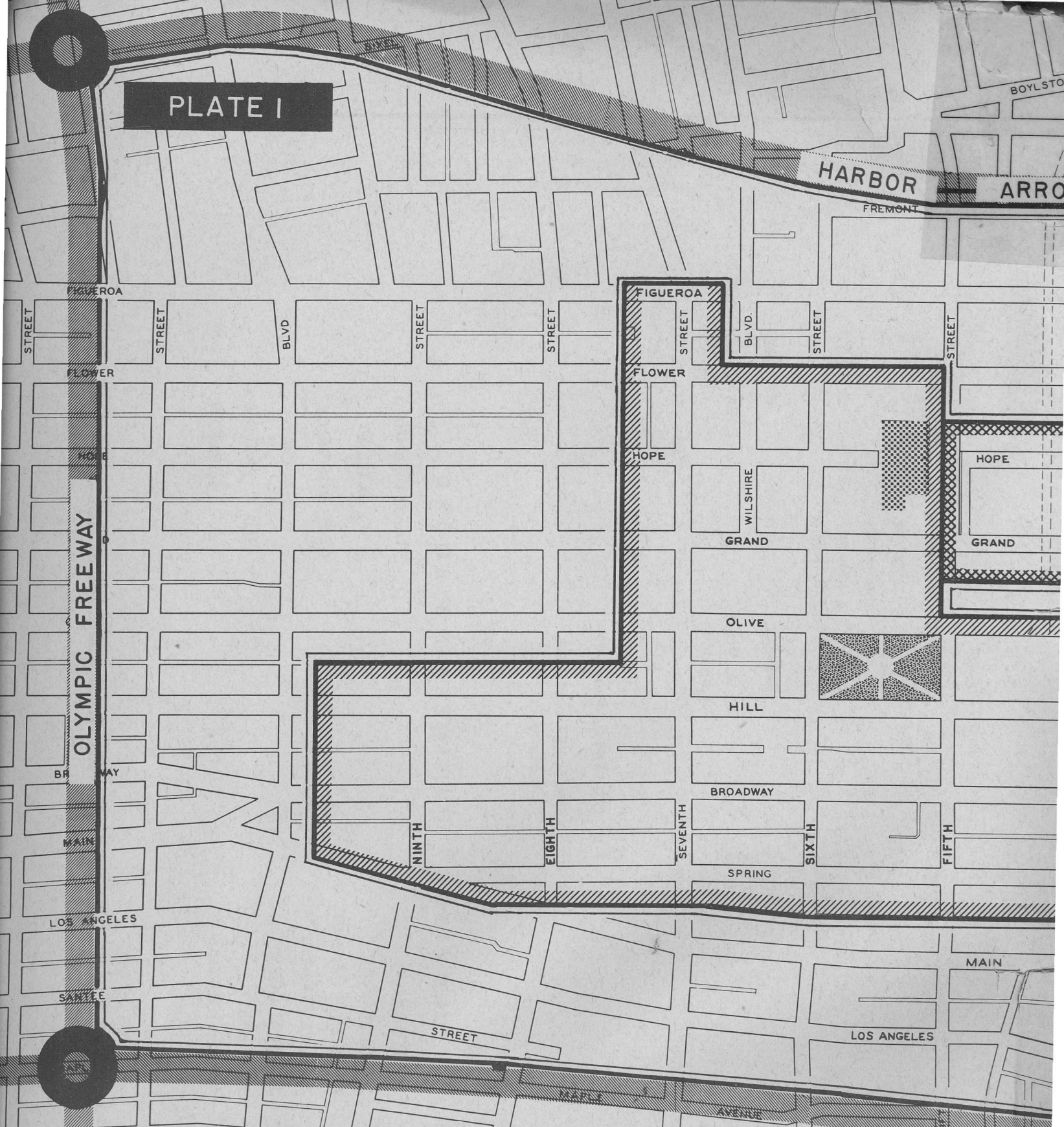
FRED KERMAN  
Chairman


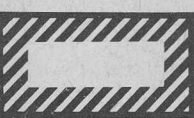
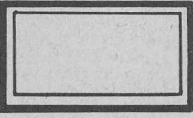
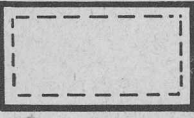
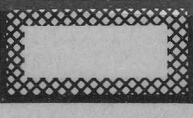
### **ADVISORY ENGINEERING BOARD**

A. H. ADAMS  
LLOYD ALDRICH  
CHARLES B. BENNETT  
S. V. CORTEYOU  
RALPH T. DORSEY  
E. E. EAST  
WM. H. GORMAN

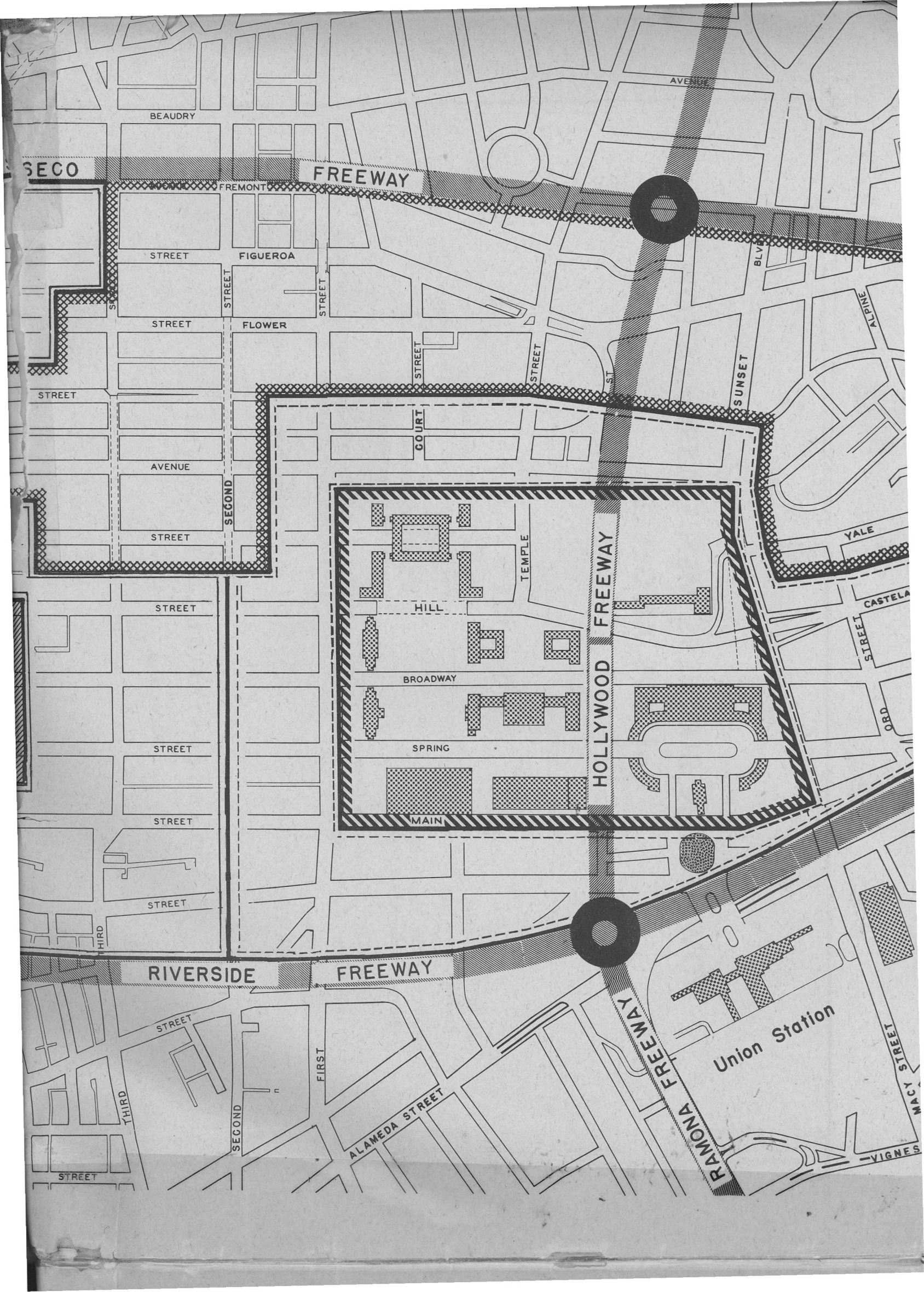
STANLEY LANHAM  
H. O. MARLER  
C. E. MORGAN  
J. D. NAILOR  
FRED C. PATTON  
JAS. L. RONNOW

# PLATE I



	Downtown Business District		Civic Center Building Area
	Business District Parking Area		Civic Center Parking Area
	Hill District		

0 300 600  
SCALE IN FEET



SECO

FREEWAY

BEAUDRY

STREET

FIGUEROA

STREET

FLOWER

STREET

AVENUE

STREET

STREET

STREET

STREET

STREET

RIVERSIDE

FREEWAY

STREET

THIRD

SECOND

FIRST

ALAMEDA STREET

STREET

HOLLYWOOD FREEWAY

HILL

BROADWAY

SPRING

MAIN

TEMPLE

COURT

Union Station

RAMONA FREEWAY

YALE

CASTELA

ORD

MACY STREET

VIGNES

AVENUE

FREMONT

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

HIRD

STREET

STREET

STREET

STREET

SECOND

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

ST

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

STREET

SUNSET

BLVD

ALPINE

STREET

STREET

STREET

STREET

STREET

STREET

OFFICERS AND MEMBERS OF BOARD OF DIRECTORS

G. E. ARBOGAST PRESIDENT AND GENERAL MANAGER  
NEWBERY ELECTRIC CORPORATION

DR. FRANK F. DARHAM PUBLISHER  
LOS ANGELES EVENING HERALD AND EXPRESS

HARRY J. BAUER PRESIDENT  
SOUTHERN CALIFORNIA EDISON CO.

J. M. BIDLAKE DIVISION MANAGER  
SOUTHERN CALIFORNIA TELEPHONE COMPANY

GEORGE C. BROCK PRESIDENT, BROCK AND COMPANY

ASA V. CALL PRESIDENT  
PACIFIC MUTUAL LIFE INSURANCE COMPANY

R. A. CARRINGTON, JR. PUBLISHER  
LOS ANGELES EXAMINER

NORMAN CHANDLER PRESIDENT AND GENERAL MANAGER  
LOS ANGELES TIMES

EUGENE P. CLARK PRESIDENT  
ELI P. CLARK ESTATE, INC.

LAWRENCE E. CORWIN VICE PRESIDENT  
METROPOLITAN THEATRES, INC.

E. E. DUQUE PRESIDENT  
CALIFORNIA PORTLAND CEMENT CO.

L. G. FREEMAN VICE PRESIDENT, FOREMAN & CLARK

P. B. HARRIS PRESIDENT  
LOS ANGELES RAILWAY CORPORATION

I. N. HASKELL PRESIDENT AND GENERAL MANAGER  
HARRIS & FRANK

H. B. HILL VICE PRESIDENT, J. J. HAGGARTY CO.

FRED S. HILPERT VICE PRESIDENT  
THE FARMERS & MERCHANTS NATIONAL BANK

URBAN S. HIRSCH, SR. PRESIDENT  
HIRSCH MERCANTILE CO. (FAMOUS DEPARTMENT STORE)

SIDNEY HOEDEMAEKER PRESIDENT, PIG'N WHISTLE

WILLIAM A. HOLT FIRST VICE PRESIDENT  
BULLOCK'S, INC.

FRED B. HUESMAN PRESIDENT AND GENERAL MANAGER  
DESMOND'S

W. A. INNES PRESIDENT, INNES SHOE CO.

H. D. IVEY PRESIDENT  
CITIZENS NATIONAL TRUST & SAVINGS BANK

T. E. IVEY, JR. VICE PRESIDENT, CALIFORNIA BANK

J. A. LAMB VICE PRESIDENT  
BROADWAY DEPARTMENT STORE, INC.

JAMES LIDDELL MANAGER, MULLEN & BLUETT

W. H. LOLLIER MANAGER, TAX, REAL ESTATE AND CIVIC  
PUBLIC RELATIONS, FOX WEST COAST THEATRES CORP.

BARON LONG PRESIDENT, BILTMORE HOTEL

A. MACCORQUODALE VICE PRESIDENT AND GENERAL  
MANAGER, FIFTH STREET STORE

S. F. MACFARLANE ATTORNEY-AT-LAW

JAMES R. MARTIN SECRETARY AND TREASURER  
CENTRAL INVESTMENT CORPORATION

TOM MAY VICE PRESIDENT, THE MAY COMPANY

ROBERT L. MCCOURT, SR. PRESIDENT  
W. ROSS CAMPBELL CO.

MALCOLM MCNAGHTEN PRESIDENT  
BROADWAY DEPARTMENT STORE, INC.

ROBERT H. MOULTON PRESIDENT  
R. H. MOULTON & COMPANY

STUART O'MELVENY ATTORNEY AT-LAW  
O'MELVENY & MYERS

GEORGE F. PFAFFENBERGER  
THE PACIFIC SOUTHWEST MANAGER, OWL DRUG CO.

LEONARD E. READ GENERAL MANAGER  
LOS ANGELES CHAMBER OF COMMERCE

T. J. REYNOLDS VICE PRESIDENT AND GENERAL COUNSEL  
SOUTHERN CALIFORNIA GAS CO.

C. A. RUDE VICE PRESIDENT  
SECURITY-FIRST NATIONAL BANK OF LOS ANGELES

A. T. SCHABER PRESIDENT, SCHABER CAFETERIA CO.

J. W. SCHNEIDER PRESIDENT, J. W. ROBINSON CO.

J. M. SIEROTY EXECUTIVE VICE PRESIDENT  
EASTERN-COLUMBIA

A. N. SLAVICK PRESIDENT, SLAVICK JEWELRY CO.

O. A. SMITH PRESIDENT  
PACIFIC ELECTRIC RAILWAY COMPANY

ROBERT L. SMITH GENERAL MANAGER, DAILY NEWS

GEORGE S. STROUD PRESIDENT, SILVERWOOD'S

W. E. TEAGUE VICE PRESIDENT AND MANAGER  
LOS ANGELES UNION TERMINAL, INC.

C. L. TERRILL GENERAL MANAGER  
THE CITY MARKET OF LOS ANGELES

THEO. J. VAN DE KAMP FIRST VICE PRESIDENT  
VAN DE KAMP'S HOLLAND-DUTCH BAKERS, INC.

J. B. VAN NUYS PRESIDENT  
I. N. VAN NUYS BUILDING COMPANY

JAMES G. WARREN PRESIDENT, WARREN & BAILEY CO.

P. G. WINNETT PRESIDENT, BULLOCK'S, INC.

GEORGE E. WORSTER PRESIDENT  
YELLOW CAB COMPANY OF CALIFORNIA

NEIL PETREE, PRESIDENT  
PRESIDENT, BARKER BROS. CORPORATION

FRANK SIMPSON, JR., VICE PRESIDENT  
CHAIRMAN, SAVOY HOTEL COMPANY

W. J. BRUNMARK, CHAIRMAN OF THE BOARD  
VICE PRESIDENT, THE MAY COMPANY

B. O. MILLER, VICE PRESIDENT  
PRESIDENT, W. I. HOLLINGSWORTH & CO.

WALTER H. ROLAPP, VICE PRESIDENT  
VICE PRESIDENT, PACIFIC MUTUAL LIFE INSURANCE CO.

A. L. LATHROP, TREASURER  
VICE PRESIDENT, UNION BANK & TRUST CO

WALTER J. BRAUNSCHWEIGER  
CHAIRMAN, FINANCE COMMITTEE  
VICE PRESIDENT, BANK OF AMERICA

RAY W. SMITH  
SECRETARY AND GENERAL MANAGER

## DOWNTOWN BUSINESS MEN'S ASSOCIATION

of LOS ANGELES

590 SUBWAY TERMINAL BUILDING • 417 SOUTH HILL STREET • MICHIGAN 1213  
LOS ANGELES 13, CALIFORNIA

January 10, 1945

### TO THE PRESIDENT AND BOARD OF DIRECTORS:

The following report of the Parking Committee of the Transportation Department is submitted to the President and Board of Directors in the hope that it will establish certain basic factors in the solution of the automobile parking problem affecting the Downtown Area. It is believed that the facts collected and presented in the report will help the Association to develop and present from time to time to its members and interested government officials, plans which will progressively meet the growing need for more and better parking facilities in Downtown Los Angeles.

On later pages of the report we have endeavored to give due credit to those to whom we are indebted for much of the information hereafter set out in text, charts and maps, but we feel that special mention should be made here of the great assistance given us by the Regional Planning Commission of Los Angeles County and its staff who provided information secured by them in a comprehensive parking and transportation survey of Los Angeles Downtown Area in 1941. With the help of this information it has been possible for us to determine the general conditions affecting parking as they existed before the changes in business and automobile uses brought on by the war had occurred. From this basic background estimates have been made to cover the parking needs of the post-war future.

This report is not presented as a solution of the parking problem, but as a contribution to the solution which must be found by continuous action and study. To this end certain recommendations for immediate action and further study are presented.

Respectfully submitted,

#### PARKING COMMITTEE

Walter J. Braunschweiger, Chairman  
Eugene P. Clark

William H. Schuchardt

Carl Bush, Director of Transportation

"DOWNTOWN LOS ANGELES HAS EVERYTHING"

ORGANIZED FOR YEAR-ROUND  
COOPERATIVE PROMOTION AND  
PROTECTION OF DOWNTOWN  
BUSINESS AND PROPERTY.



# TABLE OF CONTENTS

## SECTION ONE — *Basic Information*

	PAGE
Downtown Los Angeles - - - - -	5
Transportation Facilities - - - - -	5
Parking Requirements - - - - -	5
Parking Habits - - - - -	9
Parking Facilities, 1941 - - - - -	9
Types and Location of Parking Facilities Studied - - -	11
Improvements in Parking Service - - - - -	13
Improved Validating Service - - - - -	13

## SECTION TWO — *Location of Parking Facilities*

Redistribution of 1941 Parking Facilities - - -	15
---	----

## SECTION THREE — *Operating Costs*

Operating Cost Distribution - - - - -	19
Parking Cost Tables - - - - -	19-21
Present Parking Rates - - - - -	21

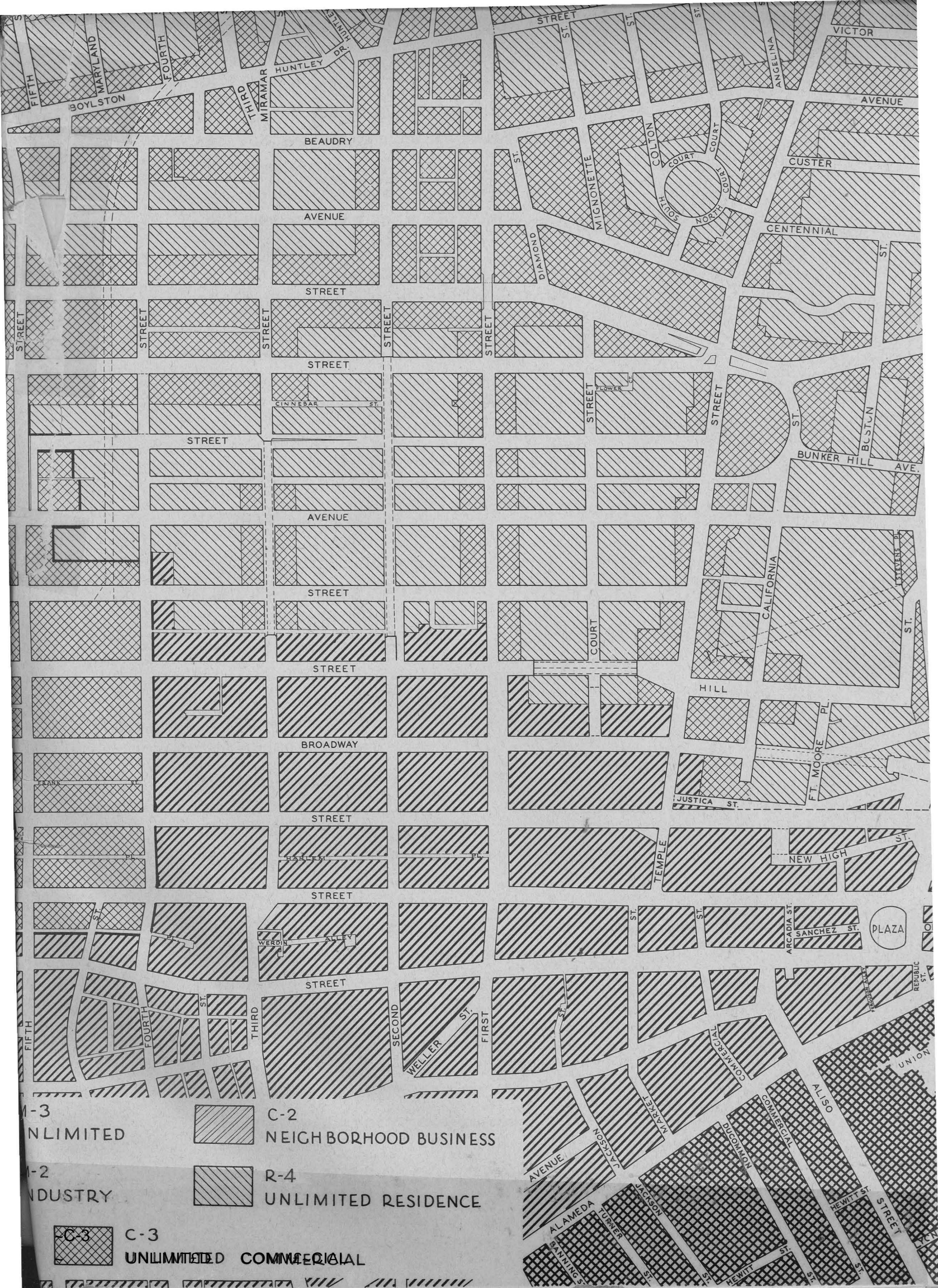
## SECTION FOUR — *Possible Solutions*

Permanent Solution - - - - -	22
Recommendations for Immediate Action - - -	22
Recommendations for Future Action - - - - -	23

<b>ACKNOWLEDGMENTS</b> - - - - -	23
----------------------------------	----

## LIST OF PLATES

PLATE	TITLE	PAGE
I	Downtown Los Angeles - - - - -	2
II	Downtown Zoning - - - - -	4
III	Building Heights and Construction - - -	6
IV	Cordon Traffic Counts - - - - -	7
V	Origin of Parked Cars - - - - -	8
VI	Proposed Freeway System - - - - -	8
VII	Parking Facilities, 1941 - - - - -	10
VIII	Pedestrian Traffic Flow by Hours - - -	12
IX	Pedestrian Traffic Flow, All-Day - - -	14
X	Ideal Distribution of Parking Facilities - - -	16
XI	Practical Distribution of Parking Facilities - - -	17
XII	Photograph, Downtown Parking Lot - - -	18
XIII	Sketch, Improved Parking Lot - - - - -	20

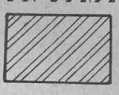


M-3  
UNLIMITED

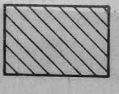
M-2  
INDUSTRY



C-3  
UNLIMITED COMMERCIAL



C-2  
NEIGHBORHOOD BUSINESS



R-4  
UNLIMITED RESIDENCE

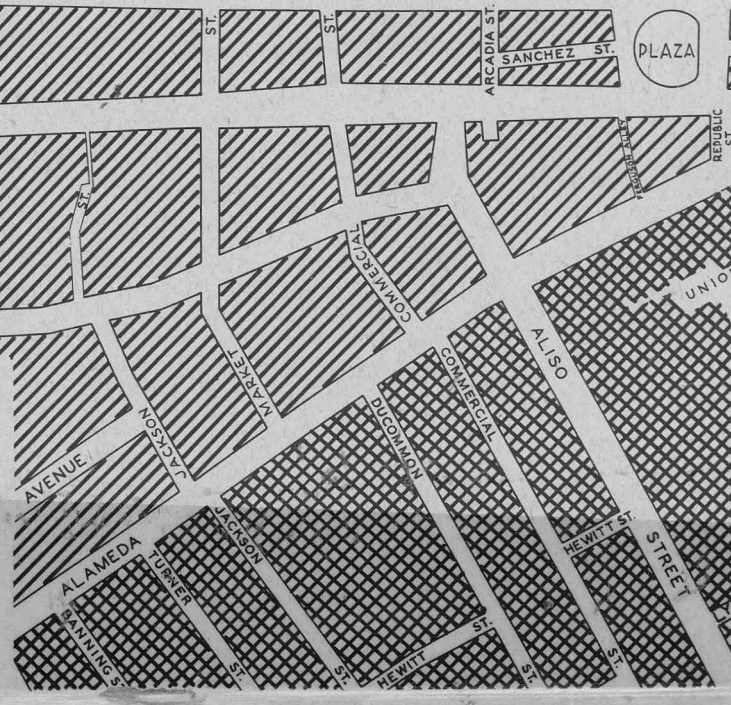
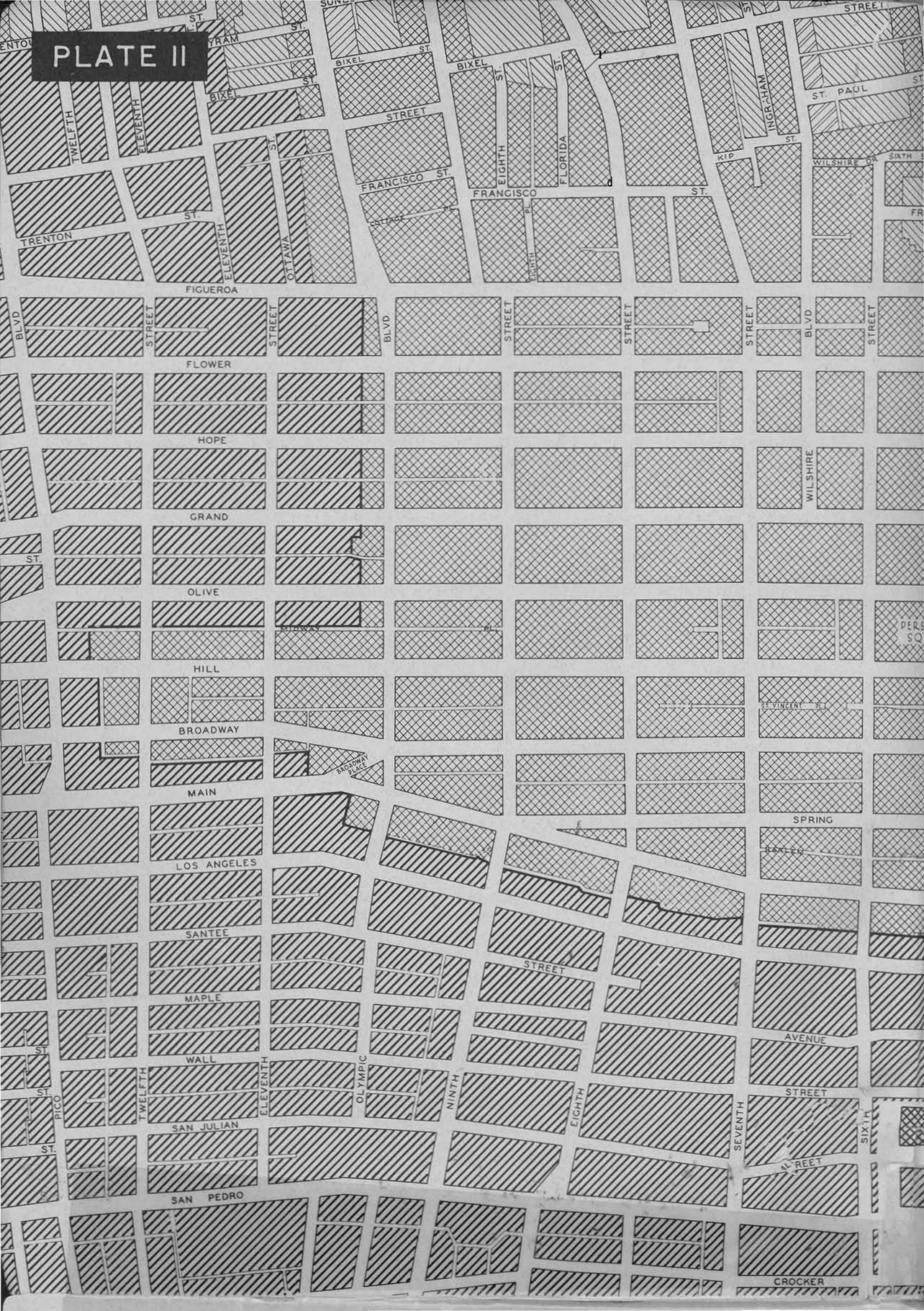




PLATE II



# D O W N T O W N L O S A N G E L E S

## Section One

### BASIC INFORMATION

#### DOWNTOWN LOS ANGELES

The name "Downtown Los Angeles" has for many years been applied to that portion of the city which is bounded by Sunset and Pico Boulevards on the north and south and by Los Angeles and Figueroa Streets on the east and west. This area is approximately 9,600 feet long and 3,400 feet wide. Within it are located the city's largest retail stores; the principal offices of the banks and other financial institutions serving Southern California; and the Civic Center, in which are located practically all city, county, state and federal administration buildings.

Downtown Los Angeles is the geographical center of the population of Los Angeles County as determined by the 1940 census. The population of the county as of January 1, 1945, is reliably estimated to be 3,375,150.

For convenience in preparing this report, the Downtown Area has been divided into five districts as shown on PLATE I. They are as follows: Downtown Business District comprising the city blocks in which most of the major stores, financial headquarters, and modern office buildings are located; Civic Center Building District as adopted by the city and county; the Hill District which, by reason of its location and an average altitude of one hundred feet or more above the remainder of the area, is an important factor in the parking problem; and Parking Districts for the Business and Civic Center Districts.

The Parking Districts have been so designated because they are naturally located where they will best serve the active Business and Civic institutions, and because they contain comparatively few important buildings or businesses. Many vacant lots, inexpensive buildings, and generally lower property values make it possible to locate within these districts parking lots and garages which will adequately meet the demand for low- and medium-priced parking accommodations, while centrally located garages offering higher priced services can be located within the Business and Civic Center Districts.

#### TRANSPORTATION FACILITIES

As the original business center for the area now known as Los Angeles County, Downtown Los Angeles has through the years been the natural center of public and private transportation serving the county. Local and interurban street car and bus systems cover the county with a network of lines which can

furnish excellent transportation for most of the county's population given the area within a five-mile District.

The street and highway systems generally center in the Downtown Area. All regularly employed men and women within a few miles of the Area work at locations at points from which a direct route is available through the Area, while shopkeepers and business people desire to reach the Area because it offers them the ample space for many large stores and specialty shops.

The rapid increase in automobile traffic has made the street and highway system the breaking point. The chart around the central traffic district, PLATE IV, illustrates graphically the flow of automobiles into and through the Area under present conditions.

#### PLATE I—

Map shows the Downtown Los Angeles Area as outlined in the text. Proposed freeways are shown in approximate locations. The Civic Center Building District and First Street are realigned as shown.

The five districts outlined in the map are available for open-air parking lots and Civic Center Districts.

#### PLATE II—

For convenience in studying PLATE II, showing the zoning of the Downtown Area, it will be noted that the areas zoned generally confine the Business District boundaries on the north, east, and south, and act as an additional barrier on the west.

#### PLATE III—

PLATE III, showing building heights, provides additional basic information determining the proper amount of material changes that have occurred in the Downtown Area since the Automobile Club.

# LES PARKING STUDY

Downtown Los Angeles for  
Particularly good coverage is  
of the Downtown Business

of the city and county natur-  
because a large proportion of  
women residing within twenty  
within or near Downtown or  
from home to work leads  
using automobiles for trans-  
Downtown Business District be-  
cks and shopping facilities of  
ops in one compact area.

le traffic had, by 1942, taxed  
the city and county almost to  
ordon counts made at points  
in October, 1941, shown on  
the tremendous flow of auto-  
Downtown Area under pre-war

## PAGE TWO

Los Angeles Area as described in  
ing up the Downtown loop are  
Proposed public buildings are  
District, and streets north of  
proposed by the city engineer.  
ate graphically the locations  
s in relation to the Business

## PAGE FOUR

he parking problem, PLATE  
Downtown Area, was prepared. It  
for manufacturing automati-  
rather closely to its present  
south, while the Hill District  
north.

## PAGE SIX

ights and type of construction,  
on of considerable value in de-  
location of parking spaces. No  
nce this map was prepared by

To meet the insistent demand for highways to serve the traffic needs of this and other areas throughout the State of California, a system of freeways is being projected and planned by state, county, and city engineers. The chart map, PLATE VI, shows the general plan of freeways designed to serve most of Los Angeles County. Completed freeways and those proposed for immediate post-war construction are indicated.

The importance of completing the freeway system as rapidly as possible must be apparent to everyone, but the completion of even the units proposed for immediate post-war construction will present a new parking problem in the Downtown District which must be solved if traffic is to move freely and economically.

PLATE I shows the approximate location of the freeway loop which it is proposed to build around the Downtown Area as a part of the county-wide system shown on PLATE VI. The importance of this loop will be pointed out in later paragraphs.

The proposed freeway construction will not only serve the average automobile user, but will also provide means for rapid bus operations between all points joined by the freeway system. Steps are now being taken to provide necessary legislation which will permit selling franchises for bus operations on terms which will collect from the bus operator a fair share of the construction and upkeep costs.

Everything possible should be done to take full advantage of the possibilities of Public Transportation, and much may be done to make it more attractive to prospective customers of the Downtown District; but **proper provision must be made** for the automobile user if the District is to get its fair share of the increase in business which will develop in the post-war period.

## PARKING REQUIREMENTS

The problem of providing "terminal facilities" for automobiles in business districts is so common and so thoroughly known by everyone familiar with business development that no lengthy statement is required here to prove that a successful business district in Southern California must provide ample, well located, reasonably priced and permanent parking facilities for those who, through necessity or preference, use their automobiles for business transportation.

The business men and business property owners of the Downtown Business District should see to it that adequate parking accommodations, including a liberal ticket validating service provided by stores and offices, are made available to all who may wish to come downtown by automobile.

(Continued on Page Nine)

# PARKING SURVEY LOS ANGELES METROPOLITAN AREA 1941

ENGINEERING DEPARTMENT  
AUTOMOBILE CLUB OF SOUTHERN CALIFORNIA

## PORTION OF LOS ANGELES BUSINESS DISTRICT SHOWING LOCATION AND TYPE OF BUILDINGS AS OF SEPT. 1941

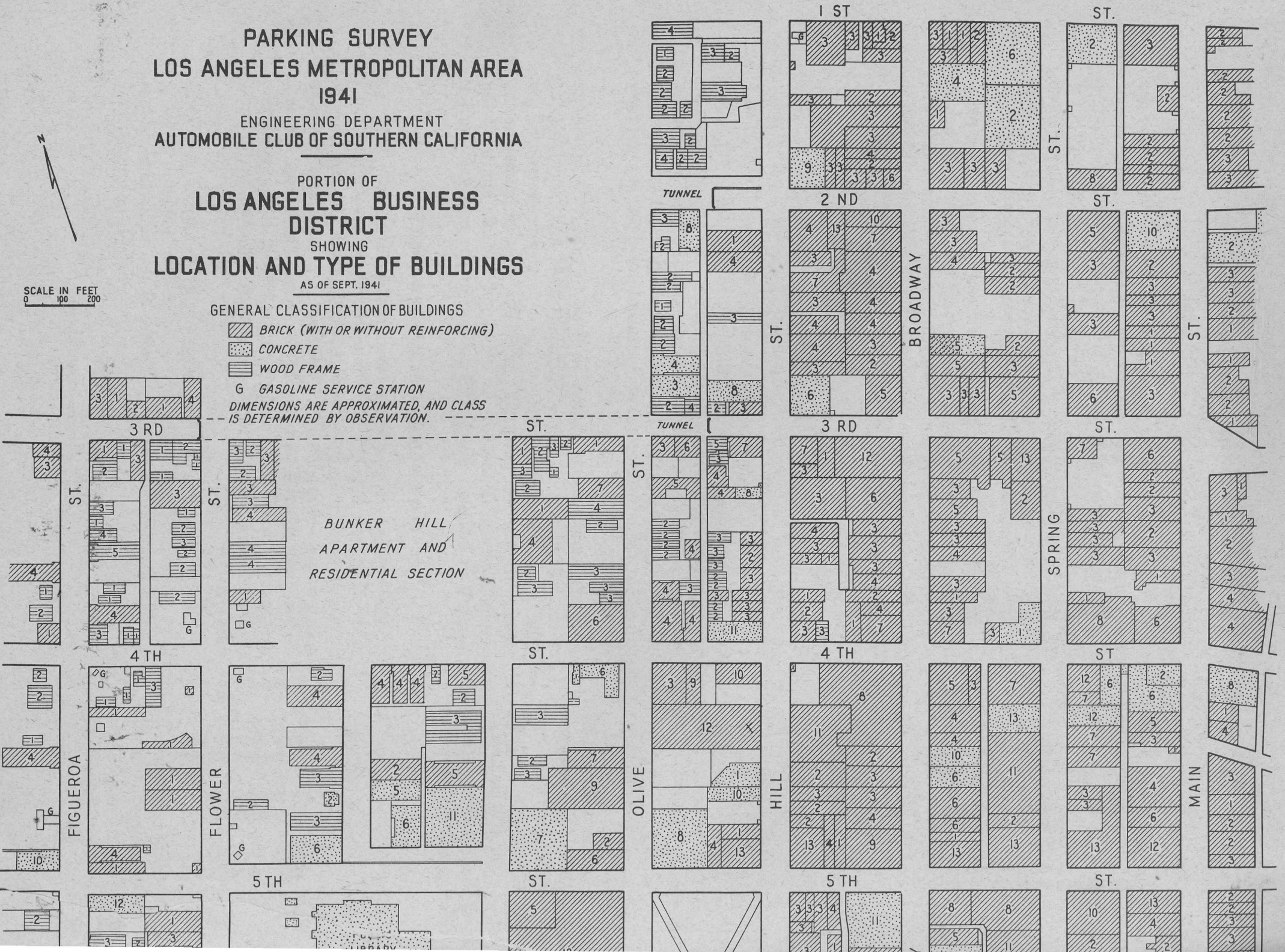


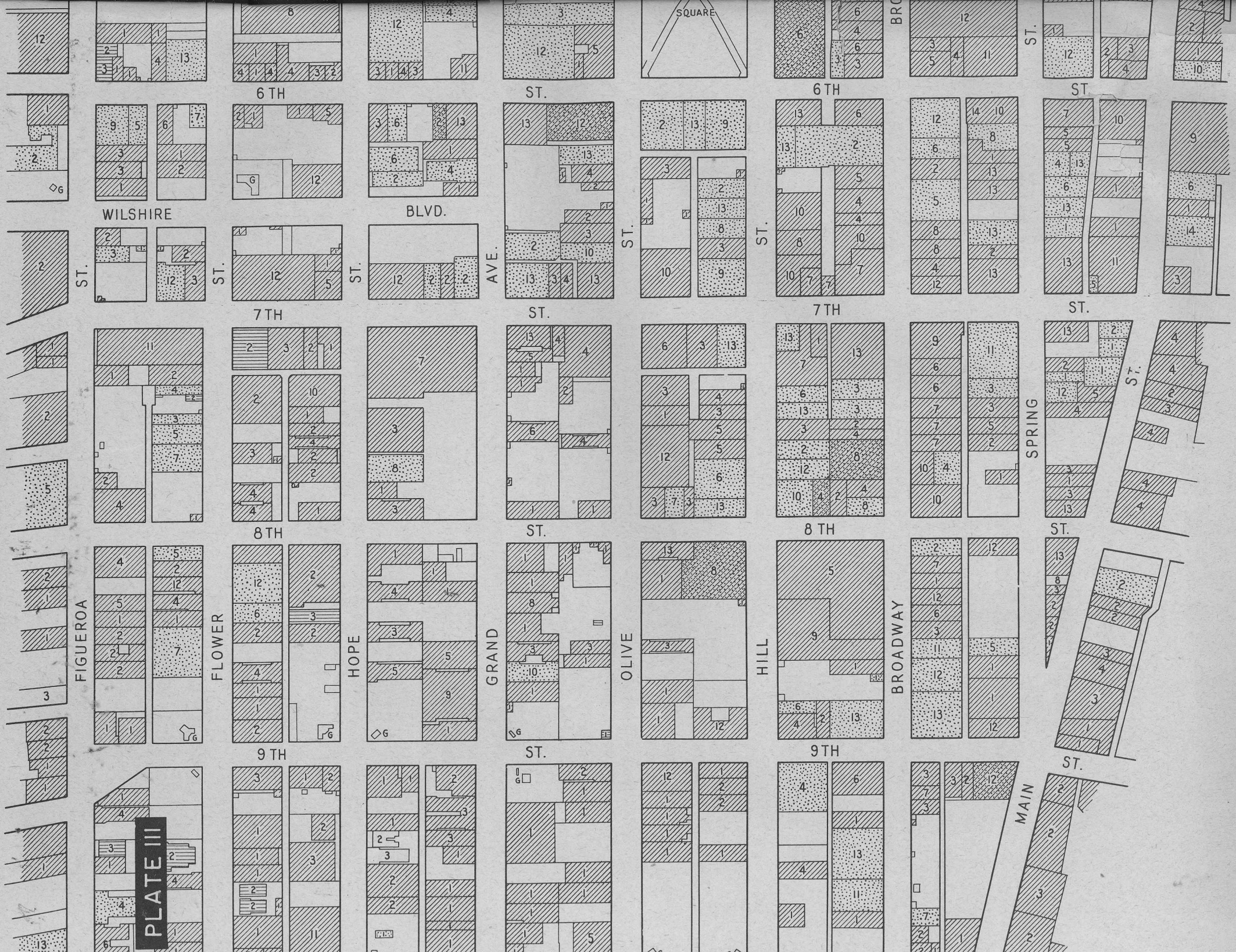
SCALE IN FEET  
0 100 200

### GENERAL CLASSIFICATION OF BUILDINGS

- BRICK (WITH OR WITHOUT REINFORCING)
- CONCRETE
- WOOD FRAME



G GASOLINE SERVICE STATION  
DIMENSIONS ARE APPROXIMATED, AND CLASS IS DETERMINED BY OBSERVATION.



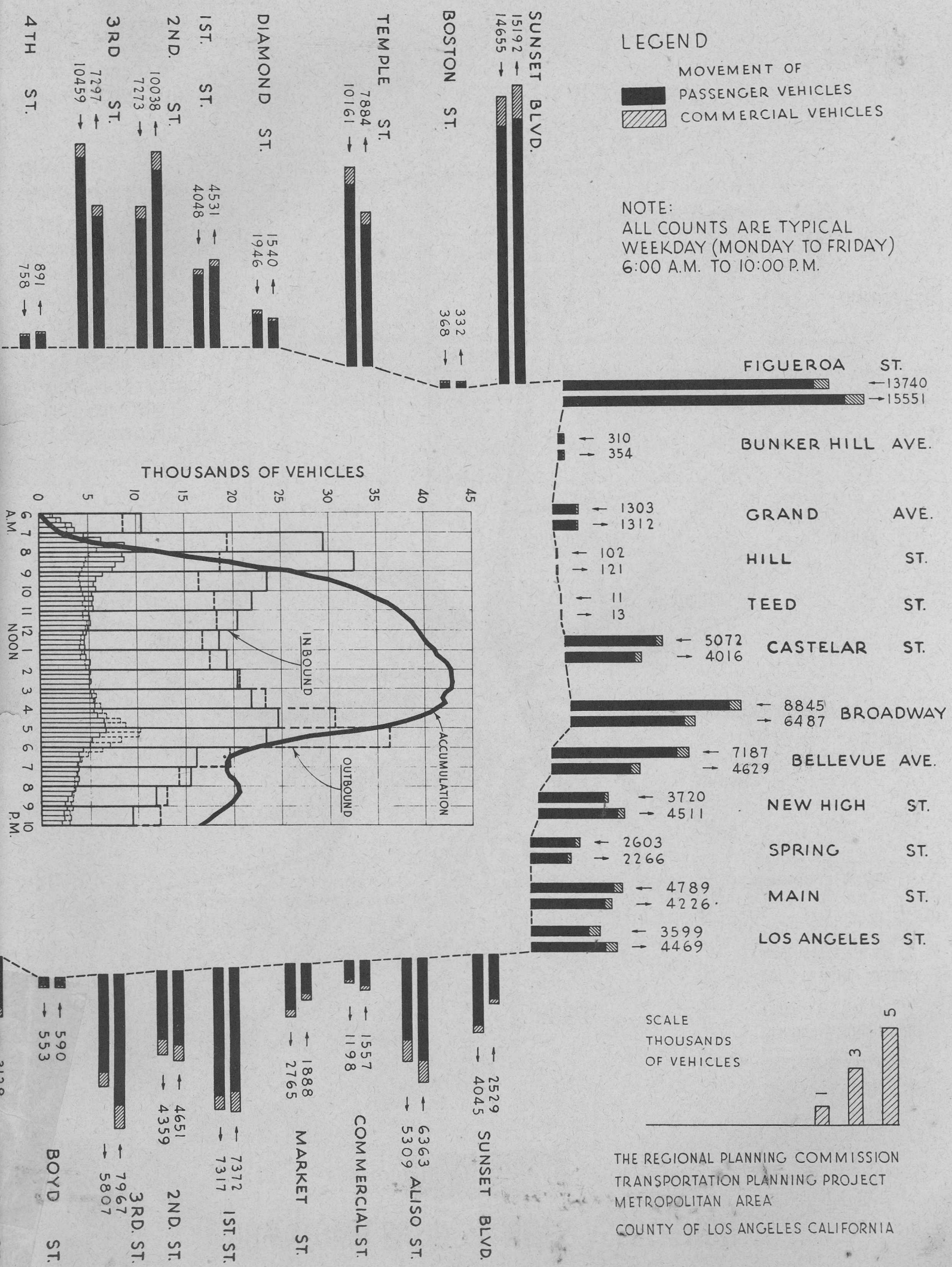


**PLATE III**

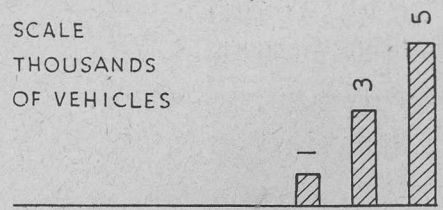
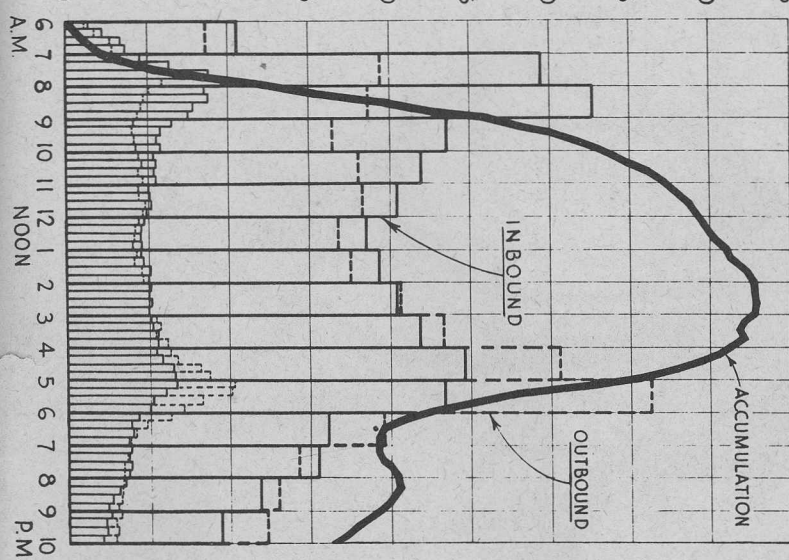
# LEGEND

- MOVEMENT OF
-  PASSENGER VEHICLES
-  COMMERCIAL VEHICLES

NOTE:  
ALL COUNTS ARE TYPICAL  
WEEKDAY (MONDAY TO FRIDAY)  
6:00 A.M. TO 10:00 P.M.



THOUSANDS OF VEHICLES



THE REGIONAL PLANNING COMMISSION  
TRANSPORTATION PLANNING PROJECT  
METROPOLITAN AREA  
COUNTY OF LOS ANGELES CALIFORNIA

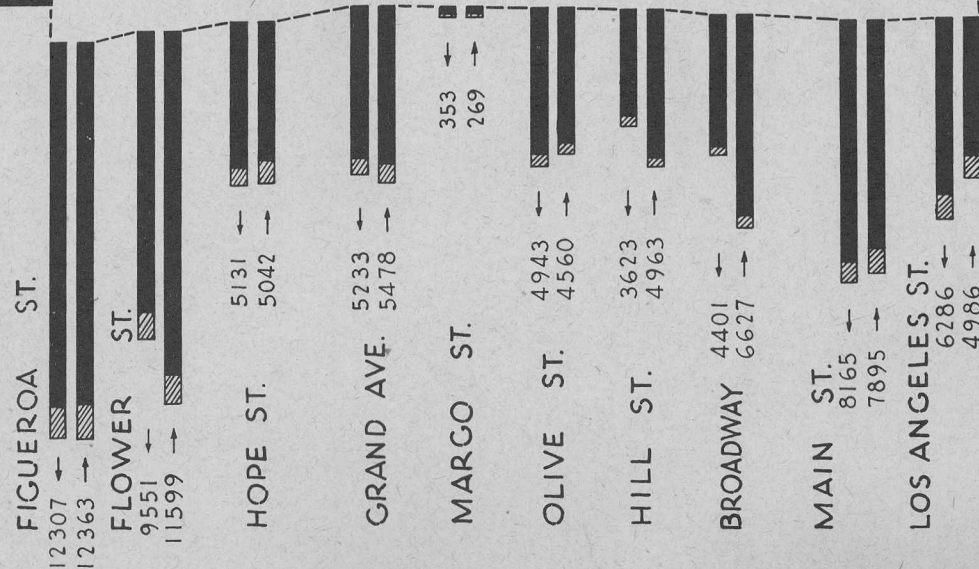
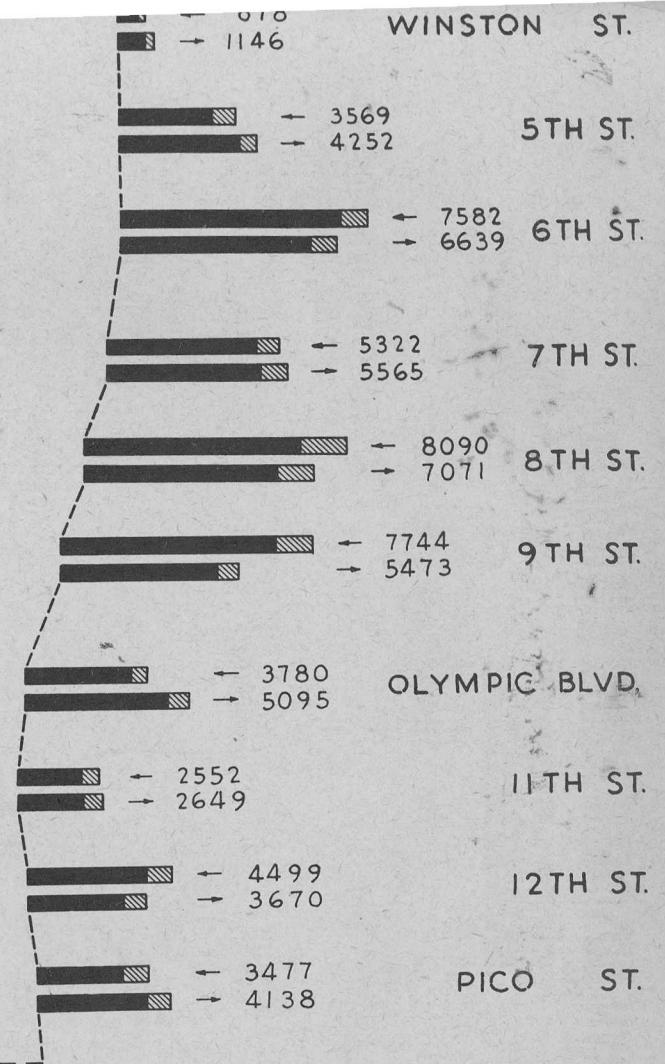
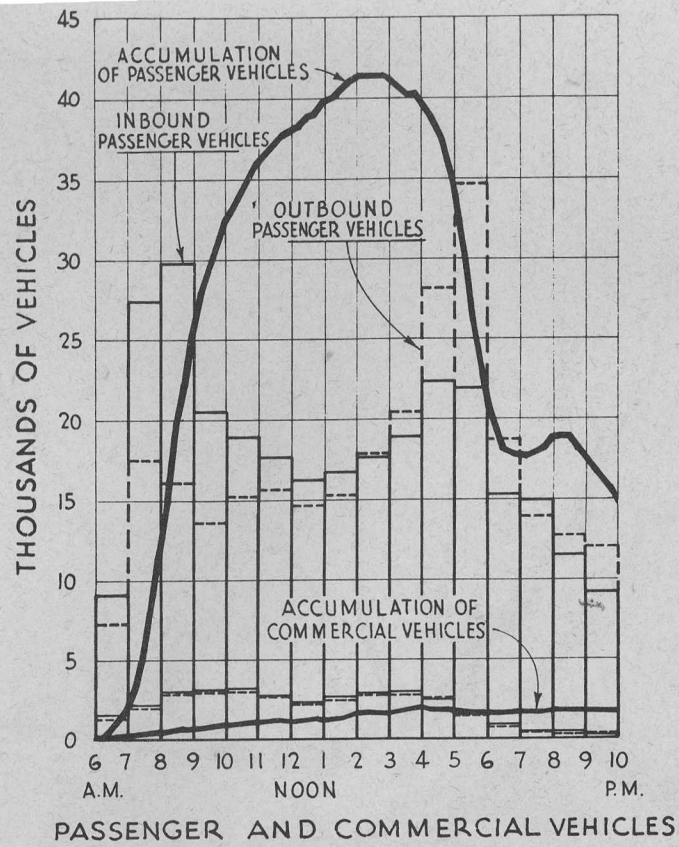
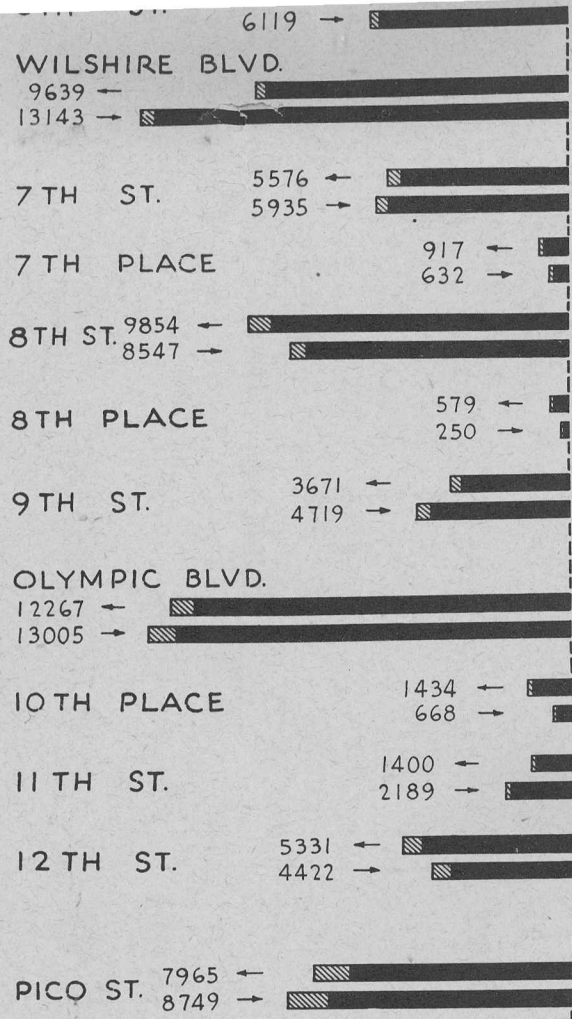
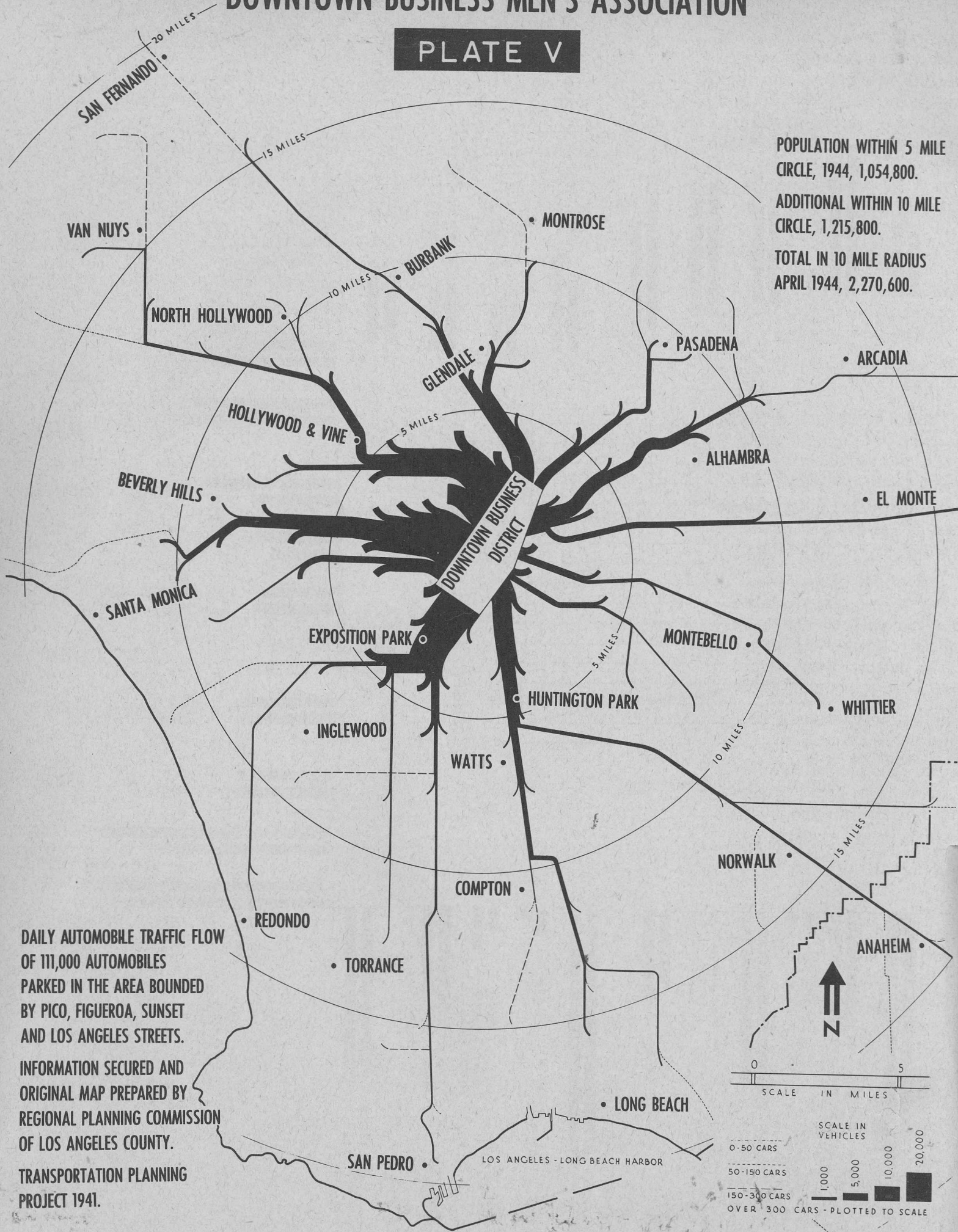


PLATE IV

# DOWNTOWN BUSINESS MEN'S ASSOCIATION

## PLATE V





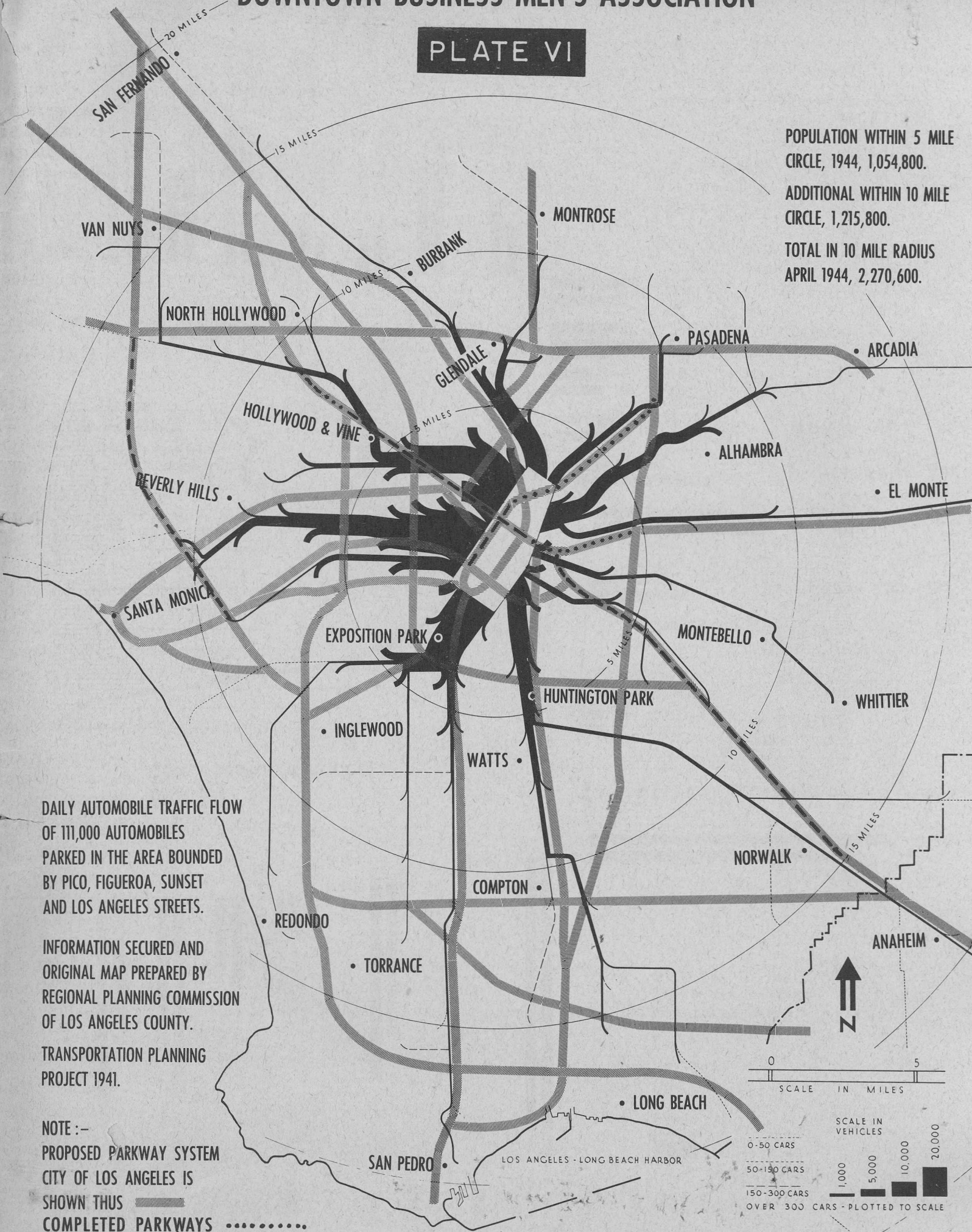
# DOWNTOWN BUSINESS MEN'S ASSOCIATION

## PLATE VI

POPULATION WITHIN 5 MILE CIRCLE, 1944, 1,054,800.

ADDITIONAL WITHIN 10 MILE CIRCLE, 1,215,800.




TOTAL IN 10 MILE RADIUS APRIL 1944, 2,270,600.

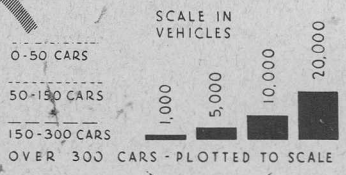
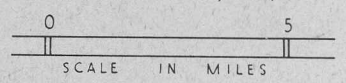


DAILY AUTOMOBILE TRAFFIC FLOW OF 111,000 AUTOMOBILES PARKED IN THE AREA BOUNDED BY PICO, FIGUEROA, SUNSET AND LOS ANGELES STREETS.

INFORMATION SECURED AND ORIGINAL MAP PREPARED BY REGIONAL PLANNING COMMISSION OF LOS ANGELES COUNTY.

TRANSPORTATION PLANNING PROJECT 1941.

NOTE:--  
 PROPOSED PARKWAY SYSTEM CITY OF LOS ANGELES IS SHOWN THUS   
 COMPLETED PARKWAYS   
 POSTWAR CONSTRUCTION 



# D O W N T O W N L O S A N

## PARKING HABITS

A large proportion of parkers are willing to pay and accustomed to paying their own parking costs. For these groups described below it is only necessary to see that they are furnished adequate facilities, properly located and at reasonable and stable parking fees. There are, however, a considerable number who expect, and will demand, free parking if they shop regularly in the District.

Careful studies have been made to determine whether parking needs can be broken down by groups as a guide to a solution of the parking problem affecting the Downtown Business District. It is apparent that the following groups require different services.

1. The all-day parker. Owner, employer, executive, government official.
2. The all-day parker. Employee or other person requiring low-cost parking.
3. The short-time parker. Executive or salesman type, visiting banks, brokers, stores, professional offices, etc.
4. The short-time parker. Visiting governmental offices.
5. The short-time parker. Visiting stores, shops, professional offices, etc.
6. Theatre and hotel customers.

Members of group 1 either have private parking furnished them or are willing to pay from \$10.00 to \$20.00 per month per car parked, depending on location and service. Ticket validations are not necessary for this group.

Members of group 2 wish to get parking as close to their work as possible, but at costs of about \$3.00 per month. Ticket validations are not usually required for this group.

Members of group 3 desire parking in the center of the district, usually, and are willing to pay high rates for periods of one hour or even less. Charges of 25c to 35c will be paid by many in this group for short-time parking if the facilities are located within a few hundred feet of the parker's destination. Ticket validation is seldom necessary.

Members of group 4 desire parking space in or near the Civic Center, for the most part. Ticket validation is unnecessary.

Members of group 5 are typical shoppers who can and will go where parking and other services seem most desirable. About 80% are women, a large portion of whom desire to shop for at least two hours. Parking space near several large stores is desirable for this group. Ease of getting to and in and out of the parking lot or garage will offset the necessity of walking one or

two blocks in many cases. At least one hour, preferably for

Members of group 5 prefer by any parking plan that makes them the best customers of Downtown Los Angeles. At one time, they handle their own parking, but generally buy the better grade of parking. In other words, they are in a position to do so any time they are dissatisfied

## PLATE IV

PLATE IV, showing graph made around the outer boundary of the Downtown Business District, October, 1941, is of particular interest in the studies of parked-car traffic in the Downtown Business District.

It also is interesting and of great importance as a point of freeway location and

The purpose of a cordon of vehicles entering and leaving the Downtown Business District during periods of the day by way of a cordon from north, south, east, and west. The area at any time of day is indicated in the center of the chart.

The accumulation at any point of cars: those which are passing through the Downtown Business District have parked for all day or for part of the day.

It is believed that much of the traffic in the Downtown Business District area throughout the day is accounted for by the system is even partially covered by the widening between Figueroa and

## PLATES V AND VI

PLATES V and VI are maps of the Downtown Business District showing information furnished by the Register of Motor Vehicle Registration. A survey of 111,000 cars parked in parking facilities within the Downtown Business District, October, 1941. PLATE V shows the distribution of cars and masses, the points of origin and route which would logically be followed by the Downtown Business District. On PLATE VI has been overlaid to show the points of origin of parked-car operators could be built at that time. These traffic patterns are shown with maps or figures covering the Downtown Business District. Only those cars parked in the Downtown Business District are shown. The center of these cars originated within the 10-mile circle.

# ELES PARKING STUDY

et validation is expected for at a longer period.

the chief problem to be solved proposed. On the average, they own Businesses. They buy more packages to a large extent and of merchandise. On the other ke their business to other centers with either traffic or parking con-

## PAGE SEVEN

ly the results of cordon counts ries of the Downtown Area in interest in connection with the TES V and VI.

emely important from the stand- gn.

t is to determine the number of e area during the various pe- the streets serving the district The number of cars within the ted by the accumulation curves

e is made up of two groups of u h the district and those which porter periods of time.

traffic now passing through the go around when the freeway ted and Olympic Boulevard is os Angeles Streets.

## I — PAGE EIGHT

arts prepared by us from infor- Planning Commission covering the curb and in off-street park- wn Area on an average day in by the width of the black lines of these cars and the general followed by them to reach the of the proposed freeway system roximately how many of the used freeways had they been w charts should not be confused automobile traffic. They repre- e Area on one day. Sixty per n the five-mile circle and 86.9%

ditions. As a whole, they demand free parking, which must be furnished or they will go elsewhere.

Members of group 6 are willing to pay comparatively high rates for evening or all-night parking. If a garage can be located close to first-class hotels and a busy opera house or legitimate theatre, the evening and night business can be counted upon to pay a considerable portion of the fixed costs, as illustrated on page 19.

A careful adjustment of parking facilities between these six groups should be worked out which will provide each of the groups with locations, services, and prices that will satisfy the greatest possible number.

## PARKING FACILITIES 1941

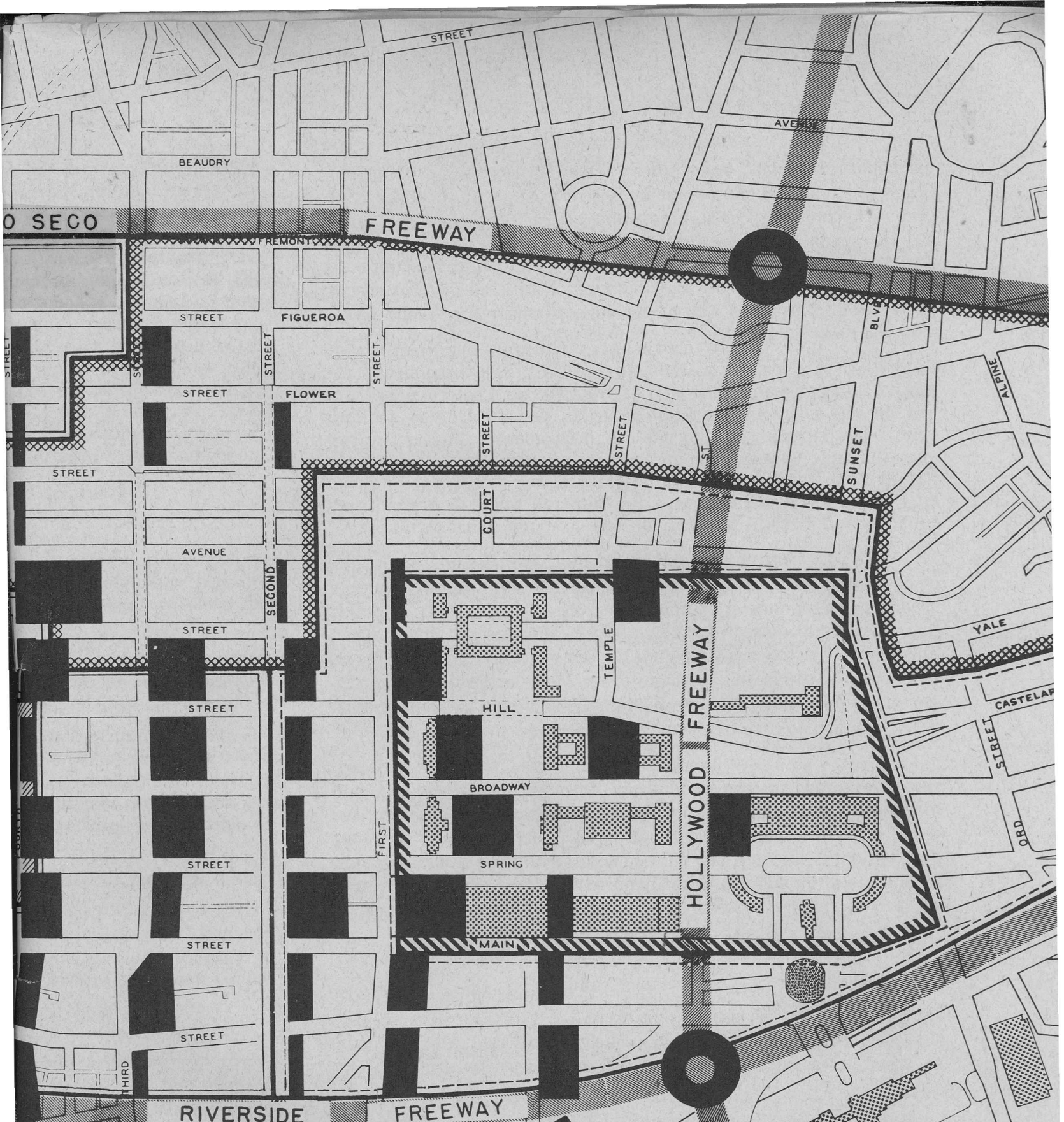
Present parking facilities in the Downtown District are the result of natural competitive business development. Parking lot operators have been quick to sense the locations in which parking facilities are needed and have increased or decreased the parking space offered at various points, in accordance with changing business conditions affecting automobile use, to the extent that building and land values would permit.

The result of this development is shown by PLATE VII, which indicates the blocks in which public parking in open-air lots or garages is offered, and the number of car spaces provided in each block. This information, compiled by the Regional Planning Commission of Los Angeles County in 1941, has been checked and found to be practically the same today. It shows 39,460 spaces available within the Downtown Area and approximately 7,885 additional spaces facing on its outer boundaries.

On an average business day in October, 1941, a check of all cars parked in these parking lots and garages was made. This check showed that the greatest number of parked cars in the spaces within the Downtown Area at any time on that day was 31,713, leaving a theoretical surplus of 7,747 spaces. The total number of cars parked in these off-street facilities during the day prior to 6:00 p.m. was 83,534. Of these at least 12,271 parked for the entire day. These all-day parkers used 31% of all the spaces available within the Downtown Area.

Of these 12,271 spaces used by all-day parkers at least 4,747 spaces were in parking lots or garages most desirable for short-time parkers in groups 3 and 5. Had these spaces been used for short-time parking to the same degree that other spaces in the same lots were used, 12,418 additional short-time parkers could have been served. Based on 306 business days per year, 3,799,908 additional downtown customers could have been accommodated.

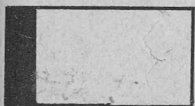
(Continued on Page Eleven)



# PARKING AREAS

Public and private, open air and in garages

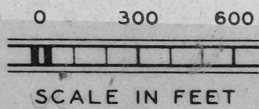
## SCALE



200  
CAR SPACES

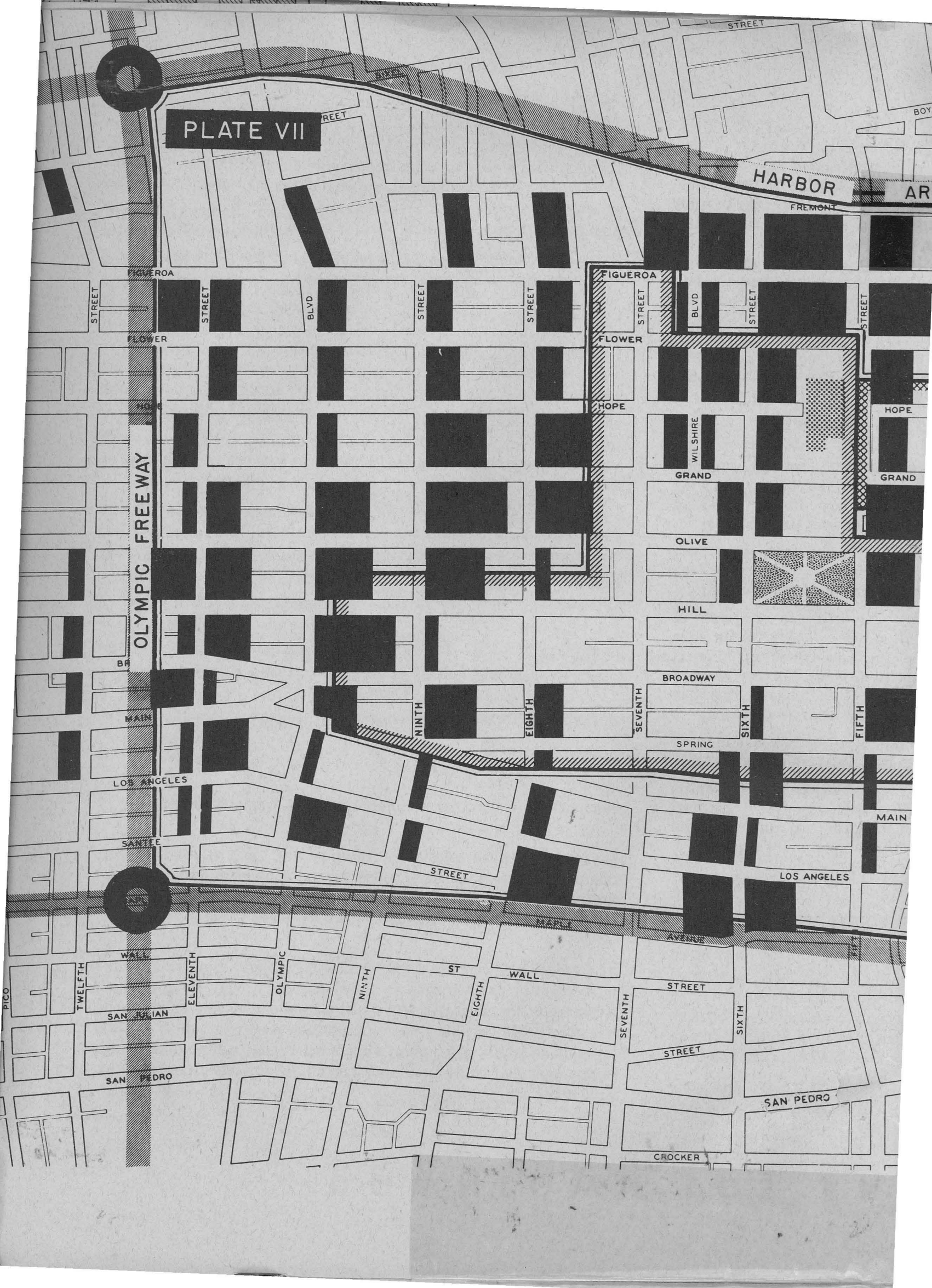


1000  
CAR SPACES



SCALE IN FEET

PLATE VII



# D O W N T O W N L O S A N G

While the map and above information indicate that there were available in the area on an average day more parking spaces than were used, it is probable that most of the excess spaces were in lots in undesirable locations which would be used only as a last resort by business customers or possibly during special sales or other events.

The foregoing text and PLATE VII indicate that there was a reasonable number of parking spaces available in the Downtown Area in October, 1941, to meet the demands of that period, but it is apparent that the best use was not being made of the available facilities, and careful study of present-day operations indicates that conditions are worse today than they were in 1941.

Based on these operations and records, it may be said that the following conditions are adversely affecting Downtown parking.

1. Parking space suitable for short-time parkers is used for all-day parking to a serious degree.

2. Prices (except those under war control) are unstable and confuse customers.

3. Parking places are mostly poorly kept, are unsightly, and are partially used for minor businesses which are objectionable in many ways.

4. Due to the great number of owners of parking lots and garages, customers are not referred to unfilled parking spaces by operators whose facilities are completely used.

5. Service rendered by parking lot attendants is seldom up to the standards set by modern businesses patronized by parking customers.

If the conditions above described were eliminated and only the present facilities operated at maximum efficiency, nearly four million more customers could be given good parking service than were served inadequately in 1941. It should be possible, however, to do more than correct the conditions mentioned by careful redistribution of the parking facilities now available.

## TYPES AND LOCATION OF PARKING FACILITIES STUDIED

In the preparation of this report we have endeavored to familiarize ourselves with all practical means of providing space. Among those considered are the following:

1. Open-air lots designed for self parking.
2. Open-air lots designed for attendant parking.
3. Garages in remodeled structures available in the area.
4. Garages underground.

5. Garages above ground, close three, and four stories.
6. One floor structure above ground.
7. Garages with automatic high service.
8. Open-air or garage facilities business district for walking, bus or street car service through.
9. Garages especially designed a freeway in buildings devoted those in which part of the spaces.
10. Garages of normal design for other normal business uses.

While time did not permit all the plans listed, the following conditions

1. Open-air lots designed for twice the ground space per car than parking. Hence the difficulty in Downtown Los Angeles is that parking farther out than would be practical any considerable number of spaces. Cost of operation is much minimized, but land costs are at parking.

2. Open-air lots designed for most practical means of adequate can be had at reasonable costs and of pedestrian traffic centers.

## PLATE VII

Superimposed on the map use indicating the number of parking available for use in each city block having less than 100 car spaces blocks from left to right indicate discrepancies in the number of to the number in sight is due to unnoticed by the casual observer area used for parking in the block Broadway, and Hill is only a shown by the map. The remaining floors of garages. Basic information Commission.

# LES PARKING STUDY

and open construction of two,

at parking lots.

speed elevator and handling

points too distant from the  
be provided with free special  
in the business district.

handle traffic directly from  
wholly to garage use and  
is devoted to other business

joined with office building or

thorough investigation of all  
elements will be of interest.

self parking use more than  
would be needed for attendant  
making use of such a plan for  
ing lots would be forced much  
from a service standpoint if  
were provided in this man-  
ner and traffic congestion is  
at least double that for attendant

attendant parking offer the  
parking, provided enough space  
within easy walking distances

---

## PAGE TEN

in PLATE I are blocks in black  
spaces, open-air or garage,  
in October, 1941. City blocks  
are left blank. Width of black  
number of spaces. Apparent  
spaces in some blocks compared  
garage space which usually goes  
For instance, the total land  
is bounded by Ninth, Olympic,  
is more than half the amount  
number of spaces are on upper  
is furnished by Regional Plan-

As above noted, more cars can be parked per lot of given size, at least double the number possible on a self-parking lot and about 75% more than can be parked per floor of the same area in a standard type garage. Costs of operation lie between that of self-parking lots and the garage type of service. The public generally seems to prefer open-air parking, which tends to increase turnover in these facilities.

3. Serious thought has been given to the possibility of remodeling existing buildings in the Business Parking District for use exclusively as garages. Here the difficulty is chiefly that these structures were not designed to carry the loads which the building code demands for garage structures, about 125 pounds per square foot of floor space. There may be some buildings which can be so used, and further investigation will be made.

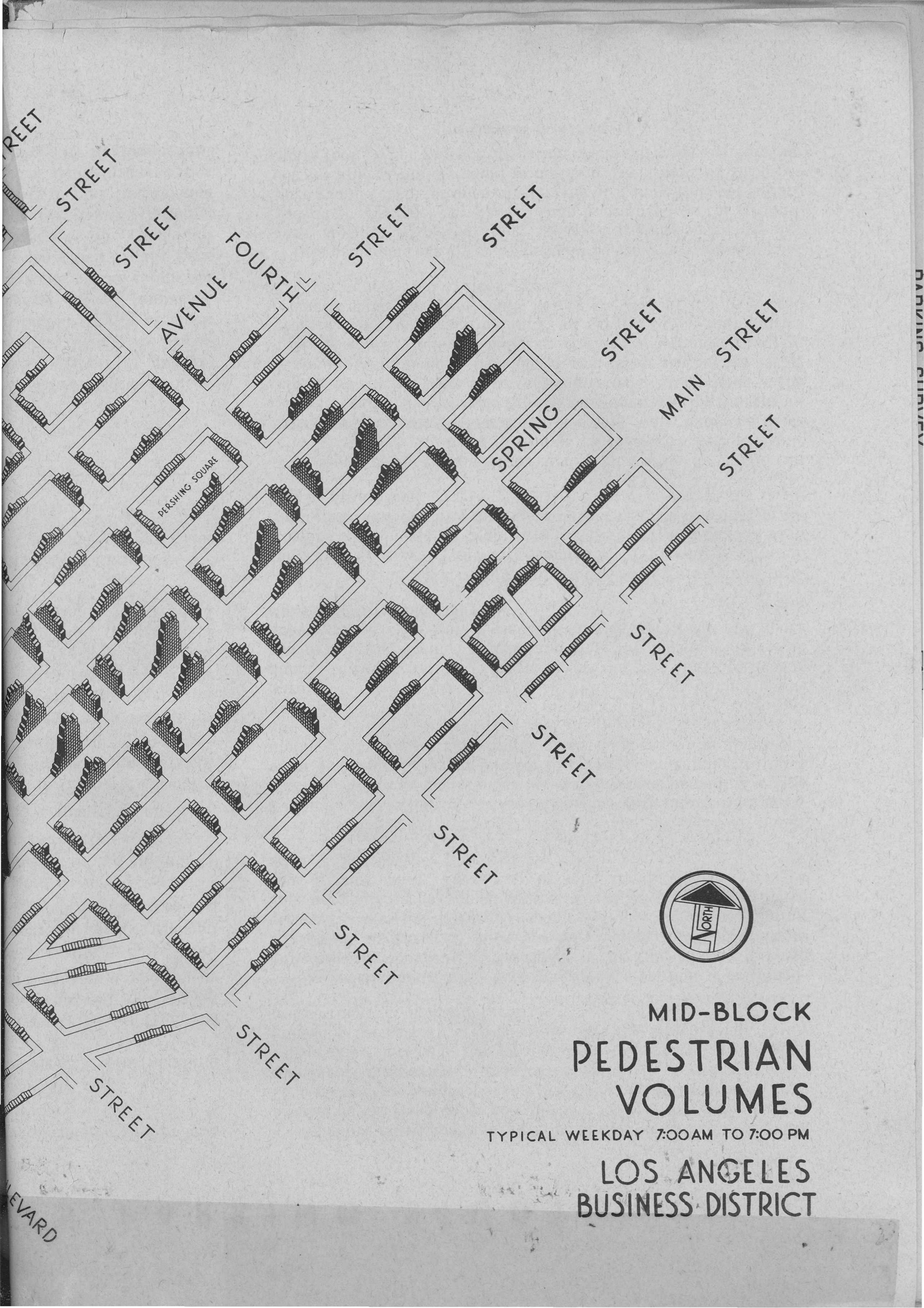
4. Underground garages such as that constructed under Union Square in San Francisco offer some very interesting possibilities. Where an entire block is available, thus providing access on all four sides, a larger number of cars may be handled without undue traffic congestion. Building costs appear to be about one and one-half to two times the cost of open-air or skeleton type garages built above ground. One important advantage over other garages is the increased speed with which cars can be moved out during the rush period. This is due to the fact that attendants can slide down "firemen's" poles and drive the car up, while in the above-ground type slower elevator service up to the car floors causes considerable delay.

Underground construction on a large scale faces some difficulty in disposing of the large amounts of ground excavated. Normally, the most practical use of this type of facility would be in connection with public property, as otherwise rates would probably be prohibitive.

5. Garages above ground are somewhat standardized and can be considered on the basis of known facts. Many garages have proved to be business failures because they were built too high, thus increasing the average time of customer waiting unreasonably. Best advice seems to be that four stories up or down is the maximum that should be considered, and fewer stories are better in many cases. Reliable building engineers estimate that reinforced concrete garage buildings of skeleton type four stories in height could have been built before the war at not to exceed \$2.00 per square foot of floor space.

It is probable that lower costs could be secured in buildings of fewer stories. As noted above, garages require much greater gross floor space per car parked than is required on the ground, hence ground costs for open-air parking of nearly \$4.00 per square foot are approximately equal to building costs, only, of \$2.00 per square foot. When costs of operation are taken into consideration

(Continued on Page Thirteen)



MID-BLOCK  
PEDESTRIAN  
VOLUMES

TYPICAL WEEKDAY 7:00AM TO 7:00 PM

LOS ANGELES  
BUSINESS DISTRICT

LEAVARD



# PLATE VIII

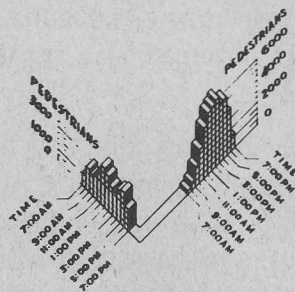
## PLATE VIII

Hourly pedestrian traffic flow at block centers in Downtown Business District. Compare with PLATE IX, showing all-day traffic for both sides of street in each block.

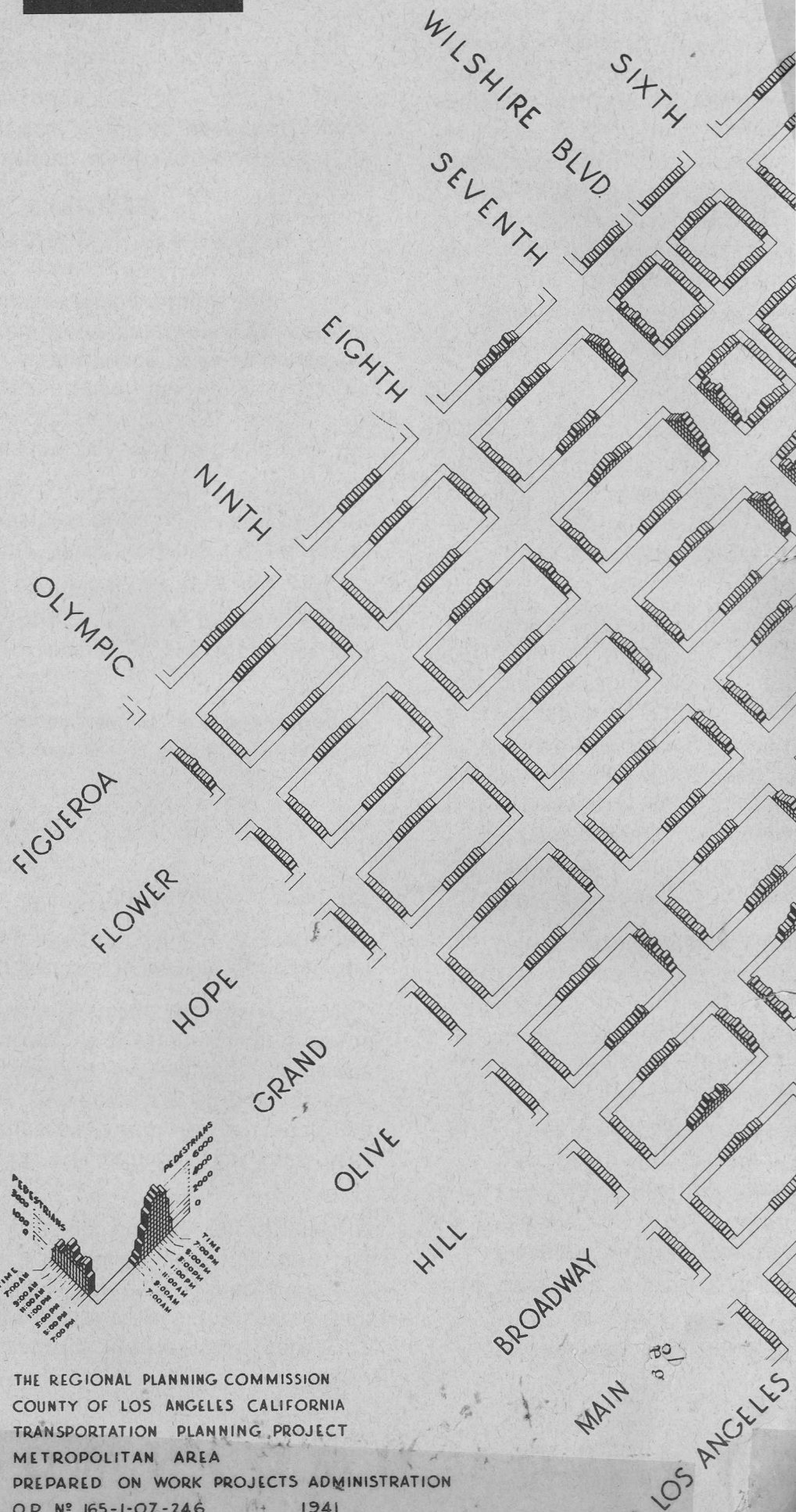
It will be noted from the legend accompanying the map that reading from left to right each column of blocks indicates one hour of time while each block in height indicates 500 pedestrians passing the center of the block; hence the complete mass of the pyramid in the center of each block indicates the total pedestrian flow for the twelve-hour period between 7 a.m. and 7 p.m., while the height of each column indicates the traffic flow for one hour only.

Note how accurately the traffic habits of pedestrians are reflected by the hourly flow at various points. For instance, the 5:00 to 6:00 o'clock peak traffic on streets leading to Pershing Square Bus Depot, the Pacific Electric Rail and Bus Depot and, to a lesser extent, the Pacific Electric Subway Depot on Hill Street. Investigation indicates that a large part of the pedestrian flow to and from the Subway Terminal Building was not counted, due to the fact that a great deal of traffic goes directly across Hill Street and does not traverse the block, Fourth to Fifth Streets on Hill.

Traffic on Hill and Broadway from Third to Fourth, caused largely by the Grand Central Market, is also reflected, particularly between 5:00 and 6:00 p.m.



THE REGIONAL PLANNING COMMISSION  
 COUNTY OF LOS ANGELES CALIFORNIA  
 TRANSPORTATION PLANNING PROJECT  
 METROPOLITAN AREA  
 PREPARED ON WORK PROJECTS ADMINISTRATION  
 O.P. N° 165-1-07-246 1941



# D O W N T O W N L O S A N G E

there is a further advantage in open-air parking. In general, operating costs for garage parking under best conditions will be from one to four cents per car parked more than the handling cost in open-air attendant parking.

Due consideration must be given to the location of any parking facility in its effect on street traffic. Lots or garages having two or more entrances or exits are most desirable in order to give good service and at the same time permit prohibition of left-hand turns or other measures to prevent street traffic congestion. This factor alone tends to prohibit the use of large garage buildings in congested traffic areas, as, frequently, they must use a single street and a single opening for their customer traffic.

Some consideration has been given to combining garages with adjoining open-air lots. Such a plan would provide many advantages in handling cars within the parking area and in and out of the street.

6. Engineers are investigating for us the possibility of erecting an all-steel deck over a large part of suitable parking lots. Such a plan, if feasible, would provide from 50% to 70% additional car space at a minimum cost and thus permit rapid expansion of parking space in the close-in areas as business increases.

7. Several types of automatic or semi-automatic garages have been considered. These plans usually propose a skeleton type structure with high-speed automatic elevators which will pick up a car, select a vacant stall and shunt the car to that space, reversing the movement when the car is desired by the owner. Variations provide for more manual and less automatic handling. Investigation shows that costs would probably be about \$3,200.00 per car space, including land and equipment, in close-in locations. Such a cost would demand exceedingly rapid turnover at relatively high charges to meet investment and operating costs.

8. A plan is in use in St. Louis, and probably in other cities, under which garages and parking lots too far from the business district to be practical for walking are combined with special free bus or street car service in the parking fee. Such a plan could be used for Downtown Los Angeles. Its advantage lies in the possibility of using inexpensive land. Its greatest drawbacks are the traffic congestion on the streets at the afternoon rush period, caused by the large number of buses or street cars that would be needed, and the possible dislike by customers of mixing automobile and bus service in their shopping trips. If costs could be kept low enough, this plan should be extremely popular with all-day parkers.

9. Garages designed to handle traffic directly from a freeway would, in general, take on the characteristics of other garages

mentioned. The greatest care would be given to the design of tieups in internal car movement and to the design of the freeway.

None of the freeways now planned are so located as to provide good locations for possible all-day parkers along the freeway. The space per car probably would be less than in ordinary garages, due to the special

10. Combining garages with other uses is a cost problem which is difficult to solve. One floor or possibly two floors can be used for increasing the general cost of the building. This can be combined in with other uses on upper floors to reduce building costs, due to the greater

Another serious disadvantage lies in the fact that, without decreasing the usefulness of the building, thus increasing its net cost for parking, a combination of an open-air parking lot and other building purposes may not meet all of the parking needs of the district.

It is our thought that no one type of plan has depended upon to provide all needs, but that several plans may be found to meet service demands.

## IMPROVEMENTS IN

While the principal factors in the design of parking facilities for downtown customers are land and fees, there are other factors to be considered in developing an ideal parking plan.

One of these is the appearance of the building and its immediate surroundings, which is given by attendants at parking facilities.

PLATE XII shows a photograph of a parking lot indicating the general appearance of the district. PLATE XIII shows some practical changes are suggested which will cost from \$15 to \$35 per car space. Under these conditions, the carrying charge for parking fees and should be met by the satisfaction of patrons and their convenience in the Downtown Business District.

Such improvements on parking facilities of sufficient length to provide for the needs of the district.

# LES PARKING STUDY

have to be taken to prevent  
creating traffic jams on the

ed for early construction is  
ns for such garages except  
the Harbor Freeway. Costs  
somewhat higher than for  
traffic conditions mentioned.

inary buildings presents a  
e. Portions of one basement  
ed without unreasonably in-  
ng, but garage space mixed  
automatically increases total  
is garage floors must carry.

providing ample access ramps  
the ground floor of the build-  
ther purposes. Here again a  
nd handling area with garage  
found which will meet some

of parking facility should be  
sary service for the district,  
d useful in meeting differing

## PARKING SERVICE

roviding satisfactory parking  
ion (distance to destination)  
of considerable importance in

of the property used and that  
nother is the kind of service  
and garages.

h of a busy downtown parking  
nce of the better parking lots  
vs a sketch of the same lot in  
sted. While such improvements  
ace, depending on varying con-  
small item in the necessary  
an balanced by the greater sat-  
rd-of-mouth advertising of the

t lots can be made only if term  
it amortization of the cost can

be obtained, or if property owners can be found who will make  
the improvements and include the cost in rental charges. In our  
recommendations suggestions are made for carrying out an im-  
provement program in a practical manner.

Parking lot employees are an important factor in customer  
satisfaction. While it may be difficult under war conditions to  
improve the personal service given in most lots and garages, it  
will be possible under post-war conditions to develop an employee  
personnel which will be a great asset to the district. Simple, clean  
uniforms and unfailing courtesy will do much toward encourag-  
ing more and more patronage of Downtown Businesses. In our  
recommendations, further reference is made to this phase of the  
problem.

## IMPROVED VALIDATING SERVICE

In the foregoing pages of this report we have dealt with park-  
ing conditions in the district as they existed in 1941, and the  
layout of parking facilities and suggestions for their use have  
been based on the assumption that the number of users of auto-  
mobile parking spaces within the district in the comparatively  
normal month of October, 1941, was the maximum number who  
would have come to the district by automobile if better parking  
facilities had been provided, and if stores and other businesses,  
generally, had validated parking tickets for their customers and  
clients on an adequate basis.

Our studies of parking validations by stores indicate that a  
little over two million parking tickets were validated by stores in  
the district in 1941 as compared with approximately 21,300,000  
short-time parkers using off-street parking facilities during the  
year. The ratio of parking tickets validated to total sales made  
by the stores issuing the validations was approximately \$90.00  
per ticket.

Contrasted with this average, one store with more adequate  
facilities and a liberal validating policy validated one ticket for  
approximately each \$25.00 of total sales. If a group of stores in  
the district who cater to the medium- or high-priced trade, with  
total sales of only \$100,000,000 per year, had furnished similar  
accommodations, the resulting number of validations would have  
been 4,000,000 for the year or approximately 2,000,000 more than  
were validated by all stores in the district.

While we cannot be sure that a net increase of 2,000,000 more  
shoppers' cars would have been brought into the district by this  
means, it would seem evident that had a concerted effort along  
this line been made by most of the stores and offices, such a result  
could have been attained under 1941 conditions.

*(Continued on Page Fifteen)*

OLYMPIC

NINTH

EIGHTH

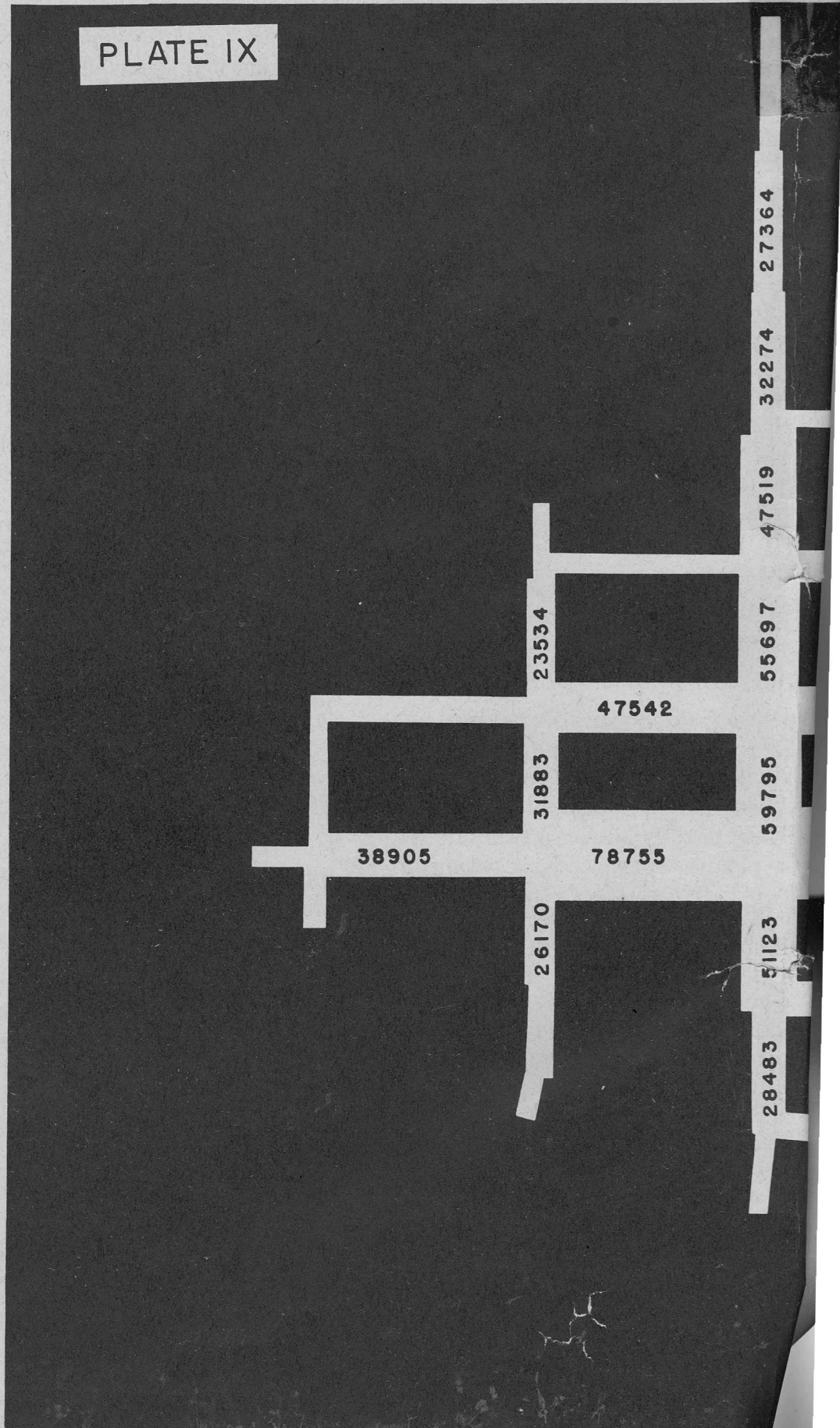
SEVENTH

PLATE IX

PLATE IX

Width of white masses paralel-  
ng street lines indicates the total  
aily pedestrian traffic flow at block  
enters for all day on an average  
ay in the fall of 1941. Traffic on  
oth sides of the street has been  
ombined. The minimum traffic  
hown is 15,000. Actual figures are  
iven for all blocks having 23,000  
r more pedestrians during the day.

Basic information furnished by  
Regional Planning Comission. See  
PLATE VIII and caption for com-  
parison. In general, the observa-  
ions made with reference to hourly  
traffic flow apply to the total daily  
flow shown on this PLATE.



SIXTH

FIFTH

FOURTH

THIRD

SECOND

FIGUEROA

60 000  
PEDESTRIANS

20 000  
PEDESTRIANS

FLOWER

HOPE

GRAND

OLIVE

HILL

BROADWAY

SPRING

MAIN

LOS ANGELES

28806

28231

38941

43826

24810

40682

53319

72103

62007

49229

37977

43991

23549

23716

36419

29278

27688

27430

26123



# D O W N T O W N L O S A N G E L E S

## Section Two

### LOCATION OF PARKING FACILITIES

#### REDISTRIBUTION OF 1941 PARKING FACILITIES

An interesting guide to proper location of parking lots is pedestrian traffic flow, as, in general, automobile users wish to go where other pedestrians go, and in about the same proportions. PLATES VIII and IX illustrate graphically pedestrian traffic flow in the Downtown District by hours and for all day, as it was found at the time of the survey made by the Regional Planning Commission in 1941.

Traffic considerations and property values prevent a simple solution of the automobile parking problem. It is obviously desirable to provide a series of parking facilities which will furnish ample accommodations within minimum walking distances of heavy traffic centers and which will, at the same time, have good access to the principal streets and freeways. By reference to PLATE VII it will be seen that present parking lots and garages follow only roughly the pedestrian traffic flow, and the quantity of parking space available to the Business District leans heavily to the west and south.

Reference to the Parked Car Traffic Flow chart, PLATE V, shows in part the reason for this condition. Traffic of parked cars from the south and west is extremely heavy, and with the heavy traffic flow on east and west streets, it is difficult for these automobile users to drive to parking lots on the north or east sides of the Business District.

This condition will be remedied by construction of the freeways now being planned, as illustrated by PLATE VI, and by the completion of the Olympic Boulevard widening project, scheduled for immediate post-war construction. With the construction of the Hollywood-Ramona Freeway and the completion of the Harbor-Arroyo Seco Freeway to Olympic Boulevard, it will be possible for many of the automobile users from the northwest, north, west, and southwest to drive directly and with a minimum of delay or traffic inconvenience to the parking places most convenient for their use. As these are among the freeways which are scheduled for construction immediately after the war, any parking plan prepared at this time should be based on conditions as they may be found after this construction is completed.

Studies made by the Regional Planning Commission, and shown by PLATE VII, indicate that a total in round figures of

40,000 car spaces were available in plan to meet present and future number as a minimum, with such may seem advisable.

As shown by PLATE VII, app provided in the area north of Seco were used principally by those hav District, leaving approximately 33 District to the south and west. PL spaces should have been distrib pedestrian traffic flow shown by The locations shown on this map b ence to property values and imp on the assumption that the Hill I for parking.

As parking plans must be based PLATE XI, has been prepared to ing spaces rearranged to use le more level parts of the district. be in the Hill District have been e by 2,500 car spaces in the Pershin

As previously noted, the steep vent placing the proper number west of Hill Street and north of capacity indicated located in the remedy this condition to a consid ous hotels and theaters within ea evening and night patronage.

There is, of course, a limit to which can be rented at the rates in such a garage, but it is believe point could be profitably used.

An intensive study is now be portation, highway, legal, and f use of the underground space fo be made within a short time.

The only practical alternativ garage purposes would be the b of smaller garages as near this traffic conditions would allow.

Suitable properties, appare square foot and, as shown by garages not exceeding four stor

# LES PARKING STUDY

ber, 1941, and any parking  
itions can be based on this  
itions for future growth as

nately 7,000 car spaces were  
Street in 1941. These spaces  
business in the Civic Center  
spaces to serve the Business  
E X shows how these 33,000  
d, in accordance with the  
ATE IX, for ideal service.  
been selected without refer-  
ements, and also are based  
istrict is a level area available

actual conditions, the chart,  
w the same number of park-  
expensive properties in the  
se shown by PLATE IX to  
inated and partially replaced  
Square block.

ades of the Hill District pre-  
parking spaces in the area  
th Street. A garage of the  
ershing Square block would  
ble extent. There are numer-  
walking distance, to provide

ne number of parking spaces  
would be necessary to charge  
at 2,500 spaces located at this

made of traffic, public trans-  
ncial conditions affecting the  
his purpose, and a report will

o the use of this location for  
ling of a considerable number  
eation as property values and

, would cost about \$20.00 per  
e tables on pages 19 and 21,  
in height (the maximum height

in which good service can be given) built on such property require extremely high rates per day per car space to meet the capital expense. This is true even assuming a building cost of \$1.50 per square foot, a rate which has not been attained under the present building code.

On PLATE XI we have shown more spaces to the west and south than is indicated by pedestrian traffic flow, in order to provide a greater proportion of spaces for all-day parking on cheaper property. To the all-day parker a walk of a few blocks is not so important as to a shopper whose walking time automatically becomes a part of the parking time. Turnover in parking is accelerated by reducing walking time for short-time parkers, while low land values are most important in placing all-day parking lots.

If parking lots placed approximately as shown are segregated between the various groups of users, as previously described, it is believed that considerably more business could and would be carried on in the district by automobile users than was true in 1941 or is true under present war conditions. In 1941, as noted previously, a large number of close-in parking spaces were used by all-day parkers, thus forcing short-time parkers into parking places unsuitable for their use or causing them to go to other business centers.

Under post-war conditions parking fees and the hours at which certain auto parks are opened in the morning can be arranged to automatically prevent all-day parkers encroaching on those facilities designed for short-time parkers. So long as the war lasts and the O.P.A. maintains the present rate structure, probably, the only segregation that can be made is to close parking lots most desirable for short-time parkers until about 9:30 a.m. daily, which would have the effect of preventing all-day parkers from monopolizing close-in spaces. Parking lot operators who have been approached regarding such operations have been reluctant to set up such a plan, partly because of the expense of providing necessary fencing and gates, and partly through fear of losing some of their gross business. Suggestions contained in our recommendations for immediate action offer a possible solution to this phase of the problem.

In our suggestions for redistributing present parking facilities we have not included those used by employees and patrons in the Civic Center District. There appears to be reasonable opportunity to expand these facilities as required by the increased demand which is certain to follow the normal expansion of population in city and county. As the Civic Center buildings are extended west to Hill and Olive Streets, some of the property in

*(Continued on Page Nineteen)*

SIXTH

FIFTH

FOURTH

THIRD

SECOND

FIGUEROA

FLOWER

HOPE

GRAND

OLIVE

HILL

BROADWAY

SPRING

MAIN

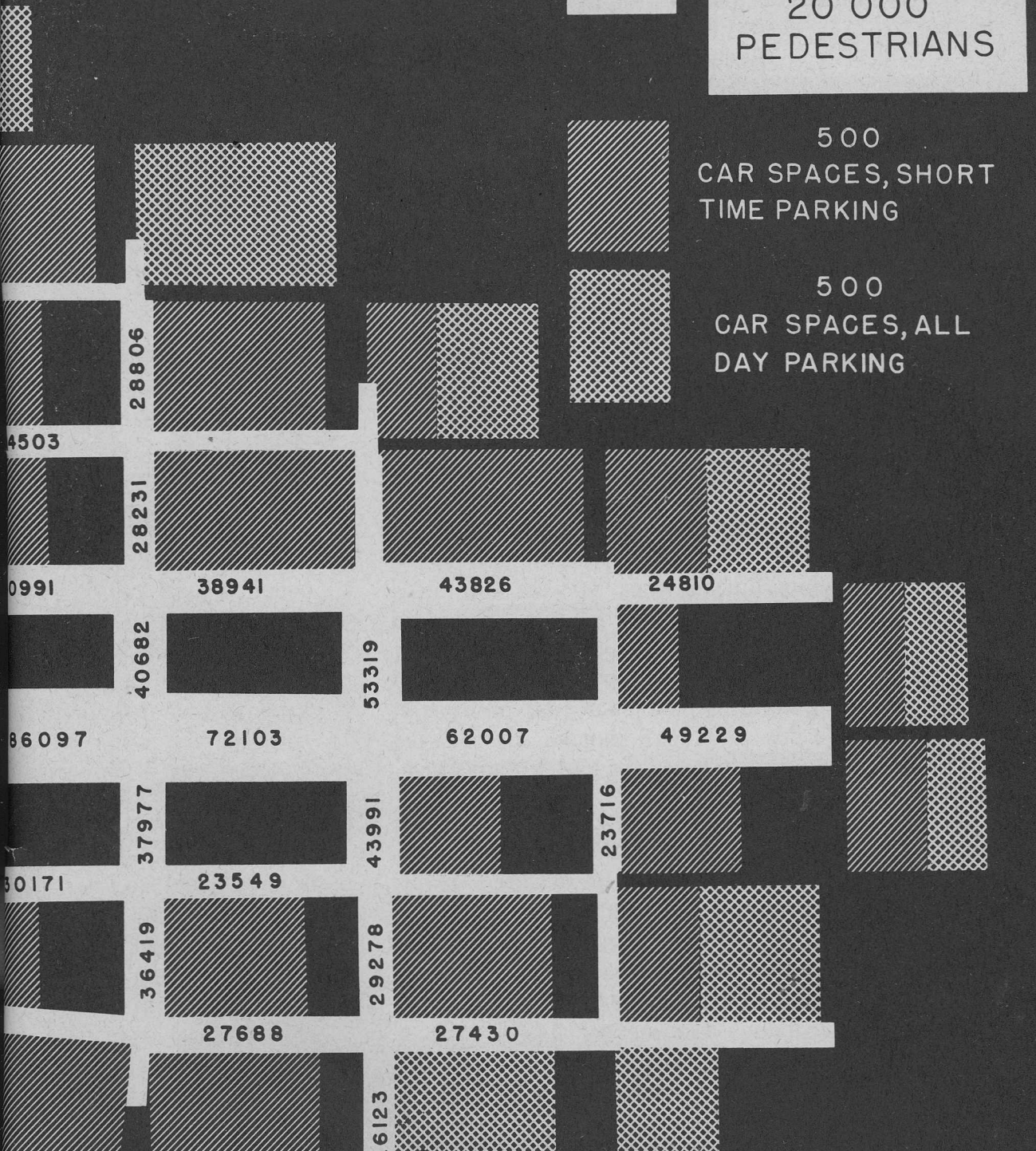
LOS ANGELES

60 000  
PEDESTRIANS

20 000  
PEDESTRIANS

500  
CAR SPACES, SHORT  
TIME PARKING

500  
CAR SPACES, ALL  
DAY PARKING



28806

28231

40682

37977

36419

26123

4503

0991

86097

30171

38941

72103

23549

27688

53319

43991

29278

26123

43826

62007

27430

27430

23716

24810

49229

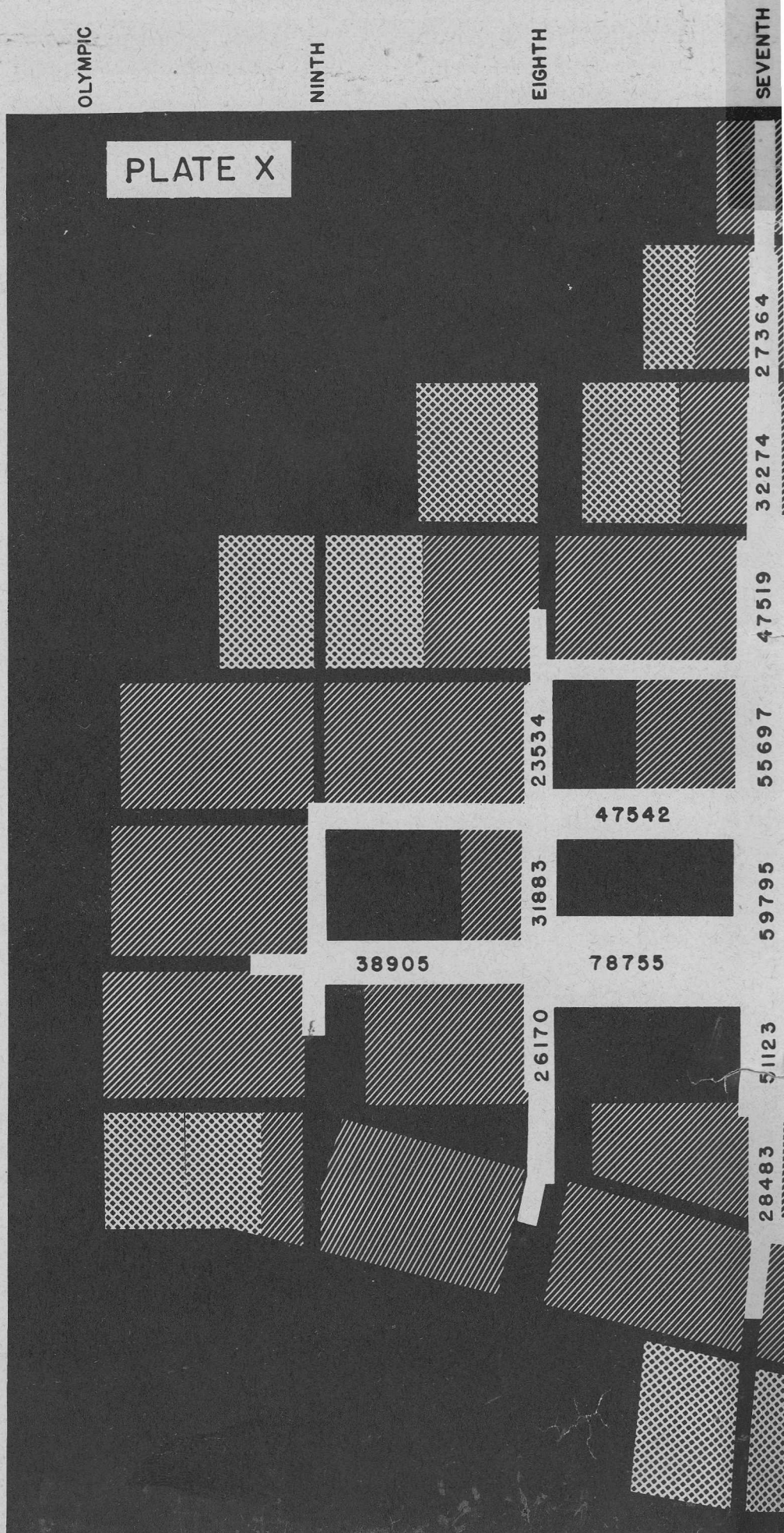


## PLATE X

This chart shows, superimposed on the chart used in PLATE IX, the number of parking spaces shown south of Second Street and between Los Angeles and Figueroa Streets on PLATE VII (33,000). Short-time and all-day spaces have been allocated in the proportions used, as found by the 1941 survey.

The arrangement is idealistic and approximately what might be done if there were no physical or other barriers of any kind to prevent placing parking lots where desired.

Daily pedestrian traffic flow was used as a guide to determine approximate needs in various parts of the area. It is obvious that those blocks having the heaviest pedestrian traffic are, for the most part, used for the business which produces the traffic, hence no parking space is shown in them, but is shown as close and in the proportion that existing pedestrian traffic will allow. Placing of parking spaces was also governed by a desire to hold down automobile traffic in the blocks having heavy pedestrian traffic, leaving as much street space as possible available for public transportation vehicles.



SIXTH

FIFTH

FOURTH

THIRD

SECOND

FIGUEROA

60 000  
PEDESTRIANS

20 000  
PEDESTRIANS

500  
CAR SPACES, SHORT  
TIME PARKING

500  
CAR SPACES, ALL  
DAY PARKING

FLOWER

HOPE

GRAND

OLIVE

HILL

BROADWAY

SPRING

MAIN

LOS ANGELES

28806

24503

28231

2500

40991

38941

43826

24810

40682

53319

86097

72103

62007

49229

37977

43991

30171

23549

23716

36419

29278

27688

27430

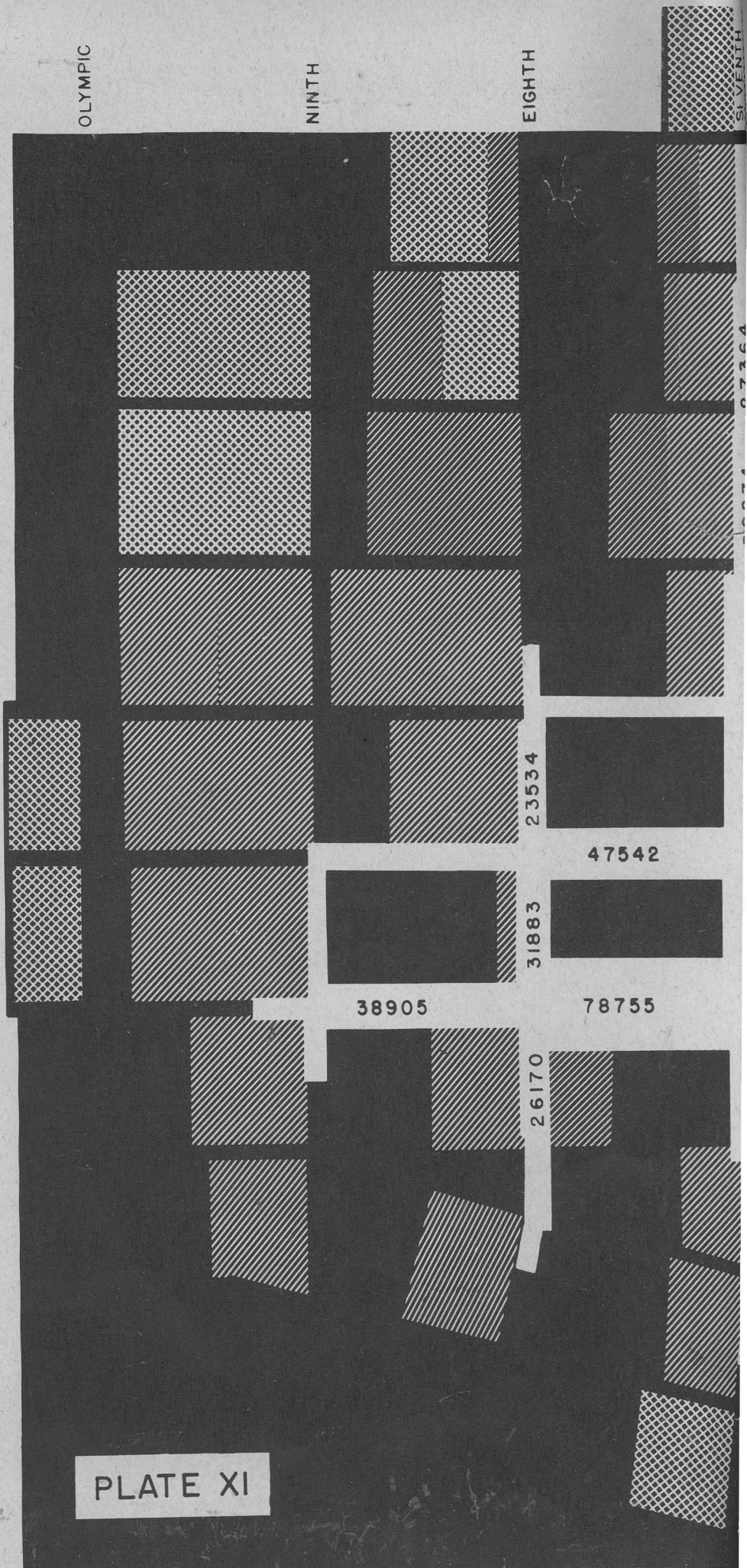
26123

### PLATE XI

This chart shows, superimposed on the chart used in PLATE IX, what appears to be the most practical present arrangement of the 33,000 parking spaces shown more ideally placed on PLATE X.

Careful comparisons between PLATES X and XI will show how far short of the ideal arrangement the practical one must be if any consideration is given to costs of securing the necessary amount of space.

While approximately 10,000 spaces for all-day parking are placed in the outer rim of parking places shown, it is assumed that some of these parkers will be accommodated in close-in garages. The numbers of spaces indicated in some of the Business District blocks are due to existing garages in those blocks, as indicated on PLATE VII. In the detailed plan 500 additional all-day parking spaces are allocated to the block bounded by Fourth, Fifth, Olive, and Grand, due to available garage space which cannot be shown on the scale used.





PAN  
A  
M  
E  
R  
I  
C  
A  
N  
B  
L  
D  
G

**HUNT**  
FOR THE BEST!



**15¢**  
ONE HOUR  
25¢ ALL DAY  
CLOSE 6 P.M.

Coca-Cola

**15¢**

SERVICEMEN'S  
INFORMATION  
CENTER

WOLFE SCHLESER

EMUL ST

Easter or Heiser

DOUG  
BULL

PLATE XII



# D O W N T O W N L O S A N G

the Hill District not now usable for parking space will become available, and will be provided by private parties under normal conditions.

Consideration should be given to providing a reasonable amount of garage space underground under the parks and buildings of the Civic Center. It is probable that such space would be leased by private operators if given such an opportunity and that rents could be charged the operators which would return the garages to the governmental agency involved, clear of any encumbrance, within a 50-year period.

## Section Three OPERATING COSTS

### OPERATING COST DISTRIBUTION

In developing a general parking plan for the Downtown Business District, careful consideration should be given to capital and operating costs, and the rates to be charged by the various kinds of parking facilities to be provided, keeping in mind the conditions involved in serving all groups wishing to park in the district, as outlined on page 9.

Cost items can be divided between space expense and handling expense, as they are differently affected by various factors in the parking business. Properly combined, they reflect the fees which should be charged under varying conditions.

Rents or capital carrying costs are a fixed charge against the entire space on land or in buildings and are not affected by the number of cars parked daily. Costs of light, heat, telephone, advertising, etc., also are fixed and do not vary materially with the number of cars handled.

Handling and management costs, on the other hand, vary in almost exact proportion to the number of cars handled daily, provided the minimum number parked is large enough to develop minimum operating costs.

Rent or capital carrying costs vary with location and type of facility operated. Rent per car space for a plot of ground on which attendants park all cars will be much less than if the same plot is used as a "park-your-own" lot, in which case approximately twice as much space will be needed per car parked, and the rent or capital cost per space will be approximately doubled.

If the same plot is used as a garage site, an entirely different set of fixed costs per parking space will develop, due to space used for ramps, elevators, columns, and walls, and frequently space used for more elaborate services to customers.

Handling costs vary in accordance with the type of facility given in open-air lots or in garages. If attendants park all cars, the handling cost is much greater than if customers park their own cars. A garage which can handle 100 or more cars per day and which can handle a hundred may be handled under the same conditions.

Handling costs are primarily a function of the amount of car movement. Hence the more that cars are crowded into a garage, the more frequent movement to let cars in and out of the garage. Sometimes the cost per car is reduced due to the greater distances walked by attendants. A considerable saving is made by taking advantage of the fact that cars are usually parked to get in the car while it is still parked. This saves the attendant handling a large part of the cars during the outgoing rush hours.

Garage handling costs present a different set of going cost examples. Time consumed in getting the car to its owner is still the primary cost to be given, such as cleaning, dusting, etc. The time of parking tickets is usually not a factor. They require more cashiers, supervisors, etc. The more cars handled, the more cars handled.

Total costs of operation including handling costs and rent or carrying costs are shown in the following table.

### PARKING COSTS

Following are tables showing the distribution of handling charges for garages and open-air lots. Handling costs shown do not provide for crowding.

#### TABLE I

##### 300-Car, 4-Story Garage Built

Land, 21,000 square feet at \$20.00 per square foot  
Building 84,000 square feet at \$20.00 per square foot

Total investment.....

Total investment per car.....

#### Fixed Capital Costs

Interest, 6% .....  
Taxes, 3%.....  
Building depreciation, 2%.....  
Amortization, land and building, 2%.....  
Upkeep and repairs.....

# LOS ANGELES PARKING STUDY

ance with the type of service  
s. On a plot where attendants  
will obviously be much larger  
n. While one attendant may  
der the first plan, several hun-  
dred plan by one attendant.

a matter of employee time.  
ded on a lot, thus causing fre-  
out, the greater the cost per  
handled is more on larger lots,  
ed by the attendants. Some-  
handling costs on open lots is  
atural desire of the customer  
ed and drive it out, thus elimi-  
cars by attendants, especially

a simple variation of the fore-  
ned in parking and returning  
ipal factor. More services may  
etc., and a more elaborate sys-  
quired which, in turn, may re-  
and other helpers per unit of

ve a proper apportioning of  
ng costs.

## TABLES

approximate capital and han-  
air lots at various land values.  
de for extra costs due to over-

### Expensive Close-in Land:

..... \$ 420,000.00  
0..... 168,000.00

..... \$ 588,000.00  
pace..... 1,960.00

### Costs Per Year

..... \$ 35,280.00  
..... 17,640.00  
..... 3,360.00  
..... 11,760.00  
..... 1,000.00

..... \$ 69,040.00

### Fixed Operating Costs Per Year

Light, heat, etc.....	\$ 400.00
Telephone.....	120.00
Advertising.....	200.00
Rent or amortization of office equipment, time clocks, etc.....	100.00
<b>Total fixed costs.....</b>	<b>\$ 69,860.00</b>
Fixed costs per year per car space.....	\$ 232.87
Fixed costs per day per car space, based on 306 business days per year.....	\$ .76
<b>Handling costs per car parked based on ability to secure workers on shifts to meet morning and eve- ning rush demands:</b>	
Attendants' wages, parking and returning car to customer, average 7 minutes.....	.10
Salary of management, based on operation of several parking places.....	.008
Wages of office force per car parked.....	.008
Social security taxes, printing, supplies.....	.007
<b>Total handling cost per car parked, based on parking at least 300 cars per day.....</b>	<b>\$ .123</b>

### Total Costs Per Car Parked Based on Foregoing Figures

NUMBER OF CARS PARKED DAILY	FIXED COSTS PER CAR	HANDLING COST PER CAR	TOTAL COST PER CAR PARKED
300	\$.76	\$.123	\$.883
400	.57	.123	.693
500	.456	.123	.579
600	.38	.123	.513
700	.326	.123	.449
800	.285	.123	.408
900	.253	.123	.376
*1500	.152	.123	.275

All of the above handling cost figures are based on daytime operations only, when maximum use of personnel can be obtained and when turnover is greatest. If sufficient patronage can be secured for night, holiday, and Sunday operation, the higher rates obtained will offset higher labor costs and contribute something toward capital costs as well.

One well-known garage charging 25c for one hour, 35c for two hours, 50c for all day to 6:00 p.m., 50c for anytime up to midnight after 6:00 p.m., and 75c for all-night parking, is able to secure approximately 48c as the average parking fee and a turnover of two cars per space per day, or 96c per space per day. It will be noted that this is close to the rate which would be necessary to meet the costs shown on the above table for 600 cars per day.

\* This rate of turnover was attained in a few open-air lots in Downtown Los Angeles in October, 1941.

(Continued on Page Twenty-one)



**PARK IMPROVEMENT**  
LOS ANGELES





# SUGGESTED AUTO PARKING

CITY PLANNING COMMISSION

# D O W N T O W N L O S A N G

**TABLE 2**

Using the basic figures set out in Table 1, total costs per car parked in garages built on less expensive land would be as follows:

Number of cars parked daily	TOTAL COST, INCLUDING HANDLING, PER CAR PARKED, BASED ON LAND VALUES PER SQUARE FOOT AS SHOWN:					
	\$3.00	\$4.00	\$5.00	\$10.00	\$15.00	\$20.00
300	\$.456	\$.481	\$.496	\$.629	\$.753	\$.883
400	.372	.391	.410	.503	.599	.693
500	.322	.339	.353	.427	.503	.579
600	.289	.302	.314	.386	.440	.513
700	.265	.276	.287	.340	.397	.449
800	.247	.257	.266	.313	.361	.408
900	.234	.242	.251	.289	.334	.376
1500	.189	.194	.199	.224	.250	.275

**TABLE 3**

Typical costs of open-air parking lots where all cars are handled by attendants:

**Investment  
300 car spaces**

Land 45,000 square feet at \$3.00.....	\$ 135,000.00
Improvements at \$25.00 per car space.....	7,500.00
<b>Total Investment.....</b>	<b>\$ 142,500.00</b>

**Fixed Carrying Costs, Per Year,  
Land and Improvements**

Interest at 6% .....	\$ 8,550.00
Taxes at 3% .....	4,275.00
Improvements depreciation 10% .....	750.00
Amortization 2% .....	2,850.00
Upkeep and Repairs.....	1,000.00
<b>Total Carrying Costs.....</b>	<b>\$ 17,425.00</b>

**Fixed Operating Costs Per Year**

Light, heat, etc.....	\$ 100.00
Telephone.....	120.00
Advertising.....	50.00
Rent of office equipment, time clock, etc.....	50.00
	<b>\$ 17,745.00</b>
Fixed cost per day based on 306 business days.....	57.99
Cost per car space per day.....	.193

**Handling Costs  
Daytime**

Attendants' wages, parking and customer, 5 minutes.....	
Salary, management.....	
Office wages per car parked.....	
Social security taxes, and misc supplies, etc.....	

**Costs Per  
Based on A**

NUMBER OF CARS PARKED DAILY	FIXED COSTS PER CAR
300	\$.193
400	.145
500	.115
600	.096
700	.082
800	.072
900	.064
1500	.038

**TA**

The following table has been parked when land is rented for same allowance for improvements handling costs per car parked

RENT PER SPACE PER MONTH	1 turnover	CO
\$8.00	.422	t
7.50	.403	
7.00	.383	
6.50	.364	
6.00	.344	
5.50	.325	
5.00	.305	
4.00	.266	

From the foregoing it will costs for land and/or improvements provided a frequent turnover spaces can be maintained or a be secured, with a high percent on a high rate of turnover during rates for theatre or all-night parking and building costs prevailing in

# TABLES PARKING STUDY

Per Car Parked, Service Only	0.069
Returning car to .....	0.005
.....	0.005
aneous .....	0.007
<b>\$</b>	<b>0.086</b>

Per Car Parked, Average Figures	
HANDLING COST PER CAR	TOTAL COST PER CAR PARKED
\$.086	\$.279
.086	.231
.086	.201
.086	.182
.086	.168
.086	.158
.086	.150
.086	.124

Under present building code requirements, it does not seem possible to build garages for much, if any, less than \$2.00 per square foot, using 1941 costs for material and labor as a basis. Garage handling costs will also be higher than shown in our tables unless a cheaper means can be found for carrying attendants up and down in the building than is now permitted. It should be possible to have changes made in the building code which will permit less expensive buildings and elevators to be used, and an investigation will be made along this line.

In our estimates of spaces needed and the proper locations for parking facilities, we have assumed that most of the spaces would be made available in open-air lots. Such a plan has the advantage of providing sufficient space for immediate post-war needs, with the possibility of building inexpensive garages on the same property to meet expected expansion of automobile use.

## PRESENT PARKING RATES

Regular parking rates in the Downtown Area (except during December and Easter Week) as ordered by the O.P.A., effective November 20, 1944, provide a maximum for all-day parking (to 6:00 p.m.) in open-air parking lots in the district of not to exceed 25c, with the following exceptions:

845 South Broadway.....	50c
416 West Fourth.....	35c
Grand Ave. between 5th and 8th.....	50c
409 South Hill.....	50c
Remainder of Hill, 4th to 8th.....	\$1.00
Hill Street, 8th to 9th.....	50c
Main Street, 6th to 7th.....	35c
Olive Street, 4th to 5th.....	35c
625 South Olive.....	50c
Remainder Olive, 6th to 7th.....	75c
Olive, 7th to 813 South Olive.....	50c
353 South Spring.....	35c
Spring, 5th to 8th.....	50c
815 South Spring.....	35c
825 South Spring.....	50c

None of the lots, including the above higher priced lots, were allowed hourly rates to exceed 15c, except those having a maximum rate of \$1.00. These have a rate of 20c for the first hour.

It is obvious that the 43 parking lots above listed are so located that under present conditions there is strong pressure to use them for all-day parking by the group 1 type of parker, excepting those lots with maximums of 75c and \$1.00.

(Continued on Page Twenty-two)

TABLE 4  
Prepared to show the cost of cars in open-air parking lots, with the costs, fixed operating costs and set out in Table 3.

PER CAR PARKED	3		4	
	turnovers	turnovers	turnovers	turnovers
2	.197	.169		
4	.191	.165		
5	.187	.160		
5	.178	.155		
5	.172	.150		
5	.162	.147		
5	.159	.140		
6	.146	.131		

It is seen that comparatively high rates can be paid for parking space, if the total number of parking spaces and high all-day or all-night rate can be of occupancy at night. Based on the daytime and relatively high parking rates, it is possible to pay ground parking rates in expensive downtown locations.

Some of these lots accept validated tickets from various stores one- or two-hour periods, but most of their space other than used for all-day parking appears to be used largely by members of group 3.

Under present O.P.A. regulations, it is probable that rates will be subject to frequent change, as they have been in the past, which will encourage the public to make more use of downtown parking facilities.

The above-mentioned rates tend to favor the all-day parker and thus remove the most desirable parking spaces in the district from possible use by the short-time parkers—groups 3, 4, and 5.

It is our intention to try by two means to remedy the situation. One, to get the O.P.A. to permit higher all-day rates on the lots best located for short-time parking; and, two, to get the operators of these lots to keep them closed until 9:30 a.m., after which there are few drivers coming in who wish to stay all day. This is a current problem which will not affect post-war conditions materially, but it is important in its effect upon business during the war period.

## Section Four POSSIBLE SOLUTIONS

### PERMANENT SOLUTION

No complete and permanent solution of the parking problem under post-war conditions can be offered except one which will involve the setting aside exclusively and permanently for parking, sufficient land properly located which will provide outdoor or indoor parking of approximately 45,000 car spaces within the downtown Los Angeles Area, and which can be operated for fees which those who validate tickets as well as those who pay cash can and will pay.

Such a program would involve the acquisition by some public or quasi-public agency, or by a private corporation, of approximately 6,750,000 square feet of properly located ground, or some lesser amount, if means can be found to provide parking spaces in buildings at the same or less cost per net parking space. If such spaces are not set aside, the choice parking areas will gradually be absorbed for other purposes, thus increasing the demand for parking space and making it increasingly hard to secure sufficient parking property well located, at reasonable prices.

The above amounts of land to be acquired can be reduced to a considerable extent so far as the responsibility of Downtown Business Men is involved, if it is assumed that private interests and

the governmental agencies involved will contribute to the solution for the Civic Center District. As noted in our report, it should be possible to construct a large amount of ground parking space in the Civic Center District. There will probably be a comparatively large tract of vacant land in the Civic Center Parking District, I, to meet all requirements for a considerable period.

An additional reduction can be made by the use of private funds. It has been found who will build suitable garages in or adjoining it, which can be operated at reasonable rates, to serve the various groups of parkers. Possible construction of a large garage for example, would permanently meet a large part of the demand for centrally located parking spaces at reasonable rates. Construction of other and less expensive buildings would serve other parking customers and the existing buildings provides reasonable assurance.

If it is assumed that the problems of parking of about 7,000 spaces can be set aside and that garages now in operation or to be built in the Business District will provide 6,000 parking spaces, then it will be necessary to provide approximately 32,000 (4,800,000 square feet) in open-air lots within the Business District on a permanent basis.

Three legislative acts, California Assembly Bill 971; 1207, chapter 246; and 2206, chapter 246, which provide for the formation of parking facilities to acquire and operate parking facilities. A plan of such acts. Under any of them a property for parking purposes acquired by donation and the property within the district benefits estimated to accrue from the operation of the facility.

None of these acts seems to fit the downtown parking problem but it may be possible to amend one or more of them in the next legislative session to make them more useful. The act mentioned above was written by James L. Barber, member of our Transportation Department. It is being taken to the Supreme Court. They will be helpful in developing further measures for meeting the downtown parking situation.

While further studies are being made on the solutions of the general problem, there is no doubt that independently and in cooperation with private parking facilities to meet immediate needs. The recommendations are contained in our recommendations.

# ES PARKING STUDY

## RECOMMENDATIONS FOR IMMEDIATE ACTION

For immediate action, your committee recommends the formation of a corporation, to be controlled by the Executive Committee of the Association, which will have authority to rent, lease or otherwise acquire parking lots or garages and to operate them for the benefit of the District, with emphasis on serving short-time parking needs. We recommend that the corporation when formed proceed to acquire as rapidly as possible approximately 3,000 parking spaces located where they will serve all parts of the Downtown Business District. We recommend that these facilities be improved as soon as the war permits in a way which will make them a credit to the Association (see PLATES XII and XIII).

Such improvements in physical appearance and in service will, we believe, enable us to point the way toward a general cooperative effort on the part of present operators to improve the whole parking situation throughout the Downtown Area.

Present operators, for the most part, carry on their business under very difficult conditions which do not tend toward the best in service to the public, upon whom they depend for their financial success. We believe the acquisition and operation of the comparatively few parking facilities suggested will act as a stabilizing influence, the results of which will encourage present operators to join with our Association in providing, immediately after the war, if not before, general improvements in parking service which will help to bring an increasing number of customers to the Downtown Business District.

Zoning regulations now under consideration by the City Planning Commission provide regulations for the location, improvement and use of parking lots which will probably be helpful in promoting improved service.

Tentative articles of incorporation drawn for the Association by Mr. James L. Beebe contemplate an organization with no capital stock. Necessary funds are to be borrowed from businesses and property owners of the District.

A thorough investigation of the possibility of acquiring certain properties has been made for us by a competent realty broker, who reports that it will be possible to acquire the recommended number of spaces at rentals approximately the same as those being paid by present operators. No investigation has been made of properties not now used for parking purposes, but this will be done when actual negotiations are in order.

The corporation, when formed and capitalized, would, of course, examine in detail the history of each lot before acquisition and would acquire only those whose record of operation prior to

# D O W N T O W N L O S A N G E L E S

the war, as well as their present business, indicate they can be operated by the corporation to meet expenses now and under post-war conditions.

We have ascertained that suitable lots can be acquired on payment of the first and last month's rent. We recommend that capital for acquisition and operating purposes be sufficient to provide for such payments, and the equivalent of an additional month's rent for working capital.

Our own investigations and the experience of the Oakland Downtown Association, which operates under a similar plan, indicate that approximately \$25.00 per car space should be provided for improvements to the properties acquired. Such improvements to consist of surfacing, planting, painting adjacent walls, construction of ornamental front walls or fences with gates (which will be required if we are to eliminate all-day parking), suitable office buildings, and time clocks. It has been found that parking lots may be rented at rates varying from \$3.30 to \$12.00 per car space per month.

From the broker's investigation mentioned, it appears that 3,000 desirable spaces can be secured at an average rental of \$8.34 per space per month. The capital requirement to provide the equivalent of three months' rental on this basis would be \$25.00 per car space. The total improvement, rental and operating capital amounts to an average of \$50.00 per car space, or \$150,000 for 3,000 spaces as suggested.

Part of the improvements contemplated cannot be made during war times and it will not be possible to acquire all of the areas at one time. We therefore recommend that pledges for loans amounting to \$150,000 be secured, such pledges to be payable on demand as required by the corporation.

Through the formation and operation of the corporation suggested we believe that a long step toward a permanent solution of the parking problem will have been made. It is assumed that the extent of the corporation's operations will be expanded only as experience justifies it. The experience gained will be helpful in determining the future actions of the Association and the community in the further steps which must be taken to solve the parking problem on a permanent basis.

## RECOMMENDATIONS FOR FUTURE ACTION

We recommend that the committee be authorized to continue its studies looking toward a permanent solution of the parking problem in Downtown Los Angeles. Our investigations, the results of which are set out in this report, show that no material expansion in business in the Downtown District can be expected

from automobile users unless measures are provided and properly operated.

Whether this can be done through the corporation we have suggested in our report, or by other private means, cannot be solved through our present experience. To meet the problem cannot be solved through present means, that the legal advisory committee be requested to join us in our study of the problem to parking operations and in the preparation of a plan to existing laws or the preparation of new laws is advisable.

If possible, such legislative proposals should be presented to the legislative committee on January 2, 1945.

We recommend that the City Attorney be requested to join us in our study of the problem as a permanent solution of the problem. We recommend that the City Attorney be requested to advise and assist our legal staff to advise and assist our legal staff.

## PLATE XII—PARKING LOT

This parking lot located in the downtown district is typical of the better kept parking lots in Los Angeles. Reference to the sketch in Plate XII, however, will show the great improvement in general appearance at comparison with other parking lots.

## PLATE XIII—PARKING LOT

This sketch prepared by the City of Los Angeles shows the parking lot after reasonable changes in appearance, including gates and planting.

# LOS ANGELES PARKING STUDY

## ACKNOWLEDGMENTS

The committee desires to express its sincere appreciation to the following, who, by making available to us reports, legal information, building estimates, operating experience and helpful suggestions, enabled us to compile the report without incurring the expense in time and money which would have been necessary had we secured all our information through our own surveys and initial research.

The following departments of the City of Los Angeles.

The City Planning Commission, director and staff.

The City Engineer and staff.

The Street Traffic Engineer.

The Bureau of Building and Safety.

The Regional Planning Commission of Los Angeles, its chief engineer and staff.

The California State Highway Commission, its chief engineer and staff, and particularly the chief engineer and staff of the Los Angeles office.

The Automobile Club of Southern California, Engineering Department.

The Downtown Merchants' Parking Association of Oakland.

The operator and management of Union Square Garage in San Francisco.

James L. Beebe, attorney.

Dwight Gibbs, architect.

Coldwell Banker and Company, Realtors, Mr. Riley and Mr. Brun.

William Simpson Construction Company.

General Petroleum Corporation, Mr. Felix Chappellet.

W. Ross Campbell Co., Realtors, Robert L. McCourt, Jr.

adequate parking facilities  
d.

gh present operators, the cor-  
recommendations for imme-  
means, requires further study  
the possibility that the prob-  
vate business, we recommend  
of the Transportation Depart-  
study of existing laws relating  
eparation of such amendments  
of such new laws as may seem

oposals as may be developed  
ture which began its sessions

nd County Planning Commis-  
our studies looking toward a  
s presented in this report, and  
ed to assign a member of his  
committee.

## PLATE EIGHTEEN

Business Parking District is  
places in Downtown Los An-  
LATE XIII, on page twenty,  
ovement which can be made  
tively small expense.

## PLATE TWENTY

City Planning Commission of  
ot illustrated by PLATE XII  
rance have been made by walls,