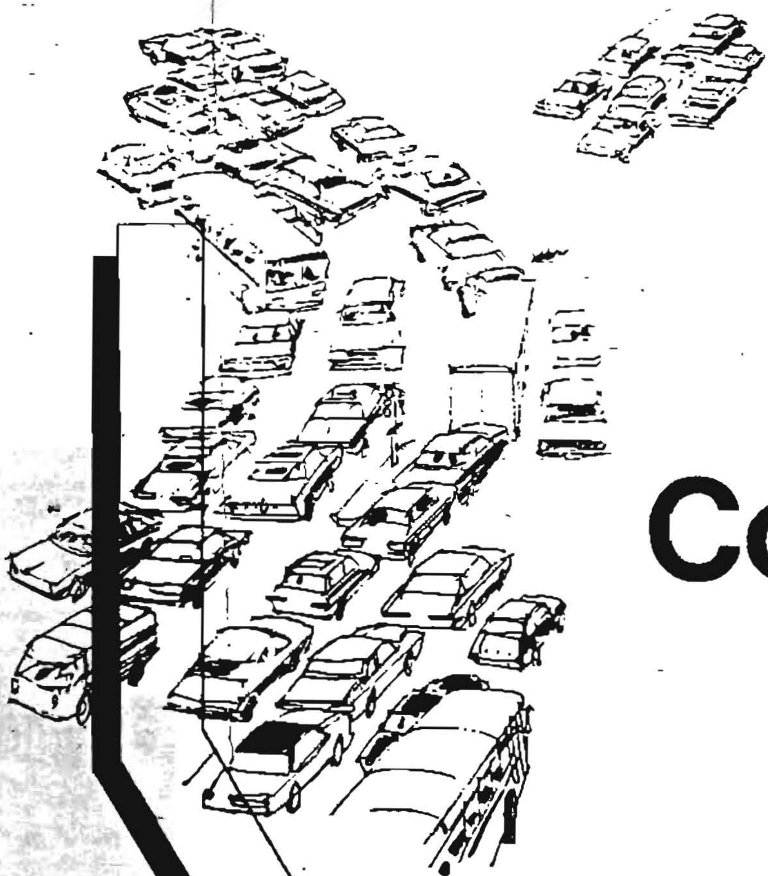

I-405 North Corridor Study

July 1986

SCAG
SOUTHERN CALIFORNIA
ASSOCIATION OF GOVERNMENTS

I-405 NORTH CORRIDOR STUDY

July 1986

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I-405 NORTH CORRIDOR STUDY

EXISTING CONDITIONS AND NEEDS ANALYSIS

Prepared by:

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I-405 CORRIDOR STUDY EXISTING CONDITIONS AND NEEDS ANALYSIS

The purpose of this report is to present the existing and anticipated future conditions in the I-405 Corridor Study area. Upon an analysis of the data, a set of alternatives will be designed for testing through the LARTS (Los Angeles Regional Transportation Study) computer network. The data used for the present highway analysis is from the model run which utilized SCAG '82 forecasts. Year 1980 and 2000 highway data used in this memo results from that modeling exercise. Transit ridership data comes from the most recent model runs--those for 1984 and 2010. This modeling data is preliminary as the modeling for these years is still under development. Thus, the highway data, which was collected earlier, was not modified to reflect the new horizon years. Since the highway data is more critical to this study the more accurate nature of the earlier data was thought to be more important than the more timely but still uncertain data now being generated by the model.

The socio-economic data discussed further on is the model input data from SCAG '82.

I. STUDY AREA DEFINITION

The corridor study boundaries extend from Victory Boulevard in the San Fernando Valley as the northernmost point to Rosecrans Avenue south of Los Angeles International Airport (LAX) as the southern boundary. The coastline forms the western boundary with a straight line extending from Reseda Boulevard at Victory Boulevard, south to the ocean. The eastern boundary begins at Beverly Glen Boulevard in the north and ends at Western Avenue in the south. Since the study boundaries are defined through the LARTS Analysis Zone (AZ) system, the eastern boundary reflects the geometric pattern of the Analysis Zones.

While the above area provides a general framework with which to understand the overall dynamics of transportation in this part of the Los Angeles Metropolitan region, a smaller area was used for the traffic and public transit analysis undertaken here. The study area's east and west boundaries were narrowed to an area approximately one mile either side of the I-405 Freeway. This area, termed the primary impact area, is bounded by Westwood and Sepulveda Boulevards on the east and Centinela and Woodley Avenues on the west. The north and south boundaries of the primary impact area correspond to those of the general study area. The attached map (see Figure 1) clarifies the general study area and primary impact area boundaries.

Of greater importance than the outline of the boundaries, is the freeway and arterial street system included in the study. Once again, the LARTS modeling effort was utilized. The street system used is the LARTS network. The freeways included in the study area, other than I-405, are Route 90, and I-10. Minor significance was placed on these routes, however, as they are east-west highways and the corridor study concentrates on the north-south movement of traffic. In addition I-405, the Century Freeway, will be

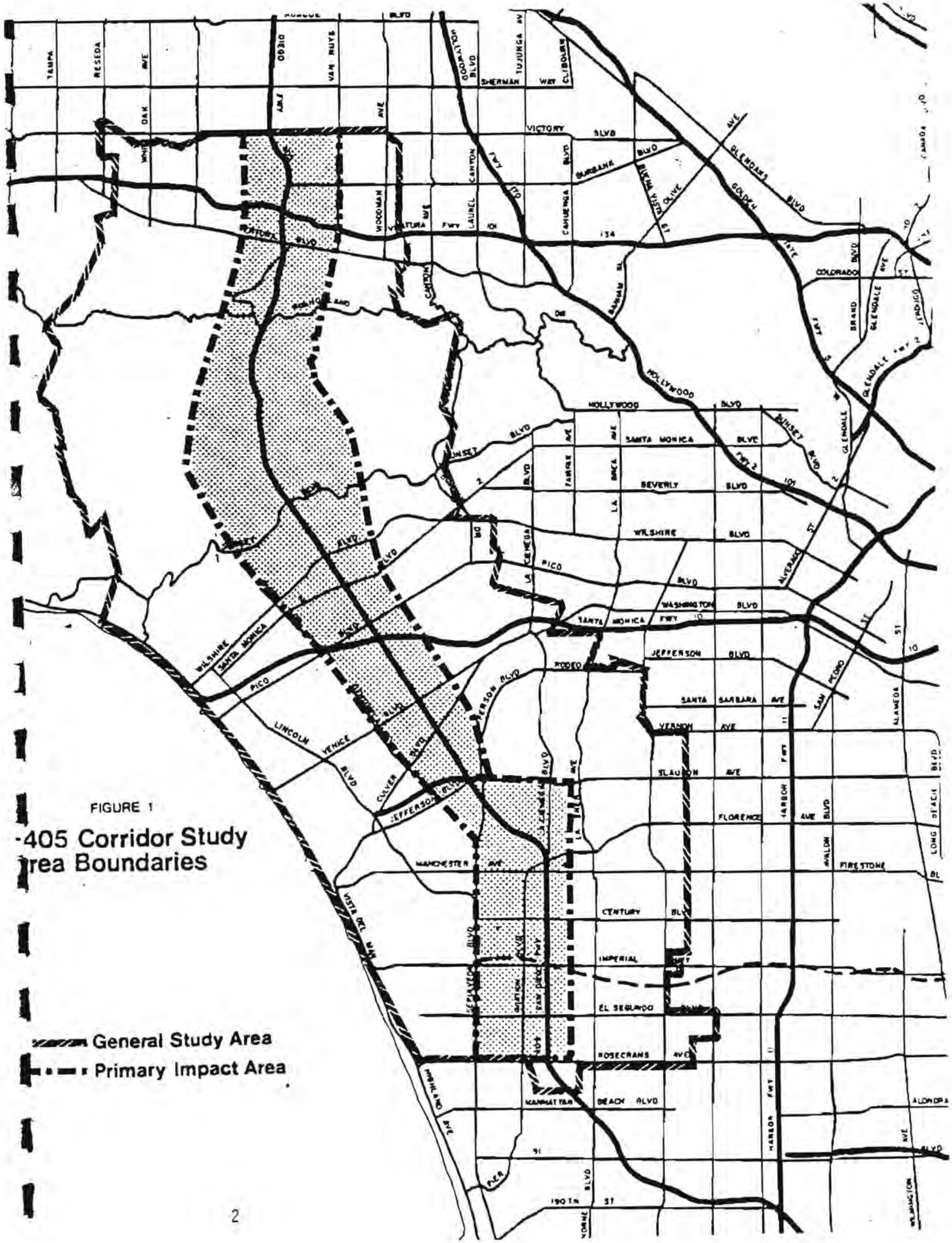

FIGURE 1

-405 Corridor Study Area Boundaries

General Study Area

Primary Impact Area

in operation by the year 2000. While it will have an effect on future traffic generation in the stuoy area, it does not fall within the primary impact area and, as with routes 90 and I-10, is an east-west highway.

The major arterials of importance to the study include Sepulveda/Jefferson, Centinella/Bundy, Overland, Beverly Glen, and Westwood Boulevard. Again, the east-west arterials are of minor significance to the study and will not be discussed.

II. EXISTING POPULATION AND EMPLOYMENT

Population and employment projections were based on the region's Development Guide adopted growth forecasts (SCAG 82). Projections were made for the horizon year 2000 for the highway element of this report and the year 2010 for transit analysis.

There are five RSA's within the study area's boundary. These are Southwest San Fernando Valley, Burbank, Santa Monica, West-Central Los Angeles and South Bay. The 1980 population of the above RSA's were at 2.64 million level while the employment was at 1.54 million level. This provides a ratio of employment to population of 0.58 which would indicate that at the study area level, there is some balance between job and housing. The population and employment for the forecast year 2010 are at 3.09 and 1.8 million respectively. This is an increase of 17% over 1980 population and employment growth. This also indicates that the area will stay job-housing balance into the future.

III. EXISTING LAND USE CONDITIONS

A. LAND USE

The northern portion of the study area in San Fernando Valley consists of 69% low to medium density residential uses, 11% commercial and industrial uses and 20% open or public land uses. Several major shopping centers and high-rise office centers and two airports, are the main traffic generators in the northern portion of the study area. The southern portion of the study area also consist of low density. (Santa Monica, Brentwood, Culver City, and Inglewood) and medium density (Westwood and Marina) residential uses. These are high activity centers located in the southern portion of the study area. They include Los Angeles International Airport, the electronic/aerospace employment complex concentrated in the City of El Segundo, the largest Marina on the west coast, Westwood Village, Century City, major shopping centers and high-rise office centers widely dispersed throughout the study area.

B. Recent Land-Use Policy Developments

The City of Los Angeles has had to take a serious look at the relationships between its transportation infrastructure, zoning plan, and community plans. Building on its centers concept, specific plans and ordinances have been proposed in the LAX, Century City, and Westwood areas. Plans for the entire City will eventually entail down-zoning to reflect the community plans and a reexamination of the community plans and specific plans to ensure that the transportation infrastructure is not outstripped by growth within the centers. The City is moving in the direction of transportation demand managment as a way to mitigate the impact of growth rather than on a sole reliance upon capital improvements to add more roadway capacity.

Coastal Transportation Corridor Specific Plan. (Adopted Sept. 20, 1985) This ordinance for the LAX employment area contains trip generation rates for calculating PM-peak-hour vehicle-trips for each of a specific development's land uses. Based on this figure, the developer must contribute $2,010/trip to the area Transportation Trust Fund. These funds will be used to mitigate development impacts, and specifically to coordinate employer-employee transportation organizations, and to plan, engineer, acquire rights-of-way for and construct transportation facilities in the Specific Plan area. Fifty percent of the funds collected along the Coastal Light Rail Corridor are allocated to a separate transit facility development account. Routine maintenance of existing facilities is not a permitted use of the fund.

The developer can (and if the PM-peak hour trips generated exceed a threshold of 100, must) develop a Project Transportation Plan to manage the additional travel demand and reduce the amount of the required contribution through mitigation measures which shift trips from peak to off-peak, encourage carpooling and transit ridership, provide developer-funded system improvements and/or reduce the project's intensity of land use development.

Westwood Specific Plan. The draft Westwood Interim Traffic Mitigation Ordinance employs the same process as the LAX specific plan, but it includes mandatory contributions to the Transportation Mitigation Fund, with no incentive or requirement for demand management or developer-funded system improvements plans. Though this simplifies implementation, it will hamper effective mitigation of congestion and treatment of cumulative impacts.

Ventura Boulevard Corridor Transportation Mitigation Ordinance. (Adopted November 9, 1985) This ordinance requires developers to agree to abide by a forthcoming Coastal Corridor-style specific plan. The specific plan will include payment to a transportation mitigation fund, developer-financed street widenings or dedications, and reduction of PM-peak hour travel demand through similar demand management measures (including staggered work hours, shuttle buses and limiting free employee parking.)

IV. EXISTING TRANSPORTATION SYSTEM CONDITIONS

A. LARTS Model Data

Most of the traffic data utilized in this study, including 1980 Base Year and Year 2000 forecast data comes from the LARTS model as the result of the model output. The I-405 Freeway figures for 1980 are not actual traffic counts and should not be considered or utilized as such. This is not to say, however, that they are inaccurate or differ greatly from what was occurring in 1980. The LARTS 1980 Base Year model output compares favorably to the Caltrans 1980 Traffic Volumes Count Book. In a comparison within the study area of the volumes on I-405, the difference between model output and actual count was approximately 1% for the ADT (Average Daily Traffic) counts. In most cases the difference was less than 1%.

For the arterials, actual 1980 traffic counts made by the City of Los Angeles Department of Transportation were used in almost all cases. 1980 model output data was only used in a few cases where traffic count data was not available for particular links. Because the 1980 count data and model data were often considerably different on a link basis, the year 2000 traffic link volumes projected by the model were factored by the 1980 differences for each link to arrive at adjusted 2000 model projections. The Year 2000 network includes existing highways and major arterials as well as 1984 RTIP (Regional Transportation Improvement Plan) funded systems and improvements.

B. Freeways

1. I-405

For the most part, I-405 is an 8 lane facility, four lanes in each direction. The only exception is between Santa Monica Boulevard and Wilshire Boulevard where it is five lanes in each direction.

Base Year 1980 Volume LARTS Outputs

Table I displays both the 1980 Base Year traffic volumes and Year 2000 traffic forecast volumes for I-405. The volumes are shown as ADT (Average Daily Traffic), AM peak period directional and total, and PM peak period directional and total. Under Base Year conditions in the study area, I-405 displays LARTS 1980 ADT outputs from a low of 193,000 between Route 101 and Victory Boulevard in the San Fernando Valley to a high of 252,000 between I-10 and Olympic Boulevard in the West Los Angeles area. Interestingly, the stretch from Ventura Boulevard to Route 101 in the San Fernando Valley also carries the second greatest volume of traffic with 233,000 ADT. The interchange of Route 101 and I-405 has just this year become the busiest interchange in the SCAG region. It would appear as though Route 101 is attracting trips from I-405 through the interchange resulting in a marked reduction of flow continuing north into the San Fernando Valley.

Levels of Service

More significantly, the peak volumes (AM peak period is two hours and PM peak period is three hours) illustrate the maximum amount of traffic carried at the height of demand. Table II is a companion to Table I and displays the corresponding Level of Service (LOS) for I-405. Table III explains in detail the levels of service in regards to volume to capacity (V/C) ratios and speed and delay associated with each designation. Briefly, however, LOS A is superior indicating free-flow conditions and LOS F is failure indicating a standstill. The grades in between deteriorate from A to F. LARTS uses a freeway lane service volume figure of 1700 vehicles per lane per hour. This figure equates to a LOS D and V/C of 1.00 to 1.13. Actual capacity of a lane is approximately 2000 vehicles per hour. Therefore, even though a particular segment of freeway or road may have a V/C ratio greater than 1.00, there still may be available capacity.

Both Tables I and II show a strong directional flow during the AM peak period, particularly in the northern and southern portions of the corridor.

The mid-section briefly displays a more balanced flow. Flow reverses itself from north-to-south at Rosecrans Boulevard to south-to-north in the San Fernando Valley. These conditions are strikingly displayed in the LOS split as A/F from Olympic Boulevard to Victory Boulevard.

The PM peak period flow shows a deterioration in levels of service due to the increase in the volume of traffic carried. The strong directionality of the AM period is lost in the PM period as evidenced by the higher number of E/E and F/F levels of service for nearly the entire length of the study corridor.

1980 Additional Lane Requirements

Table IV displays the number of lanes that would be necessary to bring the level of service on I-405 to D in all directions during AM and PM peak periods for both 1980 and Year 2000. These figures are not meant to serve as the suggested study solution. Rather, they are intended only to suggest the extent of the present capacity deficiencies on the respective highway facilities.

Once again, considering 1980 only, the directionality of the AM flow is the most pronounced from Olympic Boulevard to Victory Boulevard.

The PM peak period flow shows a greater degree of directionality than either Tables I or II would suggest. This is due to the requirements of calculating the additional lanes needed. Any section of freeway at level of service D (V/C ratio of 1.00 to 1.13) or better was deemed to require no additional lanes. At level of service E or F, lanes were added one at a time until LOS D was achieved. In some instances, even though the level of service was the same in both directions, that is LOS F, more lanes were necessary to achieve LOS D. Since LOS F is defined as anything greater than 1.25 volume to capacity ratio, the volume of traffic was just enough more to require another lane. The stretch from Sunset Boulevard to Route 101 particularly displays this condition during the PM period. For example, from Sunset Boulevard to Wilshire Boulevard and from Mulholland Drive to Ventura Boulevard, the PM LOS is F/F. However, Table IV indicates that it would take two lanes northbound, but only one lane southbound to reach LOS D. That is accounted for by the following volumes and V/C ratios:

VOLUME	VOLUME TO CAPACITY RATIO		
	4 Lanes	5 Lanes	6 Lanes
31,000 (NB)	1.52 (F)	1.22 (F)	1.01 (D)
27,000 (SB)	1.32 (F)	1.06 (D)	.88 (B)

To break down this difference in terms of vehicles carried per lane per hour would mean 2,000 vehicles. At a minimum of 1700 vehicles per lane per hour, the required number of added lanes would be approximately one, which is the difference shown.

TABLE I

I-405 1980 BASE YEAR TRAFFIC VOLUMES AND
YEAR 2000 TRAFFIC FORECASTS
LARTS MODEL OUTPUT

LIMITS	1980 ADT	1980 AM	1980 PM	2000 ADT	2000 AM	2000 PM
Rosecrans to El Segundo	205	16/11/27	22/25/47	216	16/12/28	22/25/47
El Segundo to Imperial	207	16/12/28	23/25/48	241	15/15/30	26/26/52
Imperial to Century	215	16/13/29	24/25/49	235	17/16/32	27/28/55
Century to Manchester	214	15/14/29	25/25/50	264	16/17/33	27/28/55
Manchester to La Tijera	220	15/15/30	25/25/50	270	15/19/34	29/29/58
La Tijera to Route 90	220	13/16/29	26/25/51	267	14/20/34	32/34/66
Route 90 to Washington	201	14/16/30	27/26/53	278	15/21/36	35/32/67
Washington to Venice	212	13/17/30	26/26/52	271	15/20/35	35/31/66
Venice to I-10	216	13/16/29	25/25/50	309	15/20/35	33/31/64
I-10 to Olympic	252	14/19/33	30/27/57	305	15/21/36	32/33/65
Olympic to Santa Monica	231	10/19/29	29/24/53	263	11/21/32	33/30/63
Santa Monica to Wilshire	214	8/21/29	31/27/58	271	10/23/33	37/32/69
Wilshire to Sunset	192	7/22/29	31/25/56	240	8/25/33	36/31/67
Sunset to Mulholland	197	9/22/31	31/28/59	291	10/27/37	38/34/72
Mulholland to Ventura	189	9/20/29	31/27/58	285	10/24/34	37/30/67
Ventura to Rt. 101	233	9/20/29	30/26/56	304	11/25/36	36/28/64
Rt. 101 to Victory	193	9/16/25	25/22/47	208	11/16/27	25/31/55

All volumes should be multiplied by 1000.
AM and PM volumes are northbound/southbound/total.

TABLE II

I-405 LEVELS OF SERVICE
LARTS MODEL OUTPUT

LIMITS	1980 AM	1980 PM	2000 AM	2000 PM
Rosecrans to El Segundo	E/B	D/E	E/B	D/E
El Segundo to Imperial	E/C	D/E	D/D	F/F
Imperial to Century	E/C	E/E	E/E	F/F
Century to Manchester	D/D	E/E	E/E	F/F
Manchester to Florence	D/D	E/E	D/F	F/F
Florence to Culver	C/E	F/E	D/F	F/F
Culver to Washington	D/E	F/F	D/F	F/F
Washington to Venice	C/E	F/F	D/F	F/F
Venice to I-10	C/E	E/E	D/F	F/F
I-10 to Olympic	D/F	F/F	D/F	F/F
Olympic to Santa Monica	A/F	F/E	B/F	F/F
Santa Monica to Wilshire	A/E	E/D	A/E	F/E
Wilshire to Sunset	A/F	F/E	A/F	F/E
Sunset to Mulholland	A/F	F/F	A/F	F/F
Mulholland to Ventura	A/F	F/F	A/F	F/E
Ventura to Rt. 101	A/F	F/F	A/F	F/D
Rt. 101 to Victory	A/E	E/D	A/E	E/F

Levels of Service are northbound/southbound.

TABLE III

INTERPRETATION OF LEVELS OF SERVICE FOR FREEWAYS AND ARTERIALS

LEVEL OF SERVICE*	V/C**	INTERPRETATION (DURING PEAK PERIODS)
A	Less than 0.75	Excellent operation, relatively free flow, average speeds 30 mph (constrained only by roadway alignment and/or speed limits).
B	0.76 to 0.88	Very good operation, stable flow, slight delay at key intersections, average travel speed at 25+ mph.
C	0.89 to 1.00	Good operation, stable flow, occasional delay and intervehicular conflicts at many intersections, average speed reduced to 20+ mph.
D	1.01 to 1.13	Fair operation, approaching unstable flow, delays at critical intersections as long as two or more signal cycles, average speed as low as 15 mph.
E	1.14 to 1.25	Poor operation, unstable flow, continuous backups occur on the approaches to critical intersections, traffic from minor cross streets has difficulty entering or crossing main traffic stream, average speed likely to be at or below 15 mph.
F	Greater than 1.26	Forced flow, vehicles back up from critical downstream signal through upstream signalized intersections. Stop and go conditions. Average speed less than 10 mph.

* As defined in the National Academy of Sciences Highway Capacity Manual, 1965.

** Volume/Capacity ratio relative to level of service C, i.e., V/C for Level of Service C = 1.00. The capacities at Level of Service C for various classifications of roadways are assumed to be: freeway - 1,700 vehicles per lane per hour; primary arterial - 600 vehicles per lane per hour; and secondary arterial - 500 vehicles per lane per hour.

TABLE IV

I-405 ADDITIONAL LANE REQUIREMENTS
TO LEVEL OF SERVICE D

LIMITS	1980 AM	1980 PM	2000 AM	2000 PM
Rosecrans to El Segundo	1/0	0/1	1/0	0/1
El Segundo to Imperial	1/0	0/1	1/1	1/1
Imperial to Century	1/0	1/1	1/1	1/1
Century to Manchester	0/0	1/1	1/1	1/1
Manchester to Florence	0/0	1/1	0/2	2/2
Florence to Culver	0/1	1/1	0/2	2/2
Culver to Washington	0/1	1/1	0/2	3/2
Washington to Venice	0/1	1/1	0/2	3/2
Venice to I-10	0/1	1/1	0/2	2/2
I-10 to Olympic	0/1	2/1	0/2	2/2
Olympic to Santa Monica	0/1	2/1	0/2	2/2
Santa Monica to Wilshire	0/1*	2/0*	0/1*	2/1*
Wilshire to Sunset	0/2	2/1	0/2*	2/1*
Sunset to Mulholland	0/2	2/1	0/2*	2/1*
Mulholland to Ventura	0/2	2/1	0/2*	2/1*
Ventura to Rt. 101	0/2	2/1	0/2*	2/0*
Rt. 101 to Victory	0/1	1/0	0/1	1/2

* Five lanes in each direction at these locations.
Additional lane requirements are northbound/southbound.

Obviously, it is not possible or desirable to add one or two lanes for just one peak period. The worst case or highest number of lanes required, must be added to accommodate the demand. Unbalanced widenings, such as one lane in one direction and two lanes in the opposing direction, are undesirable. Usually reverse flow is comparable and should be provided for by design. Fluctuations in demand do occur and cannot always be predicted.

I-405 would require a minimum of one lane in each direction from Rosecrans Boulevard to I-10 to achieve LOS D for the Base Year 1980, and two lanes from I-10 to Route 101. From Route 101 to Victory Boulevard, only one lane would be necessary.

2. Route 90

Route 90 is approximately two miles in length and flows east-west from Slauson Boulevard just east of I-405 in the Fox Hills area of Los Angeles to Culver Boulevard near Marina del Rey. The proposed extension of Route 90 west to Washington Boulevard, was never completed due to local opposition.

As displayed in Table VI, the LARTS model output for Base Year 1980 sets the levels of service for Route 90 at A for all peaks in all directions. The Average Daily Traffic (Table V) confirms these levels with a high of only 62,000 from Slauson Boulevard to Centinella Boulevard. Obviously, no additional lanes are required for Route 90 and no further discussion of this east-west freeway for the Base Year 1980 will be included in this report.

3. I-10

The I-10 freeway also passes through the study corridor in an east-west direction from Ocean Boulevard in Santa Monica to La Brea Avenue. Traffic volumes build from west to east within the study area. A low of 56,000 ADT for the Base Year 1980 occurs at Ocean Boulevard, the western terminus, to a high of 241,000 ADT at La Brea Avenue, the eastern boundary of the study. (See Table V) Likewise, the AM and PM peak periods build from west to east. Eastbound traffic appears to be the dominant flow in the AM period, however from La Cienega Boulevard to La Brea Avenue the westbound flow exceeds the eastbound traffic. The PM period is consistently higher in the westbound direction as it approaches Lincoln Boulevard, the reverse of the morning period.

Based upon the LARTS model output, the Base Year 1980 figures for the I-10 traffic volumes indicate few major stoppages within the study boundaries. However, as flow progresses eastward, volumes do increase and the levels of service also deteriorate. (See Table VI) The volumes increase dramatically from Centinella Boulevard to I-405 due to the addition of a fifth lane at that point. The only LOS F rating occurs from La Cienega Boulevard to La Brea Avenue in the westbound direction during the PM period. LOS E occurs consistently under PM westbound conditions from Centinella Boulevard to La Brea Avenue. All of the E's required one additional lane and the F required two additional lanes to reach a LOS D. These additional lanes would bring I-10 to a six-lane facility (in each direction) from Centinella Boulevard to La Cienega Boulevard and seven lanes from La Cienega Boulevard to La Brea Avenue. (See Table VII)

TABLE V

ROUTE 90 AND I-10
1980 BASE YEAR TRAFFIC VOLUMES AND
YEAR 2000 TRAFFIC FORECASTS
LARTS MODEL OUTPUT

LIMITS	1980 ADT	1980 AM	1980 PM	2000 ADT	2000 AM	2000 PM
ROUTE 90						
Slauson to Centinella	62	4/5/9	8/8/16	75	5/10/15	9/8/17
Centinella to Culver	47	3/4/7	6/7/13	53	3/4/7	7/7/14
I-10						
Ocean to Lincoln	56	4/4/7	8/7/15	61	6/3/9	9/9/18
Lincoln to Centinella	89	6/4/10	8/16/24	116	8/5/13	14/15/29
Centinella to I-405	161	13/10/23	11/31/42	190	15/10/25	25/26/51
I-405 to Overland	190	17/10/27	20/29/49	209	16/11/27	26/28/54
Overland to La Cienega	197	18/10/28	23/29/52	208	18/10/28	28/31/59
La Cienega to La Brea	241	19/13/32	27/30/57	258	19/14/33	30/32/62

All volumes should be multiplied by 1000.
AM and PM volumes are eastbound/westbound/total.

TABLE VI

ROUTE 90 AND I-10 LEVELS OF SERVICE
LARTS MODEL OUTPUT

LIMITS	1980 AM	1980 PM	2000 AM	2000 PM
ROUTE 90				
Slauson to Centinella	A/A	A/A	A/A	A/A
Centinella to Culver	A/A	A/A	A/A	A/A
I-10				
Ocean to Lincoln	A/A	A/A	A/A	A/A
Lincoln to Centinella	A/A	A/B	A/A	A/A
Centinella to I-405	B/A*	A/E*	B/A*	C/D*
I-405 to Overland	C/A*	B/E*	B/A*	D/D*
Overland to La Cienega	D/A*	C/E*	D/A*	E/E*
La Cienega to La Brea	D/A*	D/E*	D/B*	E/E*

* Five lanes in each direction at these locations.
Levels of service are eastbound/westbound.

C. Arterials

Arterials parallel to the I-405 Freeway were investigated for their potential to provide relief to the existing and projected traffic congestion on the Freeway. Seven arterials form three potential alternative routes to the Freeway through major portions of the study area. These routes are:

1. Sepulveda Boulevard
2. Bundy Drive -- Centinela Avenue
3. Jefferson Boulevard -- Overland Avenue -- Westwood Boulevard -- Beverly Glen Boulevard

However, only Sepulveda Boulevard provides a parallel through route to the freeway through the entire length of the study area. The Bundy-Centinela combination provides parallel service through the heavily populated central part of the area--the West Los Angeles community--while the Jefferson-Overland-Westwood-Beverly Glen combination parallels I-405 from Culver City to the San Fernando Valley.

1. Sepulveda Boulevard

Sepulveda Boulevard provides from two to four travel lanes in each direction during the peak travel periods for its entire length in the study area with one exception. That exception is the tunnel under Mullholland Drive in the Santa Monica Mountains where the road narrows to a total of only three lanes, one northbound and two southbound. The southbound direction is given permanent priority because its PM peak period/peak direction traffic volume is about 20% greater than the northbound AM peak period/peak direction traffic volume). In addition, Sepulveda Boulevard is also the closest parallel arterial to the I-405 Freeway, physically adjoining it in many places. Because the City of Los Angeles Department of Transportation is undertaking a separate more detailed study of the northern portion of Sepulveda Boulevard, this discussion will only focus on that part of the Boulevard south of Slauson Avenue. The City of Los Angeles report entitled, "Sepulveda Boulevard Speed and Delay Study," is reproduced in the appendix.

Base Year 1980 Volume Adjusted LARTS Output

Table VIII displays both the adjusted 1980 Base Year traffic volumes and year 2000 traffic forecast volumes for the previously mentioned arterials. The volumes are shown as ADT (Average Daily Traffic), AM peak period directional and total and PM peak period directional and total. These are "adjusted" traffic volumes which means that the 1980 model output volumes were compared with actual 1980 ground counts and adjusted to reflect the ground counts. The adjustment factors were applied to the year 2000 forecast volumes so that they would reflect the same relationship to the actual ground counts as the 1980 model output volumes.

Under Base Year conditions in the study area, the southern part of Sepulveda Boulevard displays 1980 model ADT outputs from a low of 22,500 between Rosecrans Avenue and El Segundo Boulevard to a high of 61,100 between Imperial and Century Boulevards. This is probably due to the fact

TABLE VII

ROUTE 90 AND I-10 ADDITIONAL LANE REQUIREMENTS
TO LEVEL OF SERVICE D

	1980		2000	
LIMITS	AM	PM	AM	PM
ROUTE 90				
Slauson to Centinella	0/0	0/0	0/0	0/0
Centinella to Culver	0/0	0/0	0/0	0/0
I-10				
Ocean to Lincoln	0/0	0/0	0/0	0/0
Lincoln to Centinella	0/0	0/0	0/0	0/0
Centinella to I-405	0/0	0/1	0/0	0/1
I-405 to Overland	0/0	0/1	0/0	0/1
Overland to La Cienega	0/0	0/1	0/0	0/1
La Cienega to La Brea	0/0	0/1	0/2	1/1

Additional lane requirements are eastbound/westbound.

TABLE VIII

ARTERIAL
1980 BASE YEAR TRAFFIC VOLUMES AND YEAR 2000 TRAFFIC FORECASTS
ADJUSTED REGIONAL MODEL OUTPUT[a]

	1980			2000		
LIMITS	ADT	AM	PM	ADT	AM	PM
SEPULVEDA BOULEVARD						
Rosecrans to El Segundo	225[b]	43/5/48[b]	24/57/81[b]	295[b]	67/7/24[b]	30/80/110[b]
El Segundo to Imperial	341[b]	21/40/61[b]	58/51/109[b]	411[b]	27/57/84[b]	79/56/135[b]
Imperial to Century	611	47/43/90	75/92/167	705	63/43/106	92/106/198
Century to Manchester	466	3/26/29	62/39/101	509	3/27/30	72/41/113
Manchester to Slauson	511	27/45/72	75/69/144	574	27/53/80	90/76/166
JEFFERSON BOULEVARD						
Slauson to Overland	315	21/19/40	43/45/87	340	19/24/43	47/50/97
Overland to La Cienega	204	16/14/30	29/31/60	224	17/14/31	32/34/66
CENTINELA AVENUE						
Rt. 90 to Culver	408	12/33/45	57/44/101	500	16/46/62	76/57/133
lver to Venice	251	12/23/35	41/36/77	315	11/32/43	55/43/98
Venice to I-10	431	35/35/70	84/84/168	477	35/46/81	102/94/196
BUNDY DRIVE						
I-10 to Pico	327	29/30/59	40/36/76	358	30/32/62	48/41/90
Pico to Santa Monica	301	17/25/42	42/36/78	334	17/27/44	52/42/94
Santa Monica to Wilshire	193	8/14/22	27/23/50	207	9/15/24	31/27/58
Wilshire to San Vicente	NA	NA	NA	NA	NA	NA
San Vicente to Sunset	291	.3/.7/1	1/.8/2	313	.3/.8/1	1/.9/2
OVERLAND AVENUE						
Jefferson to Culver	NA	NA	NA	NA	NA	NA
Culver to Venice	185	12/14/26	24/23/47	255	13/19/32	28/25/53
Venice to I-10	252	25/22/47	36/36/72	286	27/29/56	41/40/81
I-10 to Pico	299	25/27/52	41/45/86	330	24/43/67	48/43/91
WESTWOOD BOULEVARD						
Pico to Olympic	266	18/22/40	49/48/87	307	18/31/49	61/53/114
Olympic to Santa Monica	249	12/18/30	45/40/85	292	11/29/40	55/43/98
Santa Monica to Wilshire	287	20/17/37	34/32/66	308	15/28/43	36/34/70
Wilshire to Sunset	307	30/18/48	34/39/73	320	30/31/61	41/40/81

Table VIII (continued)

LIMITS	1980 ADT	1980 AM	1980 PM	2000 ADT	2000 AM	2000 PM
BEVERLY GLEN BOULEVARD						
Santa Monica to Wilshire	178	6/14/20	25/16/41	219	6/18/24	32/21/53
Wilshire to Sunset	178	4/16/20	17/10/27	216	4/18/22	21/14/35
Sunset to Mulholland	155	.7/28/29	45/12/57	213	1/37/38	59/27/86
Mulholland to Ventura	273	24/36/60	64/52/116	337	29/53/82	80/70/150

[a] See columns (4) and (7) of Table A-II for adjustment factors.
[b] No ground counts available unadjusted model output used.
All volumes should be multiplied by 100.

that this highway link connects the El Segundo Aerospace employment area with Los Angeles International Airport, the two largest traffic generators in the area.

Levels of Service

More significant, however, than the daily demand is that during the peak travel periods. The peak volumes illustrate the maximum traffic flow at the height of the demand. (As with the previously discussed Freeway volumes, the AM peak period is two hours and the PM peak is three) Table IX, a companion to Table VIII, displays the corresponding Level of Service (LOS) for Sepulveda Boulevard. While the capacity volumes for an arterial used to calculate the levels of service are different than for a freeway, the definitions are the same. These definitions are shown in Table III.

The second footnote to Table III gives arterial capacities at LOS C. At LOS D, a primary arterial can accommodate 678 vehicles per lane per hour while a secondary arterial can carry 565 vehicles per lane per hour. These figures equate to a volume to capacity (V/C) ratio of 1.00 to 1.13 (see appendix Table A-4 for actual V/C ratios). Actual capacity of an arterial can range even higher, although traffic flow may deteriorate accordingly. This, even though a particular arterial segment may have a V/C ratio greater than 1.00, there still may be available capacity.

In looking at the data on Tables VIII and IX for Sepulveda Boulevard discernable patterns are somewhat hidden but they are there. In the AM peak the predominant traffic flow is north from Rosecrans Avenue and Century Boulevard, i.e., through the aerospace complex to the airport. After Century Boulevard it tapers off considerably with the level of service improving from the worst condition, LOS F, to the best condition, LOS A. (The anomaly of LOS A from El Segundo to Imperial is due in part to the additional lane and relative lack of street entries and exits on this part of Sepulveda Boulevard). In the southbound direction the heavy flow is from Slauson Avenue south to Imperial Boulevard, again focusing in on the LAX-Aerospace employment area. Traffic south of El Segundo Boulevard reduces significantly in the morning peak period.

In the evening peak the northbound traffic flow reverses direction. Getting gradually heavier from El Segundo to Slauson Boulevard, it is the expected home commute of the Aerospace workers living north of the airport-aerospace area. However, the southbound direction has two major geographic peaks. A strong flow of traffic south from Slauson Avenue to Manchester Boulevard, then a sharp decline in volume to Century Boulevard where the traffic volume dramatically increases to Imperial Boulevard. At Imperial Boulevard there is a significant drop in traffic although a still substantial and steady volume continues on Sepulveda Boulevard to the south end of the study area. The dramatic increase in level of service from Imperial to El Segundo boulevards is due to both this drop off and the geometrics of this section of Sepulveda Boulevard discussed earlier.

1980 Additional Lane Requirements

Table X displays the number of lanes that would be necessary to bring the level of service on Sepulveda Boulevard to D in all directions during the

AM and PM peak periods for both 1980 and 2000. As with the I-405 Freeway analysis, any section of the arterials examined operating a level of service D (V/C ratio of 1.00 to 1.13) or better was deemed to require no additional lanes. At level of service E or F, lanes were added one at a time until LOS D was achieved. In some instances, even though the level of service was the same in both directions, that is LOS F, more lanes were necessary to achieve LOS D. Since LOS F is defined as anything greater than a 1.25 volume to capacity ratio, the volume of traffic was just enough more to require another lane.

To meet 1980 traffic volumes at LOS D, one additional lane is required on Sepulveda Boulevard in both directions in all but two of the sections studied. This would increase Sepulveda from three to four lanes in each direction over its entire study length. One exception to the widening, the segment from El Segundo to Imperial Boulevards is already four lanes directional. The other exception is the southbound segment from Century Boulevard to Imperial Highway. Its 1980 PM peak period of volume of 1,200 vehicles, or 3,067 per hour would normally require five lanes to achieve a level of Service D (four lanes can accommodate only 2,712 vehicles/hour using the LARTS model definition). However this stretch of Sepulveda Boulevard has no access or grade crossings from north of Century Boulevard to Imperial Highway and thus should be able to accommodate higher volumes per lane than those defined here.

Finally, most important to this study, is Sepulveda Boulevard's ability to provide overflow capacity to the traffic on the parallel I-405 Freeway. During the AM peak period the diversion of some northbound freeway traffic between Century Boulevard and Slauson Avenue to Sepulveda Boulevard, may have been desirable. A similar diversion of southbound I-405 Freeway traffic from Imperial Highway to Rosecrans Avenue, operating at LOS E, to Sepulveda Boulevard, operating at LOS A and D, may also have been beneficial. However, through all of the other segments under study, the Freeway operated at equal or better levels than Sepulveda Boulevard.

2. Bundy Drive-Centinela Avenue

The Bundy Drive-Centinela route combination provides two travel lanes in each direction over its full length except the extreme northern portion of the route from Wilshire to Sunset boulevards. This section is only one lane in each direction. While the shortest of the parallel arterial routes to I-405, it serves the very heavily populated West Los Angeles area and may be useable as a diversion for relatively short freeway trips.

Bundy Drive and Centinela Avenue lie approximately one mile west of the I-405 Freeway.

Base year 1980 volume adjusted LARTS Output

A look at Table VIII gives the 1980 ADT for the Bundy-Centinela route. Interestingly the two heaviest segments of this route are portions of Centinela Avenue approaching two freeways, I-10 and Route 90. Predictably the smallest volumes occur at the northern end of Bundy Drive.

Levels of Service

From Tables VIII and IX, it can be seen that at the southern end of the Bundy-Centinela route, traffic is quite directional especially during the AM peak period. At this time there is a relatively light northbound movement with the northbound lanes from Route 90 to Venice Boulevard operating at LOS A; well below capacity. However, the southbound traffic is two to three times the northbound volume in this area, operating at LOS E from Culver Boulevard to Route 90. The PM peak is heavier in the northbound than southbound direction but the difference is much less than during the morning. Further, the PM volumes are heavier than the AM with the operating conditions generally at LOS E and F.

Traffic on Centinela-Bundy builds toward the center of the route experiencing its heaviest volumes in the vicinity of the Interstate 10 interchange. Here the AM and PM directional flows are quite balanced with the heavier hourly traffic peaks occurring during the AM peak. Not surprisingly the route is operating at a very congested LOS E and F in the AM from Venice to Pico Boulevard in both directions while during the PM peak period the operating conditions north of I-10 improve to LOS C northbound and southbound. (However south of I-10 to Venice Boulevard the level of service is still F.) This massing of traffic around the I-10 interchange masks a predominantly directional flow on Centinela-Bundy south of Santa Monica Boulevard southbound in the AM and northbound in the PM peak periods. The level of service figures reflect this trend showing operating conditions generally in the E and F range southbound in the morning and northbound in the afternoon. North of Santa Monica Boulevard traffic decreases dramatically increasing the level of service to A in both directions for the entire day.

1980 Additional Lane Requirements

As shown in Table IX, one additional lane in each direction on Bundy Drive and Centinela Avenue south of Santa Monica Boulevard accommodates 1980 traffic at LOS D with one exception. The one block section of Centinela Avenue from Venice Boulevard to I-10 carries extremely heavy volumes of traffic in both directions during the PM peak. Given the operating assumptions used by the LARTS model, three additional lanes would have been needed to accommodate this traffic. This points out the limitations of the modelling assumptions to special arterial segments. This segment of Centinela Avenue handles heavy on-off volumes from the I-10 freeway and is subject to intersection traffic management techniques.

As a relief for 1980 I-405 Freeway volumes, the section of Centinela-Bundy south of Santa Monica Boulevard would not have been a candidate. While north of Santa Monica Boulevard this route is theoretically underutilized, the road is narrow and twisting, and too short to have been a practical alternative to the Freeway.

3. Jefferson Boulevard-Overland Avenue-Westwood Boulevard-Beverly Glen Boulevard

This somewhat complicated freeway alternative route runs about 1/2 to 3/4 mile from the freeway along Jefferson Boulevard, Overland Avenue, and

Westwood Boulevard, and about 2 miles from I-405 along Beverly Glen Boulevard. It is the only non-freeway arterial alternative to Sepulveda Boulevard over the Santa Monica Mountains in the Westside area (the area west of La Cienega Boulevard).

Base Year 1980 Volume Adjusted LARTS Output

ADT traffic volumes along the Jefferson-Overland-Westwood-Beverly Glen route ranged from a low of 15,500 on Beverly Glen Boulevard between Sunset and Mulholland Drive to a high of 31,500 on Jefferson Boulevard between Slauson and Overland avenues. With the exception of the above mentioned segment on Jefferson, the traffic volumes are generally higher on Westwood Boulevard than any other street in the route. The segment on Westwood Boulevard from Wilshire to Sunset boulevards carries, at 30,700, the second highest traffic volume on the route.

Levels of Service

With the exception of Beverly Glen Boulevard, Jefferson Boulevard, Overland Avenue, and Westwood Boulevard were at generally acceptable levels of service in 1980. Heavy volumes of PM peak hour traffic caused Jefferson Boulevard between Slauson and Overland Avenues, Westwood Boulevard, between Pico and Santa Monica boulevards, and Overland Avenue at I-10 to operate at LOS E and F in generally both directions. Further the section of Overland Avenue between Venice Boulevard and I-10 was at level of service F in both directions at both peak periods. This is due to its narrowed one lane directional cross section between Venice and Palms boulevard. Providing the same two lanes in each direction here as is provided along the rest of the street would have resulted in LOS B for that segment.

The major exception to the generally favorable operating conditions of the Jefferson-Overland-Westwood-Beverly Glen route is that portion of Beverly Glen Boulevard in the Santa Monica Mountains. As is the case with the only other non-freeway route to the valley in this area, Sepulveda Boulevard, Beverly Glen traffic had a very strong directional flow in 1980. In the AM peak southbound traffic in the two segments from Mulholland Drive to Sunset Boulevard operated at LOS F while the northbound lane was at LOS A. In the PM peak this pattern was reversed although the non-peak southbound direction carried enough traffic to warrant an LOS B and C designation. Interestingly the northern-most segment of Beverly Glen from Mulholland Drive to Ventura Boulevard, was at LOS F in <u>both</u> directions during both the AM and PM peaks.

1980 Additional Lane Requirements

Because the majority of this route operated at acceptable levels of service, additional lanes were not needed to accommodate 1980 traffic except at the points noted above, (please refer to Table X). Thus an additional lane on Jefferson Boulevard between Slauson and Overland avenues and on Westwood Boulevard between Pico and Santa Monica boulevards would better accommodate the heavy PM peak traffic in these short segments of the route. Further, the elimination of the one lane bottleneck on Overland Avenue between Venice and Palms Boulevard through the addition of another lane in each direction, would have substantially improved the 1980 traffic flow on this arterial.

The situation on Beverly Glen Boulevard from Sunset to Ventura Boulevard is however, a different story. As one of only two arterial connectors between West Los Angeles and the San Fernando Valley its present one lane per direction configuration is substantially overburdened. Just to handle the existing traffic, as measured in 1980, it will need as many as three additional lanes northbound and two southbound. Thus as a potential relief route to the I-405 Freeway, it is not a viable alternative. Likewise, while less congested, the remainder of the route would probably not be a good alternative to the Freeway for 1980 traffic due to the bottleneck on Overland, the PM peak hour congestion on Westwood Boulevard, and the rather complex nature of this alternative routing.

TABLE IX

ARTERIAL LEVELS OF SERVICE
ADJUSTED LARTS MODEL OUTPUT

LIMITS	1980 AM	1980 PM	2000 AM	2000 PM
SEPULVEDA BOULEVARD				
Rosecrans to El Segundo	E/A	A/D	F/A	A/F
El Segundo to Imperial	A/B	B/A	A/E	D/B
Imperial to Century	F/E	F/F	F/E	F/F
Century to Manchester	A/A	E/A	A/A	F/B
Manchester to Slauson	A/E	F/F	A/F	F/F
JEFFERSON BOULEVARD				
Slauson to Overland	B/B	E/E	B/C	E/E
Overland to La Cienega	A/A	B/B	A/A	C/C
CENTINELA AVENUE				
Rt. 90 to Culver	A/E	F/E	A/F	F/F
Culver to Venice	A/C	E/C	A/F	F/E
Venice to I-10	F/F	F/F	F/F	F/F
BUNDY DRIVE				
I-10 to Pico	E/E	D/C	E/F	F/E
Pico to Santa Monica	A/D	E/C	A/D	F/E
Santa Monica to Wilshire	A/A	A/A	A/A	B/A
Wilshire to San Vicente	NA/NA	NA/NA	NA/NA	NA/NA
San Vicente to Sunset	A/A	A/A	A/A	A/A
OVERLAND AVENUE				
Jefferson to Culver	NA/NA	NA/NA	NA/NA	NA/NA
Culver to Venice	A/A	A/A	A/B	E/D
Venice to I-10	F/F	F/F	F/F	F/F
I-10 to Pico	D/D	E/E	C/F	F/E
WESTWOOD BOULEVARD				
Pico to Olympic	A/C	F/F	A/F	F/F
Olympic to Santa Monica	A/A	E/D	A/E	F/E
Santa Monica to Wilshire	B/A	C/C	A/E	C/C
Wilshire to Sunset	B/A	A/A	B/B	B/A

Table IX (continued)

LIMITS	1980 AM	1980 PM	2000 AM	2000 PM
BEVERLY GLEN BOULEVARD				
Santa Monica to Wilshire	A/A	A/A	A/A	C/A
Wilshire to Sunset	A/F	F/B	A/F	E/B
Sunset to Mulholland	A/F	F/C	A/F	F/F
Mulholland to Ventura	F/F	F/F	F/F	F/F

*Level of Service A or Volume

TABLE X

ARTERIAL ADDITIONAL LANE REQUIREMENTS
TO LEVEL OF SERVICE D
LARTS MODEL OUTPUT

LIMITS	1980 AM	1980 PM	2000 AM	2000 PM
SEPULVEDA BOULEVARD				
Rosecrans to El Segundo	1/0	0/0	2/0	0/1
El Segundo to Imperial	0/0	0/0	0/1	0/1
Imperial to Century	1/1	1/2	2/1	2/3*
Century to Manchester	0/0	1/0	0/0	1/0
Manchester to Slauson	0/0	1/1	0/1	2/1
JEFFERSON BOULEVARD				
Slauson to Overland	0/0	1/1	0/0	1/1
Overland to La Cienega	0/0	0/0	0/0	0/0
CENTINELA AVENUE				
Rt. 90 to Culver	0/1	1/1	0/2	2/1
Culver to Venice	0/0	1/0	0/1	1/1
Venice to I-10	1/1	3/3	1/2	3/3
BUNDY DRIVE				
I-10 to Pico	1/1	0/0	1/1	1/0
Pico to Santa Monica	0/0	1/0	0/0	1/1
Santa Monica to Wilshire	0/0	0/0	0/0	0/0
Wilshire to San Vicente	NA	NA	NA	NA
San Vicente to Sunset	0/0	0/0	0/0	0/0
OVERLAND AVENUE				
Jefferson to Culver	NA	NA	NA	NA
Culver to Venice	0/0	0/0	0/0	0/0
Venice to I-10	1/1	1/1	1/2	1/1
I-10 to Pico	0/0	0/0	0/2	1/1
WESTWOOD BOULEVARD				
Pico to Olympic	0/0	1/1	0/1	1/1
Olympic to Santa Monica	0/0	1/0	1/1	1/1
Santa Monica to Wilshire	0/0	0/0	0/1	0/0
Wilshire to Sunset	0/0	0/0	0/0	0/0

Table X (continued)

LIMITS	1980 AM	1980 PM	2000 AM	2000 PM
BEVERLY GLEN BOULEVARD				
Santa Monica to Wilshire	0/0	0/0	0/0	0/0
Wilshire to Sunset	0/1	1/0	0/1	1/0
Sunset to Mulholland	0/2	2/0	0/2	2/1
Mulholland to Ventura	1/2	3/2	2/3	3/3

* Because of the geometrics of this section of Sepulveda Boulevard, one additional southbound lane may be sufficient.

D. Public Transportation

1. Publicly Owned Systems

Publicly owned transit service is operated on all major arterials within the study area at frequencies ranging from 13 to 70 minutes. Public transit service is also provided on three study area freeways; the San Diego Freeway (I-405), the Santa Monica Freeway (I-10), and the Marina Freeway (Route 90). Only those services that operate in a generally north-south direction parallel to the I-405 Freeway within the study area's primary impact area (see geographical definition in Section I) were examined. (This included north-south sections of generally east-west transit lines within the primary impact area.)

Fifteen weekday transit lines operated by three different publicly owned systems met the above definition. Most provided all-day service from as early as 5 a.m. to about 11 p.m. Only two lines operated only during the morning and afternoon peak period. The average frequency or headways of the all-day lines were from 20 minutes in the peak to about 35 minutes during the off-peak periods. Of these fifteen lines, eleven operate on Saturdays as well, and six provide service seven days a week. A more detailed description of this service is given in Table XI.

Table XII provides a statistical description of the supply of transit service in the area while Table XIII describes the demand for the service offered. One hundred publicly owned buses accommodate over 31,000 passenger trips per weekday on north-south transit services in the primary impact area. During the three hour PM peak period, which has the highest ridership of the two peak periods, almost 12,000 trips occur on the 100 buses in service. Because a transit seat is used more than once during any measurement period it is impossible to determine a demand capacity ratio for transit service on a gross area basis. However, because non-guideway transit service can be expanded relatively easily to meet demand, demand/capacity considerations are not as important here as with the highway analysis. In fact, the supply capacity of transit vehicles in mixed flow with general traffic is more limited by the highway capacity than by that of the transit system itself. (A fixed guideway transit system, such as the El Monte Busway or rail rapid transit, is limited by the system's guideway capacity. However, such facilities do not presently exist in the study area.)

Table XIV presents the relative operating performance of the various transit services in the study area while Table XV presents the financial data. The data presented here relates only to those line segments that fall within the study's primary impact area. Because it is impossible to isolate line segments to arrive at absolute costs and revenues this data should be only used for comparative and not absolute purposes. Still the summary data on Table XV gives a good order of magnitude feel for the resources going to public transportation service in the area examined. On an annual basis, about six and one-half million dollars are spent on transit service of which approximately 4 million dollars is recovered in fare revenue with a resulting subsidy of about two and one-half million dollars. The percent of revenue recovered is about 40% which is consistent with the average for public transportation service in Southern California.

LE XI

I-405 CORRIDOR STUDY AREA TRANSIT SERVICE CHARACTERISTICS

Operator/ Line	Service Type	Major Streets Operated in Study Area	Days Operated	Approximate Hours Operated	Frequency Peak	Frequency Off-Peak
SCRTD						
42	Local	La Tijera Boulevard Sepulveda Boulevard	7: Daily: Sat.: Sun.:	5:20 a.m.-1:00 a.m. 5:30 a.m.-1:00 a.m. 6:00 a.m.-1:00 a.m.	25 mins. 30 mins. 40 mins.	40 mins. 30 mins. 40 mins.
215	Local	Inglewood Avenue	6: Daily: Sat.:	6:05 a.m.-7:45 p.m. 6:05 a.m.-7:45 p.m.	60 mins. 60 mins.	70 mins. 70 mins.
225/226	Local	Douglas Street Avalon Boulevard	6: Daily: Sat.:	6:00 a.m.-7:15 p.m. 6:00 a.m.-7:15 p.m.	25 mins. 30 mins.	30 mins. 30 mins.
232	Local	Sepulveda Boulevard (LAX-South)	7: Daily: Sat.: Sun.:	5:35 a.m.-11:35 p.m. 6:00 a.m.-11:35 p.m. 6:00 a.m.-11:35 p.m.	20 mins. 40 mins. 40 mins.	25 mins. 40 mins. 40 mins.
234	Local	Sepulveda Boulevard (S.F. Valley)	7: Daily: Sat.: Sun.:	5:45 a.m.-11:10 p.m. 6:00 a.m.-11:10 p.m. 8:00 a.m.-11:10 p.m.	25 mins. 40 mins. 40 mins.	35 mins. 40 mins. 40 mins.
236	Local	Woodley Avenue	6: Daily: Sat.:	6:25 a.m.-7:55 p.m. 6:30 a.m.-7:20 p.m.	30 mins. 70 mins.	40 mins. 70 mins.
430	Express	I-10, I-405 Sunset Boulevard	5: Daily:	7:05 a.m.-7:30 a.m. 5:25 p.m.-6:00 p.m.	24 mins.	*
437	Express	I-405 Marina Freeway	5: Daily:	6:40 a.m.-7:55 a.m. 5:00 p.m.-6:20 p.m.	40 mins.	*
439	Local	Sepulveda Boulevard Centinela Avenue	5: Daily:	6:00 a.m.-7:35 p.m.	40 mins.	60 mins.
560	Local/ Express	I-405 Sepulveda Boulevard Ventura Boulevard	7: Daily: Sat.: Sun.:	5:05 a.m.-1:10 a.m. 6:00 a.m.-1:10 a.m. 7:00 a.m.-1:10 a.m.	13 mins. 20 mins. 20 mins.	20 mins. 20 mins. 20 mins.
Culver City Muni. Bus						
6	Local	Sepulveda Boulevard (LAX-North)	5: Daily:	5:09 a.m.-11:40 p.m.	35 mins.	35 mins.

TaL . XI (continued)

Operator/ Line	Service Type	Major Streets Operated in Study Area	Days Operated	Approximate Hours Operated	Frequency Peak	Frequency Off-Peak
Santa Monica Muni. Bus						
5	Local	Federal Avenue	7: Daily:	5:40 a.m.-10:05 p.m.	20 mins.	30 mins.
			Sat.:	6:25 a.m.-9:05 p.m.	30 mins.	30 mins.
			Sun.:	6:55 a.m.-9:05 p.m.	40 mins.	40 mins.
8	Local	Westwood Boulevard	7: Daily:	6:25 a.m.-11:35 p.m.	15 mins.	15-20 mins.
			Sat.:	6:25 a.m.-11:35 p.m.	30 mins.	30 mins.
			Sun.:	7:20 a.m.-11:35 p.m.	60 mins.	60 mins.
12	Local	Westwood Boulevard	6: Daily:	6:20 a.m.-7:20 p.m.	30 mins.	30 mins.
		Sepulveda Boulevard	Sat.:	7:55 a.m.-6:55 p.m.	60 mins.	60 mins.
14	Local	Bundy Drive	6: Daily:	6:40 a.m.-8:20 p.m.	30 mins.	30 mins.
		Centinela Avenue	Sat.:	6:55 a.m.-6:10 p.m.	60 mins.	60 mins.

TABLE XII

I-405 CORRIDOR STUDY AREA TRANSIT SUPPLY CHARACTERISTICS

Operator/ Line	Equipment Use				Peak Hour/ Direction Vehicle Trips	Average In-Service Speed (mph)	Vehicle Miles	$/Vehicle Mile	Vehicle Hours	$/Vehicle Hour	Total Cost ($)
	A.M. Peak	P.M. Peak	Base	Maximum Peak/Base							
					WEEKDAYS						
SCRTD											
42	9	10	7	1.43	3	16.0	254.25	5.18	15.77	71.66	1,167.47
215	6	3	2	3.00	1	14.7	134.94	5.81	8.37	99.17	820.84
225/226	8	7	6	1.33	3	18.4	221.34	4.65	10.92	82.43	925.95
232	10	10	10	1.00	4	17.8	308.20	4.58	15.05	67.07	1,089.83
234	6	6	4	1.50	3	15.9	131.30	5.18	9.27	70.00	655.15
236	6	6	4	1.50	2	19.2	147.40	4.84	5.13	77.23	459.64
430	2	2	0	N/A	2	25.2	20.60	5.11	.55	129.01	77.82
437	4	4	0	N/A	2	28.0	28.0	4.19	.84	100.68	91.54
439	6	7	4	1.75	2	20.1	308.38	5.01	16.95	79.87	1,392.03
560	20	22	11	2.00	5	16.6	1,988.40	5.05	120.06	74.28	9,142.73
SCRTD System Average:											
Local								5.30		65.97	
Express								4.08		79.96	
Culver City Muni. Bus											
6	3	3	3	1.00	2	13.5	599.10	3.20	42.42	45.21	1,918.00
Santa Monica Muni. Bus											
5	4	5	3	1.67	4	13.0	120.75	2.67	16.13	35.11	517.54
8	7	9	7	1.29	5	12.2	616.87	2.74	41.47	33.68	1,455.41
12	4	4	3	1.33	3	13.2	259.88	2.61	18.87	37.45	701.00
14	2	2	2	1.00	3	17.3	398.90	2.42	23.10	41.63	1,041.00

TABLE XII (Continued)

Operator/ Line	Equipment A.M. Peak	Use P.M. Peak	Base	Maximum Peak/Base	Peak Hour/ Direction Vehicle Trips	Average In-Service Speed (mph)	Vehicle Miles	$/Vehicle Mile	Vehicle Hours	$/Vehicle Hour	Total Cost ($)
SATURDAY											
SCRTD											
42	7	7	7	1.00	2	17.5	275.25	4.75	16.17	72.76	1,202.71
215	2	2	2	1.00	1	15.3	134.94	5.20	8.37	66.69	586.89
225/226	7	6	6	1.17	3	19.8	217.00	4.54	10.72	79.11	975.48
232	5	5	5	1.00	2	17.7	160.80	4.56	6.63	66.97	501.86
234	3	3	3	1.00	2	19.1	98.98	4.61	5.56	72.05	411.74
236	3	3	3	1.00	1	21.6	80.40	4.33	2.45	77.60	221.72
560	10	10	10	1.00	3	19.2	1,390.32	4.54	74.50	71.82	5,542.88
Santa Monica Muni. Bus											
5	3	3	3	1.00	2	19.4	89.25	2.67	9.33	35.11	309.72
8	4	4	4	1.00	2	11.6	315.00	2.74	16.27	33.68	611.00
12	1	1	1	1.00	1	13.3	63.25	2.61	4.22	37.45	159.45
14	1	1	1	1.00	1	17.5	166.28	2.42	9.20	41.63	386.88
SUNDAYS & HOLIDAYS											
SCRTD											
42	5	5	5	1.00	2	18.0	203.00	5.71	11.80	60.79	805.68
232	5	5	5	1.00	2	17.8	160.80	4.56	6.63	66.97	501.86
234	3	3	3	1.00	2	19.1	86.86	4.63	5.27	72.01	384.03
560	10	10	10	1.00	3	19.4	1,365.59	4.51	71.23	72.08	5,339.12
Santa Monica Muni. Bus											
5	2	2	2	1.00	2	20.3	59.50	2.67	158.86	35.11	238.78
8	2	2	2	1.00	2	11.8	181.13	2.74	496.30	33.68	447.[illegible]

TABLE XII (Continued)

Operator/ Line	Equipment Use				Peak Hour/ Direction Vehicle Trips	Average In-Service Speed (mph)	Vehicle Miles	$/Vehicle Mile	Vehicle Hours	$/Vehicle Hour	Total Cost ($)
	A.M. Peak	P.M. Peak	Base	Maximum Peak/Base							

Caution: Study Area financial data is for comparative purposes only. Line cost data cannot be segmented accurately for absolute use. Financial cost data is for in-service time/mileage only.

Sources: SCRTD -- Line Profile and Line Performance Trends Reports.

CCMBL -- A line-by-line analysis of the Culver City Municipal Bus Lines, February 1983. Master Service Plan, June 1985.

TABLE XIII

I-405 CORRIDOR STUDY AREA TRANSIT DEMAND CHARACTERISTICS

Operator/ Line	RIDERSHIP A.M. Peak	P.M. Peak	Off Peak	Total	Total Revenue($)	Revenue Pe Passenger(
			WEEKDAY			
SCRTD						
42	74	139	193	406	183	.45
215	418	382	382	1,182	521	.44
225/226	238	137	193	568	250	.44
232	453	537	750	1,740	992	.57
234	450	273	439	1,162	523	.45
236	50	56	46	152	59	.39
430	19*	25*	0	44*	33	.76
[illegible]7	51*	61*	0	112*	180	1.61
439	396	436	244	1,076	689	.64
560	2,334	5,703	3,818	11,855	6,402	.54
Culver City Muni. Bus						
6	471	601	783	1,855	578	.31
Santa Monica Muni. Bus						
5	531	627	712	1,870	505	.27**
8	1,117	1,427	2,624	5,168	1,499	.29**
12	578	569	1,118	2,265	634	.28**
14	452	658	909	2,019	525	.26**

Table XIII (continued)

Operator/ Line	RIDERSHIP A.M. Peak	P.M. Peak	Off Peak	Total	Total Revenue($)	Revenue Per Passenger($)
				SATURDAY		
SCRTD						
42	N/A	N/A	N/A	223	105	.47
215	N/A	N/A	N/A	257	136	.53
225/226	N/A	N/A	N/A	230	115	.50
232	N/A	N/A	N/A	786	472	.60
234	N/A	N/A	N/A	1,323	701	.53
236	N/A	N/A	N/A	44	20	.46
560	N/A	N/A	N/A	4,913	2,800	.57
Santa Monica Muni. Bus						
[illegible]	N/A	N/A	N/A	618	167	.27*
8	N/A	N/A	N/A	2,477	718	.29*
12	N/A	N/A	N/A	318	89	.28*
14	N/A	N/A	N/A	380	99	.26*
				SUNDAYS & HOLIDAYS		
SCRTD						
42	N/A	N/A	N/A	176	83	.47
232	N/A	N/A	N/A	841	496	.59
234	N/A	N/A	N/A	868	443	.51
560	N/A	N/A	N/A	3,515	2,074	.59
Santa Monica Muni. Bus						
5	N/A	N/A	N/A	379	102	.27*
8	N/A	N/A	N/A	1,239	359	.29*

Tab'e XIII (continued)

	RIDERSHIP					
perator/ Line	A.M. Peak	P.M. Peak	Off Peak	Total	Total Revenue($)	Revenue Per Passenger($)

* Ridership passing through area on corridor freeways. No ons or offs in area.

** Average revenue for Weekdays, Saturdays, and Sundays/Holidays by route. No separate calc tions by type of day were made by Santa Monica Municipal Bus Lines.

TA. XIV

I-405 CORRIDOR STUDY AREA TRANSIT PERFORMANCE CHARACTERISTICS

Operator/ Line	Passengers/ Mile	Passengers/ Hour	($) Total Study Area Subsidy	($) Cost/Passenger		($) Revenue/Passenger		($) Subsidy/Passenger		Farebox Ratio	
				Line Total	Study Area Segment	Line Total	Study Area Segment	Line Total	Study Area Segment	Line Total	Study Area Segment
					WEEKDAYS						
SCRTD											
42	1.60	25.75	984	1.96	2.87	.45	.45	1.50	2.42	.23	.17
215	8.76	141.22	300	1.43	.69	.44	.44	.99	.25	.31	.64
225/226	2.57	52.01	676	3.29	1.63	.44	.44	2.85	1.19	.13	.27
232	5.65	115.61	98	1.49	.63	.57	.57	.92	.06	.38	.90
234	8.85	125.35	132	.83	.56	.45	.45	.38	.11	.54	.80
236	1.03	29.63	401	1.81	3.03	.39	.39	1.42	2.64	.21	.13
430	2.14	80.00	45	6.70	1.77	.76	.76	5.94	1.01	.11	.43
437	3.93	133.33	(88)	5.67	.82	1.61	1.61	4.06	(.79)	.28	1.96
439	3.49	63.48	703	3.21	1.29	.64	.64	2.57	.65	.20	.50
560	5.96	98.74	2,741	1.12	.77	.54	.54	.58	.23	.48	.70
Culver City Muni. Bus											
6	3.10	43.73	1,340	1.03	1.03	.31	.31	.72	.72	.30	.30
Santa Monica Muni. Bus											
5	15.49	115.93	13	.74	.28	.27	.27	.47	.01	.36	.98
8	8.36	124.62	(43)	.68	.28	.29	.29	.39	(.01)	.43	1.03
12	8.72	120.03	67	.79	.31	.28	.28	.51	.03	.36	.90
14	4.70	80.0	516	.52	.52	.26	.26	.26	.26	.51	.51

Table λ.v (continued)

Operator/ Line	Passengers/ Mile	Passengers/ Hour	($) Total Study Area Subsidy	($) Cost/Passenger Line Total	Cost/Passenger Study Area Segment	($) Revenue/Passenger Line Total	Revenue/Passenger Study Area Segment	($) Subsidy/Passenger Line Total	Subsidy/Passenger Study Area Segment	Farebox Ratio Line Total	Farebox Ratio Study Area Segment
SATURDAYS											
SCRTD											
42	.81	13.79	1,098	2.44	5.39	.47	.47	1.97	4.92	.19	.09
215	1.90	30.70	451	3.29	2.28	.53	.53	2.76	1.75	.16	.23
225/226	1.06	21.46	760	10.04	3.80	.50	.50	9.54	3.30	.05	.13
232	4.89	118.55	30	1.47	.64	.60	.60	.87	.04	.41	.94
234	13.37	237.95	(289)	1.10	.31	.53	.53	.57	(.22)	.49	1.70
236	.55	17.96	202	3.57	5.04	.46	.46	3.11	4.58	.13	.09
560	3.53	65.95	2,743	1.12	1.13	.57	.57	.55	.55	.51	.51
Santa Monica Muni. Bus											
5	6.92	66.24	143	.54	.50	.27	.27	.27	.23	.50	.54
8	7.86	152.24	(107)	.58	.25	.29	.29	.29	(.04)	.50	1.18
12	5.03	75.36	70	.75	.20	.28	.28	.47	.22	.37	.56
14	2.29	41.30	288	1.02	1.02	.26	.26	.76	.76	.26	.26
SUNDAYS & HOLIDAYS											
SCRTD											
42	.87	14.92	723	3.40	4.58	.47	.47	2.67	4.11	.14	.10
232	5.23	126.85	6	1.78	.60	.59	.59	1.20	.01	.33	.99
234	9.99	164.71	(59)	1.47	.44	.51	.51	.96	(.07)	.35	1.15

Table XIV (continued)

Operator/ Line	Passengers/ Mile	Passengers/ Hour	($) Total Study Area Subsidy	($) Cost/Passenger Line Total	Study Area Segment	($) Revenue/Passenger Line Total	Study Area Segment	($) Subsidy/Passenger Line Total	Study Area Segment	Farebox Ratio Line Total	Study Area Segment
560	2.57	49.35	3,265	1.26	1.52	.59	.59	.67	.93	.47	.39
Santa Monica Muni. Bus											
5	6.37	51.42	137	.70	.63	.27	.27	.43	.36	.39	.43
8	6.84	95.90	88	.58	.36	.29	.29	.29	.07	.50	.80

TAB[illegible]

I-405 CORRIDOR STUDY AREA TRANSIT SERVICE ANNUAL FINANCIAL CHARACTERISTICS
($)

Operator/ Line	Weekday Cost	Sat. Cost	Sun./Hol. Cost	Weekday Revenue	Sat. Revenue	Sun./Hol. Revenue	Weekday Subsidy	Sat. Subsidy	Sun./Hol. Subsidy	Total Cost	Total Revenue	Total Subsidy
SCRTD												
42	297,585	62,556	46,748	46,665	5,460	4,814	250,920	57,096	41,934	406,889	56,939	349,950
215	209,355	30,524	N/A	132,855	7,072	N/A	76,500	23,452	N/A	239,879	139,927	99,952
225/226	236,130	45,500	N/A	63,750	5,980	N/A	172,380	39,520	N/A	281,630	69,730	211,900
232	277,950	26,104	29,116	252,960	24,544	28,768	24,990	1,560	348	333,170	306,272	26,898
234	167,025	21,424	22,272	133,365	36,452	25,694	33,660	(15,028)	(3,422)	210,721	195,511	15,210
236	117,300	11,544	N/A	15,045	1,040	N/A	102,255	10,504	N/A	128,844	16,085	112,759
430	19,890	N/A	N/A	8,415	N/A	N/A	11,475	N/A	N/A	19,890	8,415	11,475
437	23,460	N/A	N/A	45,900	N/A	N/A	(22,440)	N/A	N/A	23,460	45,900	(22,440)
439	354,960	N/A	N/A	175,695	N/A	N/A	179,265	N/A	N/A	354,960	175,695	179,265
560	2,331,465	288,236	309,662	1,632,510	145,600	120,292	698,955	142,636	189,370	2,929,363	1,898,402	1,030,961
Culver City Muni. Bus												
6	489,090	N/A	N/A	147,390	N/A	N/A	341,700	N/A	N/A	489,090	147,390	314,700
Santa Monica Muni. Bus												
5	132,090	16,120	13,862	128,750	8,684	5,916	3,340	7,436	7,946	162,072	143,350	18,722
8	371,025	31,772	25,926	382,174	37,336	20,822	(11,149)	(5,564)	5,104	428,723	440,332	(11,609)
12	178,755	8,268	N/A	161,721	4,628	N/A	17,034	3,640	N/A	187,023	166,349	20,674
14	265,455	20,124	N/A	133,875	5,148	N/A	131,580	14,976	N/A	285,579	139,023	146,556
TOTAL SERVICE:	5,471,535	62,172	447,586	3,461,070	281,944	206,306	2,010,465	280,228	241,280	6,481,293	3,949,320	2,531,973

NOTES: 1. Same figure may differ with similar figures on other tables due to rounding.

2. Weekdays were calculated at 225 days, Saturdays at 52 days, and Sundays and Holidays at 52 + 6 = 58 days.

2. Privately Owned Systems

To the service being provided by the publicly owned systems must be added the public transportation being provided by the privately owned systems. The private carriers generally provide two types of service in the I-405 Corridor study area; rush hour commuter service to major employers and all-day service to Los Angeles International Airport. Privately owned commuter bus service was studied by SCAG in a 1982 report entitled, "Commuter and Express Bus Service in the SCAG Region: A Policy Analysis of Public and Private Operations." According to that report,

> ". . . private operators dominate nondowntown (freeway corridor) niches not well served by public carriers. . . . the greatest concentration of (privately operated) commuter bus service is along the San Diego Freeway (Interstate 405) corridor. Up to 45 buses run along this corridor during a three-hour peak period. The El Segundo/Hawthorne area is the principle destination."[1]

Further, the report states that, "Ridership on the private commuter buses averages about 35 riders per route." Also, according to the report, of a total of 140 privately operated commuter bus routes in the region, forty-five operate on the I-405 Freeway through the study area. Assuming the average ridership per route given above, about 1,575 people per day use this service. This translates to approximately 3,150 privately operated commuter transit trips per day in the area.

At the time of the report, four private bus companies were providing this service. They varied in size from companies with as few as one to as many as sixty-seven buses. However, the private bus industry has proven to be somewhat unstable and the companies providing this service have changed since the report was completed. One of the four companies has ceased operations while new companies and employer-sponsored services have started up. To update the information in the 1982 report, a survey of all of the private bus companies in the region is being undertaken as part of this study. The results, when completed, will determine the number, identity, ridership, and operating characteristics of the privately owned transit companies now operating in the study area. The results will be used to validate and if necessary revise the information presented here.

In addition to the commuter bus service, a large number of private bus companies provide transit service to Los Angeles International Airport. As with the companies providing commuter service, these systems range in size from very small one-vehicle operations to large companies with fleets exceeding 100 vehicles. Further, the size of vehicles used in this service vary considerably. While the commuter bus service tends to use predominately standard forty-foot buses, the vehicles providing service to the airport vary from standard buses to ten passenger vans. (Companies

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[1] Southern California Association of Governments, Commuter and Express Bus Service in the SCAG Region: A Policy Analysis of Public and Private Operations, February, 1982, pp. ii and 5.

operating vehicles smaller than standard vans were classified as taxi operators and not included in this survey.) While the survey has not yet been completed, preliminary results indicate that at least 5,600 daily passenger trips are being provided from points inside and outside of the study area to Los Angeles International Airport. Most of these trips are those of airline passengers as opposed to those of airport and airport area employees carried by the publicly owned bus systems serving the airport.

3. 1984 Transit Conclusions

Adding together the public and privately owned transit service in the study area, approximately 40,000 boardings are made daily. This breaks down to about 9,000 passenger trips per weekday on the privately operated transit systems and 31,000 passenger trips per day on the publicly operated ones. It should be cautioned that the private system totals are preliminary and are probably understated somewhat.

V. YEAR 2000/2010 FORECASTS

A. Freeways

1. I-405

Network Modifications for Year 2000

The only modifications to the I-405 for the Year 2000 LARTS model run was the addition of one lane in each direction from Wilshire Boulevard to Route 101. The remainder of I-405 within the study corridor was modeled at its 1980 level of eight lanes.

Forecast Volumes

All ADT model output forecast volumes for the Year 2000 increase over the Base Year 1980 volumes, from a low of 21,000 additional trips from Rosecrans Boulevard to El Segundo Boulevard, to a high of 95,000 additional trips from Venice Boulevard to I-10. The average of these additional trips, probably a more meaningful number than either of the two extremes, is 57,000. The mean is remarkably close at 58,000. This amounts to a 27% increase in daily trips throughout the corridor.

Levels of Service

The AM and PM peak periods show a much lower level of increase in trips. The range is from 14% in the AM to 18% in the PM. The remaining additional trips are, therefore, occurring in the off peak period. An examination of Table II, I-405 Level of Service, could explain this phenomena. As the level of service approaches E and F, the peak period must expand to carry the additional trips. Since the 1980 PM LOS is predominately E and F, and additional lanes were modeled for Year 2000 only from Wilshire Boulevard to Route 101, there was little or no remaining capacity during the peak. As the peak extended and the definition of it did not, trips that should actually have been included as peak period trips slipped into the off-peak period. Table II confirms that the levels of service deteriorate from Rosecrans Boulevard to Wilshire Boulevard in both the AM and PM periods, while from Wilshire Boulevard to Route 101, where additional lanes have been included to increase capacity, the levels remain constant.

Additional Lane Requirements

A look at Table IV, I-405 Additional Lane Requirements to Level of Service D, demonstrates the further need for additional lanes even over 1980 levels. Rosecrans Boulevard to Manchester Boulevard remains fairly constant with still only one additional lane required. This is the same lane, not another lane over 1980 requirements. From Manchester Boulevard to Wilshire Boulevard two to three lanes are required. This represents one to two lanes over 1980 additional lane requirements for that portion of freeway. From Wilshire Boulevard to Route 101 an additional lane was modeled for Year 2000 analysis and contributed to maintaining constant the number of deficient lanes. A grand total of three lanes would be needed to reach LOS D. From Route 101 to Victory Boulevard, two additional lanes for Year 2000 would be required.

As mentioned earlier, Table IV, as well as Table VII, is intended only to suggest the extent of the capacity deficiency on the appropriate freeway. They are not meant to serve as an alternatives analysis for the selection of improvement scenarios or to suggest only that more lanes be added to the freeways. The purpose is to establish a benchmark amount of need to be utilized in the alternatives analysis. At that point, specific determinations can be made as to what mode or mix of modes should be considered for analysis.

2. Route 90

There were no network modifications to Route 90 for the Year 2000 model analysis. The number of lanes remained constant at four in each direction.

ADT increased 13% along Route 90, while the peak periods increased from 0% to 11%. None of these increases were enough to deteriorate the level of service from A or to require additional lanes along the route. Therefore, Route 90 will not be discussed any further in this report.

3. I-10

There were also no network modifications to I-10 for the Year 2000 model analysis. The freeway remains at four lanes in each direction from Ocean Boulevard to Centinella Boulevard, and at five lanes in each direction from Centinella Boulevard to La Brea Avenue.

The ADT volumes all increase along the route from a low of 7% at either end to a high of 30% from Lincoln Boulevard to Centinella Boulevard. In absolute numbers, the maximum increase is 29,000 from Centinella Boulevard to I-405. I-10 shows no increase in the AM peak period from I-405 to La Brea Avenue and only a small increase from Centinella Boulevard to I-405. This is a fairly unusual occurrence, especially considering the magnitude of the ADT increase from Lincoln Boulevard to I-405. A look at the employment and population changes projected from 1980 to 2000 helps to account for this situation. Employment increased within RSA 16 (the I-10 area) only 25,000. Population increased 39,000. Both of these increases are low and support a low level of increased vehicle trips.

B. ARTERIALS

No modifications were made to the arterials examined in this study in the year 2000 model analysis. The design and number of lanes for each arterial route were assumed to remain the same in the year 2000 as existed in 1980. Thus, the data presented on the accompanying charts refers to future year 2000 vehicular traffic on the same I-405 corridor study area arterial street system as exists today.

1. Sepulveda Boulevard

Forecasted Volumes

The Regional Model using SCAG 82 socioeconomic forecasts predicts that Year 2000 traffic volumes on Sepulveda Boulevard from Rosecrans to Slauson Avenues will increase an average of approximately 15% over that which exists today. The greatest percentage increase will occur in the sections from Rosecrans Avenue to El Segundo Boulevard (33%) while the greatest absolute increase, 94,000 vehicles per day, will occur between Imperial Highway and Century Boulevard. These increases are consistent with the tremendous employment growth occurring in the El Srgundo Aerospace and Los Angeles International Airport areas which are the areas, respectively, where these two segments lie. Table VIII displays the complete year 2000 traffic data for Sepulveda Boulevard and the other study area arterials as well.

Levels of Service

The increased traffic coupled with a lack of major street improvements will, naturally, lead to a decrease in levels of service along Sepulveda Boulevard by the year 2000. This is shown in Table IX. The worst deterioration occurs in the southbound direction in the PM peak period. The level of service (LOS) there drops from D at present to F by 2000. LOS D is defined as fair operation with some delays but an acceptable level of service. It is the level of service for which highway facilities in the Los Angeles region are being designed to. LOS F is considered an almost total breakdown in operation of the highway facility. It is the lowest LOS rating and facilities with this rating are considered prime candidates for improvement.

Additional Lane Requirements

From the above discussion, it is obvious that additional lanes will be needed on some segments of Sepulveda Boulevard by the year 2000. Table X displays the number of lanes that will have to be added by segment to bring the part of Sepulveda Boulevard under study up to an overall level of service of D. However, as with the 1980 figures, these figures should be viewed with some caution. The table shows a need for as many as three additional southbound lanes on Sepulveda Boulevard between Century Boulevard and Imperial Highway. This is because an average arterial capacity of 678 vehicles/lane/hour was used (the arterial LOS D capacity as defined by the LARTS Model). While acceptable as an averaging technique, this figure does not take into account special features of a roadway segment that may permit it to carry higher than normal traffic volumes while still remaining LOS D. In fact, this section of Sepulveda Boulevard has no at grade intersections and thus functions more like a freeway than a typical arterial. While traffic volumes will undoubtedly build and may cause increased congestion in the future because of its proximity to the airport, this section of Sepulveda Boulevard may need less than the three additional southbound lanes called for in the analysis. Probably one additional lane in each direction will be sufficient to meet year 2000 traffic needs.

2. Bundy Drive-Centinela Avenue

Forecasted Volumes

As with all of the other arterial routes examined in this study, the Bundy Drive-Centinela arterial will increase its traffic volumes by the year 2000. Its overall average increase of about 14% will be slightly less than that for Sepulveda Boulevard. The greatest increases will come in the two southern segments of Centinela Avenue. With an additional 92,000 vehicles a day, the segment from Route 90 (the Marina Freeway) to Culver Boulevard will register the largest absolute increase while from Culver to Venice boulevards the anticipated 25% increase in traffic will be the largest percentage gain. The rest of this arterial route will experience much smaller traffic growth on the order of about 10% in the twenty-year period.

Levels of Service

The present marked directionality in the AM peak period traffic flow over the Centinela-Bundy arterial will continue. Except around the Santa Monica (I-10) Freeway interchange, the northbound lanes will continues to experience LOS A while the southbound lanes from Pico Boulevard to the southern limit will be operating at level of service F. Only in the extreme northern portion of this route, from Santa Monica to Sunset Boulevards, will the level of service be acceptable. Interestingly, while this directional pattern reverses itself in the PM peak the differences are less extreme. Except for the far northern segments, Centinela-Bundy will operate at LOS F in the northbound direction and generally LOS E southbound.

Additional Lane Requirements

Naturally, the increasing peak period congestion described above will require capacity enhancements to achieve an overall level of service D on the route. Expressed as additional year 2000 traffic lanes, generally two additional lanes in both directions will be needed on Centinela Avenue while one should be sufficient on Bundy Drive from the Santa Monica Freeway (I-10) to Santa Monica Boulevard. The special requirement of three additional lanes on Centinela Boulevard at the I-10 Freeway interchange is a very short segment and the additional lane over and above the two per direction already suggested may be obviated through special traffic channelization and control techniques.

3. Jefferson Boulevard-Overland Avenue-Westwood Boulevard-Beverly Glen Boulevard

Forecasted Volumes

Overall traffic volume increases on this arterial route will be approximately 16% by 2000. This is approximately the same increase as that predicted for Sepulveda Boulevard.

The greatest traffic increase on a given segment both percentage wise and in absolute numbers is on Overland Avenue between Culver and Venice boulevards. This segment will experience a 38% increase in traffic or an additional 70,000 vehicles per day. The second greatest percentage increase will be on Beverly Glen Boulevard between Sunset Boulevard and Mulholland Drive. This existing one lane directional segment of Beverly Glen Boulevard over the Santa Monica Mountains will experience a whopping 37% increase in average daily traffic or about 58,000 additional vehicles per day. In absolute numbers it is the third largest increase on the route, exceeded only by the section of Overland Avenue identified above and the section of Beverly Glen Boulevard adjoining this one to the north, i.e., from Mulholland Drive to Ventura Boulevard.

Levels of Service

As might be expected from the data above, the level of service along the route will deteriorate between 1980 and 2000. Because of the large increase in traffic predicted on Overland Avenue, particularly from Culver to Venice boulevards in Culver City, the existing undercapacity situation, LOS A, will become by 2000 an over capacity problem, LOS E northbound and LOS D southbound during the PM peak period. The segment of Overland Avenue between Venice and I-10 which is already at LOS F because its one lane directional bottleneck between Venice and Palms boulevard, will continue to experience these conditions in the future. If the "bottleneck section" of the segment was widened to the same width as the rest of the street, the level of service for the entire segment would improve to LOS C; even in the year 2000. The four lane section (two lanes directional) of Westwood Boulevard from Pico to Wilshire Boulevard will deteriorate one grade, from an average LOS D to LOS E, while the larger six lane section from Wilshire north will remain at the good level of service of A and B.

However, a serious problem exists on Beverly Glen Boulevard over the Santa Monica Mountains. This highly directional street, which already operates at LOS F southbound in the AM peak and northbound in the PM peak period, will become even more congested in the future. In fact, while the directional factor will continue, the congestion will increase in the nonpeak as well as the peak direction reducing the present level of service of C on the segment from Sunset to Mulholland southbound in the PM peak to LOS F. The segment of Beverly Glen from Mulholland Drive to Ventura Boulevard is hopelessly congested in both directions at present and will remain so in the future.

Additional Lane Requirements

As can be seen from Table X, one additional lane in each direction over about half the route would satisfy the year 2000 vehicle trip demand with one major exception. That exception is of course Beverly Glen Boulevard. Because it is one of only three routes between the far west side of Los Angeles and the San Fernando Valley, and one of only two non-Freeway arterial routes, it carries very heavy volumes of peak hour traffic for its present one lane per direction design. Thus, if Beverly Glen Boulevard was redesigned to carry all of the projected year 2000 traffic at LOS D, three additional lanes would have to be added to the roadway in each direction. Making the present two lane mountain roadway into an eight lane high flow arterial, however, may not be politically accepted.

4. Year 2000 Arterials Conclusion

As can be seen from the data in the accompanying tables and the discussion above, significant segments of all of the examined major north-south arterial routes parallel and close enough to I-405 to serve as an alternative travel artery will be well over their design capacity by the year 2000. In fact, many of these segments are extremely congested already. Because of these facts, these arterials will not be able to serve as low cost alternatives to major new transportation investments in the I-405 corridor study area. In fact, continuing use of these arterials may require significant investments in their own capacity enhancements.

C. <u>Public Transportation</u>

1. Publicly Owned Systems

Table XVI displays 2010 ridership for the fifteen publicly owned and operated transit systems examined in the study. As mentioned previously, these lines presently provide service parallel to and within one mile of the I-405 freeway. As such they could provide an alternative to those person trips currently projected to be using the Freeway. The Regional Model assumes that these lines will remain largely in place in 2010. Only minor modifications were made to three of the above lines. In each case, the modifications entailed a minor (one to two block) detour of the routes to enable them to provide connecting service to the planned Century Freeway light rail line (LRT) at Aviation Boulevard.

In addition to the local bus line modifications, the 2010 transit network in the I-405 Corridor Study area includes the addition of the Century Freeway LRT. This major fixed guideway transit facility begins at Aviation Boulevard--the eastern boundary of the study's primary impact area. Thus, it does not provide service within the primary study area. However, its impact on the examined transit services will still be significant as those providing competing service will lose patronage while those providing complementary feeder service will gain substantially. Table XVI shows that with inclusion of the Century Freeway LRT, overall transit ridership in the study's primary impact area will more than double by 2010. About 68% or more than two-thirds of the increase is due to ridership on the LRT line. The other third will be increased ridership on the existing bus lines which will rise 31%--from approximately thirty-five to forty-six thousand boardings per day by 2010. Some lines will actually lose patronage while others, particularly those feeding the LRT, will show substantial gains. Unfortunately, the Century Freeway LRT will not provide significant relief for trips in the I-405 Freeway corridor. These are north-south trips between the South Bay, El Segundo Airport, Westside and San Fernando Valley areas while the LRT is a primarily east-west facility. As such it will serve trips to and from the study area and areas to the east such as downtown Los Angeles, Long Beach and Compton. However, as noted above it will increase transit travel and in the study area as the need for feeder lines to the transitway will increase. Thus, ironically, the Century Freeway LRT will actually increase person travel in the study area without providing a congestion relief benefit.

2. Privately Owned Systems

It is very difficult to speculate on the fate of private transit services in the study area. Since publication of the SCAG Commuter Bus study in 1982 some of the private bus companies surveyed have ceased operation while others have started up. It is a very fluid industry. Still, due to the present and predicted employment growth in the El Segundo-Los Angeles International Airport area and the fact that the employers in this area are the chief sponsors of privately provided public transportation service, applying the fifty percent growth rate predicted by the model for the publicly operated transit service in the area does not seem unreasonable for the private providers as well. Thus, about 13,500 passenger trips will be made on privately owned public transit services in 2010.

3. Year 2010 Transit Conclusion

Table XVI indicates that approximately 83,500 transit trips per day will be occurring in the I-405 Freeway Corridor Study primary impact area in 2010. This is an almost threefold increase over that occurring today. About 24,000 or 29% of these trips will be on the east-west Century Freeway LRT and thus of limited consequence to the focus of this study, north-south movement on or near I-405. However, the remaining almost 60,000 trips will have a direct effect and represent a doubling of today's north-south transit travel in the corridor. These trips could form the nucleus of possible auto trip diversions to a future high level transit facility in the study corridor.

4. Rail Transit System Analysis (2010)

A. Transit System Alternatives Description 2010

Five transit system alternatives were designed and tested as part of the LAX Area Transportation Study and I-405 Corridor study. In each design a "background" bus system was developed. This background bus system was largely a continuation of the existing bus system with minor route modifications made to provide feeder service to the various fixed guideway systems in each alternative. Because the modifications were minor, the "background" bus system is relatively consistent from one alternative to the next.

Table XVI
I-405 Corridor Study
Existing and Projected Transit Ridership

Operator/ Line No.	Route in Study Area	1984 Observed Home-Work Roundtrips	Adjusted 2010 Model Home-Work Roundtrips
SCRTD			
42	Sepulveda/La Tijera	406	166
215	Inglewood Avenue	1,182	370
225/226*	Aviation Boulevard/ Douglas Street	568	470
232	Sepulveda Boulevard (Airport-South Bay)	1,740	352
234	Sepulveda Boulevard (San Fernando Valley)	1,162	896
236	Woodley Avenue	152	5
430	I-10/I-405/Sunset Boulevard	44	88
437	I-10/I-405/Route 90	112	75
439**	Aviation Boulevard/ Sepulveda Boulevard/ Slauson Avenue	1,076	3,435
560	Sepulveda Boulevard/ I-405/Sunset Boulevard/ Van Nuys Boulevard	11,855	22,005
Culver City Muni. Bus			
CC-3	Overland Avenue	3,184	4,041
CC-6	Sepulveda Boulevard (Airport-UCLA)	1,855	1,875
Santa Monica Muni. Bus			
SM-5	Boulevard Federal Avenue/Olympic	1,870	1,984
SM-8	National Boulevard/ Westwood Boulevard	5,168	5,548

Table XVI (continued)

Operator/ Line No.	Route in Study Area	1984 Observed Home-Work Roundtrips	Adjusted 2010 Model Home-Work Roundtrips
SM-12	Palms Boulevard/ Westwood Boulevard	2,265	2,462
SM-14	Centinela Avenue/ Bundy Drive	2,019	2,096
SUBTOTAL		34,658	45,868
I-105 LRT	Century Freeway	--	24,086
GRAND TOTAL		34,658	69,954

* Limited modification made in route in 2010 Network Design to provide feeder service to Century Freeway LRT line.

** Model shows only one passenger on entire line in 1984 doubling to two in 2010. Thus, observed ridership was doubled to estimate 2010.

Each alternative is shown graphically on the accompanying maps. Following a description of the principal features. The five alternatives build on each other with Alternative 1 being the least capital cost intensive and Alternative 5--the most.

The alternatives are:

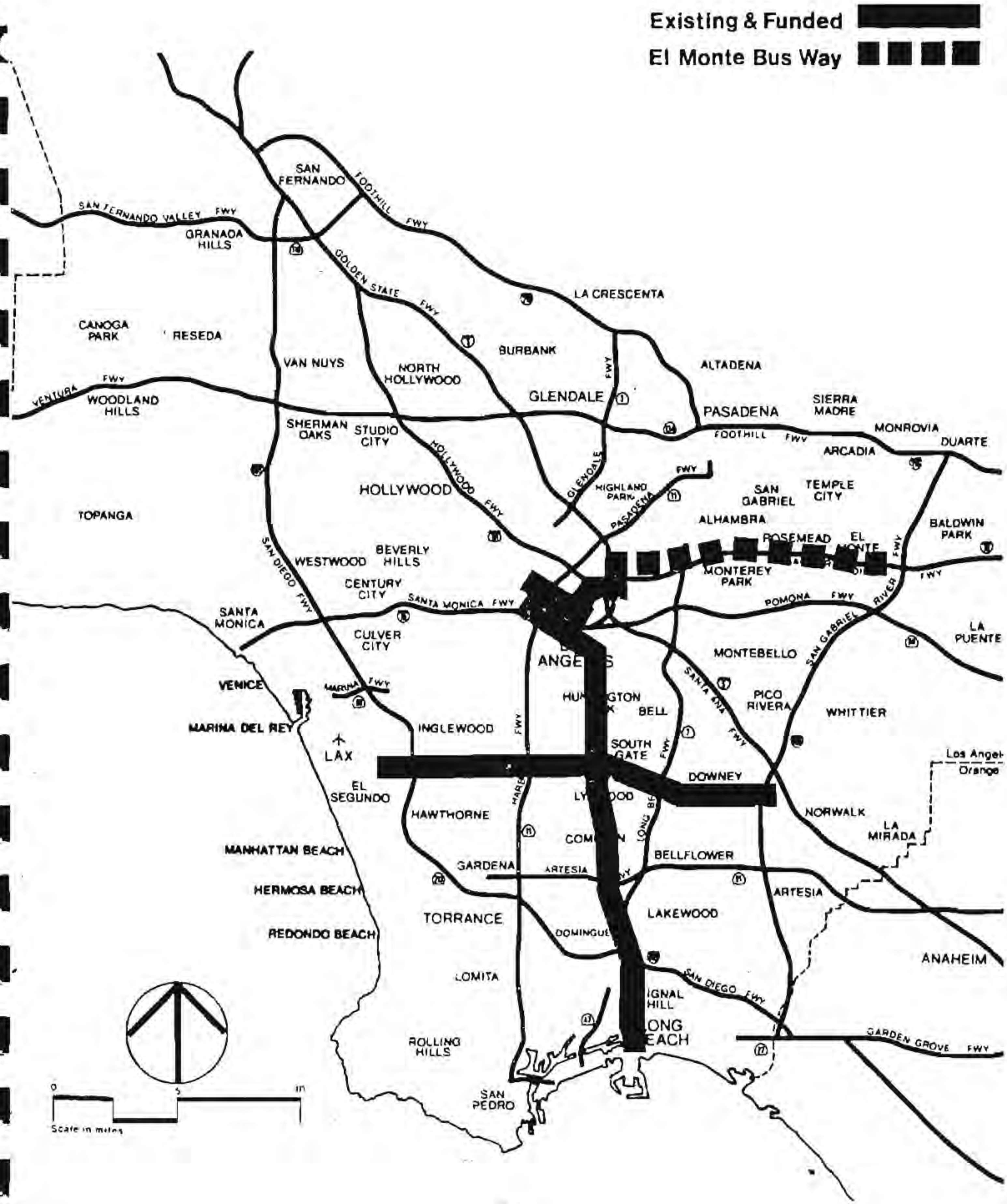
1. <u>Existing Plus Funded</u> -- Alternative 1 (Figure II) is the present regional transit system with addition of the SCRTD Metrorail starter line, the LACTC Century Freeway and Los Angeles-Long Beach LRT lines. The first line is a heavy rail subway to be built from Union Station in downtown Los Angeles through the downtown, mid-Wilshire and Hollywood areas and terminating at Universal City in the San Fernando Valley. The second and third lines are light rail surface lines with minimum grade separations to be built from downtown Los Angeles to downtown Long Beach and the LAX area respectively. The development of these systems will result in the rerouting of some existing bus lines to serve the stations, but these reroutings will be minor. Thus the new transit projects in this alternative will basically overlay on the existing regional transit system and not replace it.

In the LAX study area, these rail projects will have only minimal impact. Only the Century Freeway LRT line will directly penetrate the study area and even here the penetration will only affect the far eastern edge of the study area. Still there will be some systemwide effects from these changes that will cause changes to some of the transit operating statistics in the study area. The changes for this and all the other alternatives are presented in subsequent sections to this report.

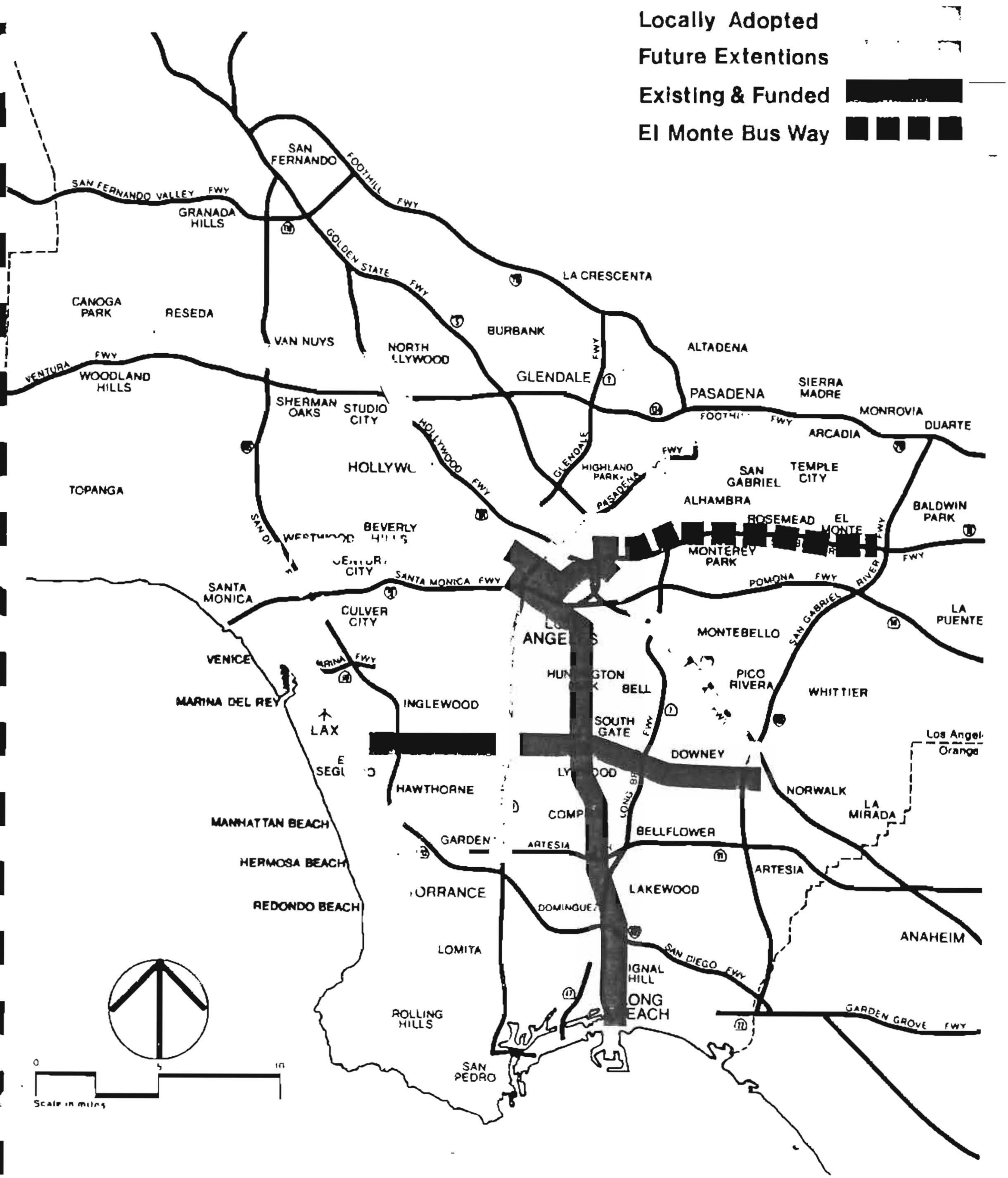
2. <u>Locally Adopted and Future Extensions</u> -- Alternative 2 (Figure III) -- In 1985, the Los Angeles County Transportation Commission adopted the rail system described in this alternative. Many of the features of Alternative 2 (Figure 3) have reflect of continuing transit planning efforts of the Los Angeles County Transportation Commission (LACTC) and the Southern California Rapid Transit District (SCRTD), just as have the features of Alternative 1. Most of the features of Alternative 2 are extensions of proposed rail projects included in Alternative 1. The SCRTD Metrorail line on Wilshire Boulevard is extended west to the end of Wilshire Boulevard in Santa Monica and southeast along the Santa Ana Freeway (Interstate 5) to Downey. Similarly, a light rail line is added on Chandler Boulevard in the San Fernando Valley from the northern terminus of the Metrorail line west to Warner Center; a distance of approximately 17 miles. Other light rail extensions include a north-south extension of the Century Freeway line to Marina del Rey and Torrance, an eastern extension of the same line to Downey and a northern extension of the Long Beach line to Pasadena. The Harbor Freeway (Interstate 110) Busway which is a high occupancy vehicle (HOV) facility has been also considered as part of this alternative. This facility could be converted to rail in the future.

Extensions to the Century Freeway LRT line are in the study area. One would travel northwest from the vicinity of Imperial Highway and Aviation Boulevard along Aviation and Lincoln Boulevards to Marina del Rey. This line would serve a number of major parking lots at LAX, the Playa Vista

I-405 NORTH CORRIDOR STUDY
RAIL TRANSIT ALTERNATIVE #1



I-405 NORTH CORRIDOR STUDY
RAIL TRANSIT ALTERNATIVE #2



development near the Marina, and the Marina. The southern extension would provide transit service to major aerospace companies in El Segundo, cutting through the Hughes Aircraft Company property, as well as service to a number of South Bay communities such as Hawthorne and Torrance. The line would terminate near the Palos Verdes Peninsula. The two extensions would significantly impact transit operations in the LAX study area. As in Alternative 1, the "background" bus system is held constant, except for minor changes in bus routes to facilitate feeder service to planned rail stations.

3. **Valley Rail** -- Alternative 3 (Figure IV) was developed to serve the increasingly heavy volume of travel along the Sepulveda Boulevard-San Diego Freeway corridor. This alternative begins at LAX in the south and follows the San Diego Freeway through the Sepulveda Pass to a northern terminus at Chandler Boulevard in the San Fernando Valley. At the southern end it would connect with the Century Freeway-Marina del Rey LRT extension of Alternative 2 while the north end would intersect the Chandler Boulevard LRT line also included in Alternative 2. The "background" bus system has been maintained with minor changes in bus routes to facilitate feeder service to proposed rail stations.

4. **Santa Monica Rail** -- Alternative 4 (Figure V) deletes the LAX to San Fernando Valley rail line of Alternative 3, but adds a connection between the Marina del Rey extension of the Century Freeway LRT and the Santa Monica extension of the Wilshire Boulevard Metrorail line. Thus, it provides a rail transit connection between the LAX area and Santa Monica. In all other respects, this alternative is similar to Alternatives 2 and 3. This alternative has not been approved by the City of Santa Monica, but was tested and evaluated against goals and objectives developed for the study area.

5. **I-405 HOV** -- Alternative 5 (Figure VI) is the same as Alternative 3 with only one exception. The I-405 (San Diego Freeway) corridor rail line from LAX to the San Fernando Valley is replaced with High Occupancy Vehicle (HOV) lanes. The HOV lanes accommodate carpools and charter buses in addition to transit buses. In this respect, there is potential for greater use of the HOV lanes than a rail line. On the other hand, the rail line has a greater maximum person trip capacity than the HOV lanes if the demand is present. The relative ability of either type of facility to create and hold the potential travel demand is as important as the maximum capacity of the facility. However, the above alternatives were tested and evaluated against goals and objectives developed for the LAX Area Transportation study. The results of those processes are described below.

B. The Year 2010 Transit Alternative Ridership Comparisons

Table XVII displays the unlinked ridership for each of the year 2010 transit alternatives as well as for the 1984 existing system. The results presented in these tables are output from the computer modelling process including the 1984 base figures for the LAX Area Transportation Study. Therefore, the unlinked ridership numbers presented in table XVII also includes some of the observed ridership presented in table XVI as discussed in previous sections. Because the model is a regional transit model, data could not be isolated to the LAX study area. The closest approximation

I-405 NORTH CORRIDOR STUDY
RAIL TRANSIT ALTERNATIVE #3

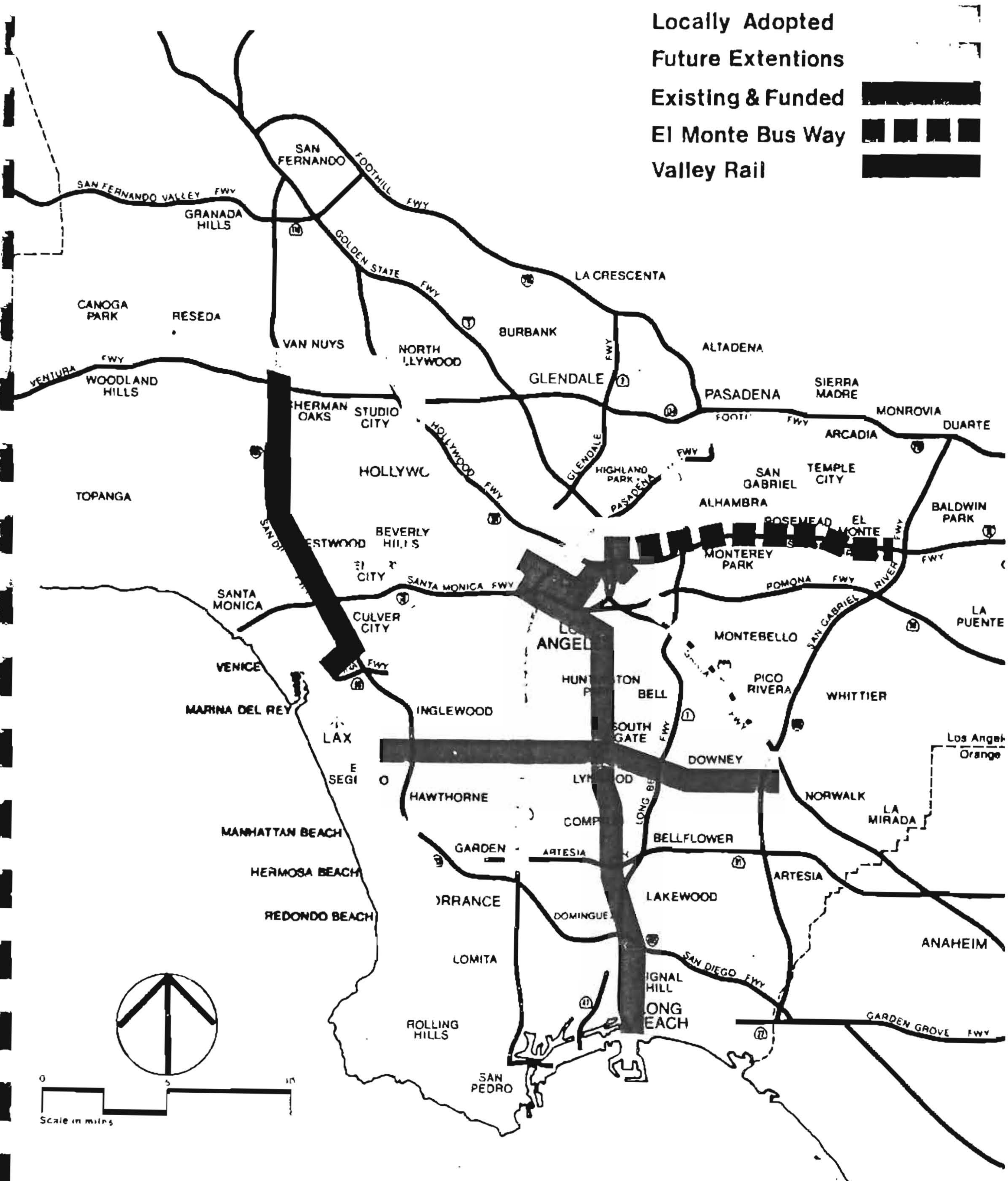
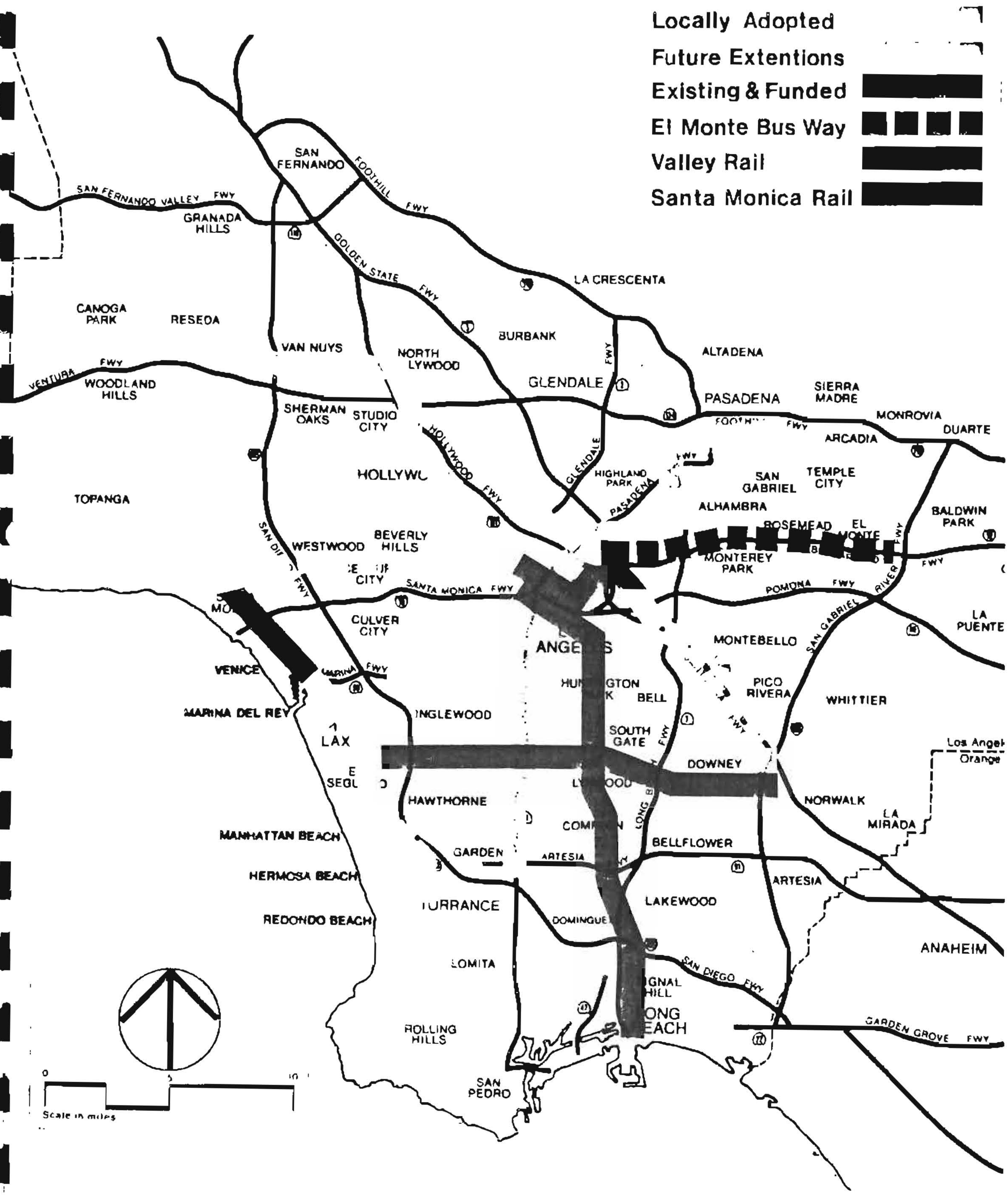
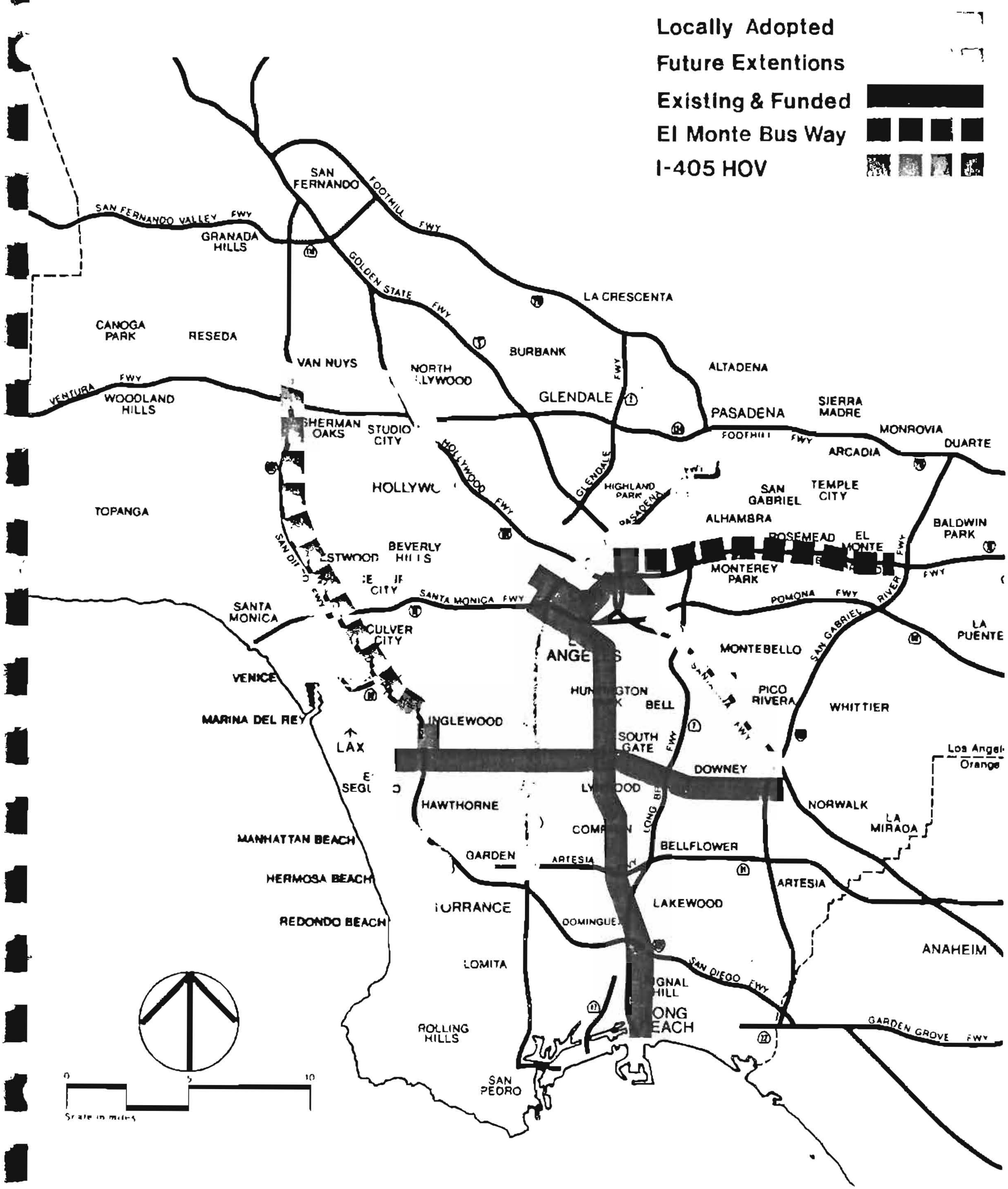


Figure V

I-405 NORTH CORRIDOR STUDY
RAIL TRANSIT ALTERNATIVE #4



I-405 NORTH CORRIDOR STUDY
RAIL TRANSIT ALTERNATIVE #5



possible was to isolate those present and future transit lines serving the LAX study area. This will result in some overstatement of LAX study area was ridership as the model gives the figures for the entire line, not just for that portion of the line in the LAX study area or I-405. Thus the 1984 base ridership of approximately 75,000 is that for all of the present lines serving the LAX study area and some of I-405 corridor area. This is higher than the 1984 public sector only operated transit ridership of about 40,000 on average weekday for the LAX study area. The relative changes should still be applicable.

Table XVII shows the absolute and relative changes. In most cases the relative differences are valid. With Alternative 1, the data anomaly results in an apparent discrepancy. The 2010 ridership for Alternative 1 shows a decrease over the 1984 existing base. This occurs because, as stated above, the entire line ridership is shown in these numbers. Alternative 1 includes the SCRTD Metrorail subway which, while not serving the LAX study area, serves the same area as the eastern portion of many of the bus lines serving the study area. Thus these bus lines are experiencing a drop in ridership as former bus patrons are diverted to the Metrorail line. The study area is not experiencing a concurrent increase in rail ridership because no significant study area rail lines are included in Alternative 1. In fact, the bus ridership for the LAX study in Alternative 1 will probably be similar to that of the 1984 base, with an increase proportionate only to the overall regional growth in transit ridership due to area population and employment increases.

The other alternatives show a pattern of ridership increases. While the bus system ridership decreases to about half of the present riders, the rail system additions more than make up for the bus system decrease. Alternative 2 more than doubles the existing ridership with its major rail extensions to El Segundo and Marina del Rey. The growth in ridership continues with the other alternatives as the rail portion of each alternative is made more extensive than that of its predecessor. However, the incremental increases are not as dramatic as that of Alternative 2.

Because the total transit ridership increases for Alternatives 2 through 5 are significantly greater than the decrease in bus system ridership, it can be assumed that new riders are entering the system and not just shifting from buses. Some of these new riders may be due to general population and employment growth but the large overall transit increases (over 100%) argue that many are probably former automobile drivers or passengers. This is confirmed by looking at the mode split figures in Table XVIII. While the changes do not seem large because of the vast preponderance of automobile travel, the transit mode split gradually increases and the auto drive alone and shared ride mode split figures gradually decrease as the transit alternatives become more capital cost intensive.

The data shows that Alternative 4, the Santa Monica-Wilshire and Santa Monica-LAX (via Marina del Rey) rail extensions attract the highest transit ridership; an almost 150% increase over the 1984 base. From an incremental ridership increase standpoint, Alternative 2, at an approximate 120% increase, may be best. Of course the ultimate decision can only be made when the capital and operating costs of these alternatives are compared to the ridership increases. Then the relative worth of undertaking the substantial transportation improvement projects defined in the alternatives can be determined.

5. Implementation

The basic purpose of this section is to identify improvement projects which are responsive to both existing and future highway deficiencies in the I-405 Corridor (San Fernando Valley to LAX). Staff has identified highway facility improvements; developed transit alternatives which are tied to other regional rail systems currently under consideration by Los Angeles County Transportation Commission and proposed transportation system management strategies for implementation. In coordination with other area studies currently underway at SCAG (LAX Area Transportation Study and San Fernando Valley Area Study), staff also identified and examined a variety of transportation and TSM alternatives proposed by these studies.

A. Highway Improvements

The highway improvements projects attempt to eliminate primary capacity deficiencies for I-405 Corridor and for individual arterials where appropriate Table IX presents a comprehensive list of these improvements.

B. Transportation System Management (TSM)

TSM expands the scope of traditional transportation planning to include strategies that will improve service and operation, and thus, increase mobility and general efficiency of the system. TSM improvements are generally low-cost actions intended to enhance capacity and vehicle flow. A comprehensive list of TSM strategies are presented in Table XX.

C. Transit Improvements

Based on analysis of transit alternatives described in previous sections and in coordination with LAX Area Transportation Study and San Fernando Valley Area Study transit analysis the following transit improvements are proposed for implementation.

1. Support the I-405 HOV lanes from San Fernando Valley to the LAX area. The detailed operation of the HOV lane should be further studied as part of I-405 South Corridor Study currently underway at SCAG.

2. Support the extension of bus transit services from San Fernando Valley to Century City. Currently line 560 connects the SFV with UCLA, but does not proceed further east.

Implementation of the various recommendations proposed in this report will require a concentrated effort on the part of many different individuals, agencies and the private sector. It is also recognized that individuals and agencies identified as having implementation responsibility have a variety of citywide, statewide or jurisdictional responsibilities which must be balanced with the priorities recommended in this report. Funding limitation, political will, and competing priorities will all affect the implementation of the study's recommendations.

TABLE XVII

COMPARISON OF YEAR 1984 AND 2010

TRANSIT ALTERNATIVE RIDERSHIP (UNLINKED PASSENGERS)

FOR LAX STUDY AREA AND I-405

2010 ALTERNATIVES

ALTERNATIVE	BUS AMOUNT	RAIL AMOUNT	TOTAL AMOUNT	% TOTAL AMOUNT CHANGE FROM BASE
1984 BASE	75,135	--	75,135	--
1	49,948	0	49,948	-33.5*
2	35,148	129,734	164,882	+119.4
3	34,318	135,283	169,601	+125.7
4	30,531	154,826	185,357	+146.7
5	36,933	132,281	169,214	+125.2

* For explanation of this negative number, please see the accompanying text.

TABLE XVIII

PERCENT SHARE OF TOTAL TRANSIT BY TRANSPORTATION MODE

(MODE SPLIT) FOR LAX STUDY AREA 2010 ALTERNATIVES

Mode	ALTERNATIVES				
	1	2	3	4	5
Trips Produced in LAX area (%):					
Drive Alone	68.53	68.21	68.01	68.18	68.17
Shared Ride	27.26	26.86	26.61	26.84	26.82
Transit	4.21	4.93	5.38	4.98	5.01
Total	100.00	100.00	100.00	100.00	100.00
Trips Attracted to LAX area (%):					
Drive Alone	69.53	68.91	68.63	68.87	68.79
Shared Ride	26.17	25.73	25.52	25.71	25.64
Transit	4.30	5.36	5.85	5.42	5.57
Total	100.00	100.00	100.00	100.00	100.00

TABLE IX

HIGHWAY-ARTERIAL IMPROVEMENTS

	ON	FROM	TO	PROJECT DESCRIPTION AND JURISDICTIONS	($ THOUSANDS) UNFUNDED COST	(MILES) LENGTH
1.	**Sepulveda (Rt. 1)**	Playa/Jefferson	Sawtelle	Remove Parking and Restripe for 6 lanes (provide 6 lanes from Jefferson (N) to Jefferson (S) intersections) -- **Culver City**	170.0	0.35
2.	**I-405**	Rt. 101 (Ventura Fwy)	Rt. 110 (Harbor Fwy)	Widen Rt. 10 to Rt. 101 and Rt. 90 to Rt. 110 from 4 lanes to 5 lanes plus 1 HOV lane; widen Rt. 90 to Rt. 10 from 5 lanes to 5 lanes plus 1 HOV lane (Route Concept) -- **Caltrans**	14,252.0	26.46
3.	**Sepulveda (Rt. 1)**	Lincoln Bd	96th Street	Maintain 5 lanes southbound and 4 lanes northbound -- **Los Angeles**	50.0	0.21
4.	**Sepulveda (Rt. 1)**	96th St.	Century Bd.	Maintain 8 lanes -- **Los Angeles**	50.0	0.28
5.	**Sepulveda (Rt. 1)**	Century Bd.	I-105	Widen tunnel; widen from 8 lanes to 10 lanes -- **Los Angeles**	36,000.0	0.96
6.	**Sepulveda (Rt. 1)**	I-105	El Segundo Bd.	Maintain 8 lanes -- **El Segundo**	100.0	1.08
7.	**Sepulveda (Rt. 1)**	El Segundo Bd.	Manhattan Beach Blvd.	Widen from 6 lanes to 8 lanes (Route Concept) -- **El Segundo -- Manhattan Beach**	1,000.0	2.00
8.	**Sepulveda (Rt. 1)**	Lincoln	Centinela	Widen to 8 lanes -- **Los Angeles**	4,644.0	1.97
9.	**I-405/Arbor Vitae**			New Interchange (STIP) -- **Inglewood -- Los Angeles -- Caltrans**	21,536.0	0.00

TABLE IX (Continued)

HIGHWAY-ARTERIAL IMPROVEMENTS

	ON	FROM	TO	PROJECT DESCRIPTION AND JURISDICTIONS	($ THOUSANDS) UNFUNDED COST	(MILES) LENGTH
10.	Imperial Hwy	Pershing Dr.	California/I-105 (Sepulveda Blvd)	Widen from 4 to 6 lanes (LACSP). -- Los Angeles	2,045.0	1.53
11.	Rt 90/I-405			EB to SB Connector (no change in model representation) -- Los Angeles -- Caltrans	5,367.0	0.46
12.	I-405/Centinela/Hughes Center			New interchange, providing more direct access from Centinela/ Sepulveda to I-405 (privately funded. No change in network model representation) -- Culver City -- Los Angeles -- Caltrans -- Private Sector	0.0	0.00
13.	96th/Sepulveda			New Grade Separation. (No change in network model representation LACSP) -- Los Angeles	10,000.0 (2,800.0)*	0.00
					98,014.0	

* Right-of-way cost estimate.

TABLE XX

TRANSPORTATION SYSTEM MANAGMENT STRATEGIES

Proposed Projects for Implementation

Project Description	Jurisdiction
1. Remove medians and restripe to provide dual left turn lanes in both directions on Sepulveda Boulevard at Centinela and change northbound right-turn-only lane to a continuous through lane.	Culver City
2. Add a separate right-turn lane on the southbound approach on Sepulveda Boulevard at El Segundo Boulevard.	El Segundo
3. Restripe Sepulveda Boulevard from six to eight lanes from Imperial Highway to El Segundo Boulevard.	El Segundo
4. Add a northbound to westbound left-turn lane (making 3) to Sepulveda Boulevard at Lincoln Boulevard.	Los Angeles
5. Add additional northbound lane on Sepulveda Boulevard between 96th Street and Lincoln Boulevard (11).	Los Angeles
6. Provide dual left-turn lanes for southbound Sepulveda Boulevard at southbound on-ramp to I-405.	Los Angeles
7. Provide dual left-turn lanes northbound and southbound on Sepulveda Boulevard at 96th Street.	Los Angeles
8. Provide roadway separation over Sepulveda Boulevard at 96th Street (12).	Los Angeles
9. Prohibit morning peak hour parking on Sepulveda Boulevard northbound between 22nd Street and Marine Avenue.	Manhattan Beach
10. Widen Route 1 Sepulveda Boulevard at Manhattan overhead (at Valley Boulevard) (widen NB roadway and railroad overhead).	Manhattan Beach
11. Provide dual left-turn lanes on Sepulveda Boulevard at Grand Avenue, El Segundo Boulevard, Rosecrans Avenue, Marine Avenue, Manhattan Beach Boulevard, and change signal phasing accordingly.	El Segundo Manhattan Beach Caltrans

TABLE XX Continued

TRANSPORTATION SYSTEM MANAGEMENT STRATEGIES

Proposed Projects for Implementation

	Project Description	Jurisdiction
12.	Provide a reversible mixed flow or high-occupancy vehicle (HOV) lane between Imperial Highway and Artesia Boulevard on Sepulveda Boulevard.	El Segundo Manhattan Beach Caltrans
13.	Restrict parking on Sepulveda Boulevard from Lincoln Boulevard to Manhattan Beach Boulevard (6:30-9:00 a.m., 3:00-6:30 p.m.) in direction of peak hour traffic.	Los Angeles El Segundo Manhattan Beach
14.	Prohibit morning and evening peak hour parking on Sepulveda Blvd. from Vicory Blvd. to Venice Blvd. where physically possible and operationally practical.	Caltrans Los Angeles Culver City
15.	Close the existing northbound on/off ramps from I-405 at Burbank Blvd. and relocate the ramps 1/4 mile to the north to Hatteras Street.	Caltrans Los Angeles City
16.	Improve Hatteras Street between I-405 and Sepulveda Blvd. to improve capacity by street widening, addition of turn lanes and installation of a traffic signal at the intersection of Sepulveda Blvd. and Hatteras.	Caltrans Los Angeles City
17.	Convert Sepulveda Blvd. into a "reversible" lane arterial during peak periods between Mulholland Drive and Devonshire Street. This would be accomplished by reversing the traffic flow on the inside lane and/or the two-way left turn median to provide an additional lane for the movement of traffic in the peak direction.	Los Angeles City

FINANCE

The purpose of this section is to deal with the potential sources of funding for the recommended improvements and to outline a funding strategy by which those responsible for implementing these improvements can approach financing them. Before turning those issues, however, it is first necessary to summarize the costs that are likely to be involved in making these improvements a reality.

A. Costs of Improvements

The cost of street, road, and highway improvements for the area have already been estimated in Table IX as totalling $99 million. These costs did not include the proposed I-405 HOV lanes, but only the addition of lanes on that highway through restriping. Full scale provision of HOV lanes on I-405 would cost about $1.25 billion in the study area alone, rather than the $14 million identified for restriping. All highway and street improvements envisioned for the study area for 2010 would therefore cost a total of about $1.35 billion.

In summary, it therefore appears that the new costs to be incurred in the study area which must be planned for, are as follows:

	$	99 million	Highways, Streets
approx.		1.25 billion	FAI Highway HOV (+/- $200 million)
Total approx.	$	1.35 billion	

B. Financial Resources

Now that we have some idea of the costs of the recommended I-405 corridor study area improvement projects, the question is that of identifying potential resources to cover these costs.

The base data for estimating future financial resources are summarized in Technical Appendix D of the Draft Regional Transportation Plan 1984. Reference should be made to that Appendix, as well as to the 1984 RTP Financial Element as questions arise. No one knows how much money will be available in the future, let alone what it will be capable of buying (i.e., its "real" values). These documents show and explain our assumptions about the future of transportation funding in enough detail to be dealt with critically.

Financial resources for TSM and highway improvements may be provided from the federal, state, and local levels of government as well as the private sector. The ability to use these sources depends upon the nature of each project on a case-by-case basis. These projects must compete with others throughout the local jurisdictions in which they are located and, in some cases, even throughout the state:

1. Federal Resources for Street + Roads and Highways

The allocation of federal support is by and large controlled by the state through the State Transportation Improvement Program (STIP) process. The federal assistance for highways is allocated using such criteria as cost-effectiveness and geographic apportionment formulae. The following list of federal programs identifies the uses to which each program can be put, the portion of the total project cost that can be covered and the manner in which the funds are allocated by the State.

Federal Aid Interstate (FAI) is restricted for use in constructing the Interstate Highway System. The I-405 (San Diego Freeway) and I-105 (Century Freeway) are eligible for these funds, which are allocated by the STIP process. Highway widenings and interchanges may be built with these funds. They cover 90% of the costs of such construction, the State supplying the remaining 10%.

Federal Aid Interstate 4-R (FIR) is available for resurfacing, restoring, rehabilitating, and reconstructing (the 4 "Rs") interstate highway facilities. Restriping, fifth "R," is included in this list. These funds may pay for up to 80% of the project cost. The remaining 20% is provided by the State. They are allocated via the STIP process. These funds are to be used for the restriping work on I-405 and may be used to construct the I-405 HOV lanes if various requirements are met.

Federal Aid Primary (FAP) is made available for other principal highways outside of the interstate system, such as Route 90 (Marina Freeway). Both new construction and rehabilitation can be financed with these funds up to 80% of the project costs. The remaining 20% is provided by the State. Allocated by the STIP process, the FAP program provides funding for a wide array of projects. Therefore, it is among the more sought after sources of federal assistance in the State and it is very difficult to get specially for projects in counties like Los Angeles, which have FAI routes. Counties without FAI routes like Ventura, are more likely to obtain FAP funds.

Federal Aid Urban (FAU) assistance is subvened to local jurisdictions as part of the Local Assistance Program from the State Highway Account (SHA). FAU designated routes in the I-405 Corridor Study include Sepulveda Boulevard and Manchester Avenue. FAU funds can be used for construction, rehabilitation, and widening of such designated routes. Up to 80% of project cost can be paid for out of these funds. The remaining 20% of costs are matched by state or local funds depending upon whether or not it is deemed to have "state-wide significance." Any FAU eligible projects in the study area would have to compete with other projects in Los Angeles County.

2. State Funding Resources for Streets + Roads and Highways

As mentioned above, the State provides some of the matching funds for federally funded programs from the SHA. Beyond this, the

Transportation Planning and Development Account (TP&D) provides funding for railroad grade separations. The Unified Transportation Fund (UTF) may also be used, but both of these funds are dwindling barring another major energy crisis, and are not likely to provide significant assistance in the near future.

3. Local Resources for Streets + Roads and Highways

Local funding for the I-405 corridor projects would come out of the streets and roads programs of local jurisdictions. These projects must compete against other projects in each locality for what is considered to be the scarcest resource in the surface transportation system. Nevertheless, these local jurisdictions have the fiscal authority to pay for streets and roads projects out of funds raised by several fee and taxation mechanisms. Here follows a list of potential resources starting with the most conventional.

Almost half of the 9 cents/gallon fuel tax collected by the state is subvened to local jurisdictions for construction, rehabilitation, and maintenance of their streets and roads network. This source accounts for approximately one-third of the costs of the streets and roads programs in the SCAG region.

Benefit assessment districts are common throughout California for many public facilities and services, including those related to streets and roads, street lighting, road construction and improvement, flood control, and the like. Several approaches to instituting benefit assessment districts are defined in the California Code, most related to legislation passed in 1911, 1913, and later. Street frontage is often the base used for assessing each landowner's share of the public expense, but any attribute of land and improvements (except market value) that is related to the benefit conferred by the proposed public works project may be used to base assessments.

Developer exactions for providing public infrastructure are defined in the Subdivision Map Act. These exactions are paid either in currency as a developer fee or in-kind by the developer's providing the facilities directly. Developer agreements have expanded the applicability and flexibility of this method of financing public works.

Collectively, benefit assessments, developer exactions, and developer agreements have provided 15% of the streets and roads program in the SCAG region, about twice the amount of federal assistance through the FAU and FAS (Federal Aid Secondary) programs.

4. Summary

In summary, it appears that the recommended highway and street + road improvements must compete on a case-by-case basis with other proposals. FAI 4R funding is probably needed in the greatest amounts for the projects listed. FAP funding, while an obvious source for Marina Freeway work, is difficult to get due to intense statewide competition. FAU, local, and private funding seem to be the most likely sources for the other work. FAU funding will depend on relative countywide priorities for that category. Local funds will depend on local relative priorities.

Private and value capture sources will depend on the special benefits the projects would confer on private entities.

C. Funding Strategy

In devising any funding strategy for the recommended improvements, the first question to be answered is how the costs match up with potential sources of funding.

The most obvious question is whether FAI 4R money would be available in sufficient quantity to build the study area portion of the I-405 HOV lanes once they were found to be eligible. Anticipated long-term totals of these funds statewide are on the order of $1.2-1.5 billion/5 year period statewide. Assuming the regional share to be half of the statewide total, about $2.5-3.75 billion of these funds could be available from now until 2010. If the I-405 HOV lanes were the only project in the region eligible for these funds, its funding would seem reasonable to expect. There are, however, other projects competing for these funds, some of which are closer to realization. In addition, rehab and related work on the existing system will consume a great deal of funds, the total of which is not now ascertainable. Finally, the $1.25 billion cost estimated here, covers only the section of the project within the study area. Actual construction of that section may be dependent upon a commitment to HOV lanes on a longer stretch of I-405.

Given this outlook, it appears that the funding of the I-405 HOV lanes from FAI 4R funds will depend upon their priority in relation to competing projects in the region. It is unlikely that any other source of funding would be adequate to the size of this project. The strategy here, therefore, must be one of pursuing this fund source.

The financing of the transit, street, and other highway projects will be accomplished from a wider variety of both public and private sources. Many of the individual street and highway projects, may be funded from exactions, dedications, fees, and other value capture mechanisms from the private sector.

Since the need for enhanced capacity is generated to a great extent by the expected growth in the corridor, some of the cost of mitigating that impact should be borne by those profiting from this growth. This is the essence of value capture.

The bulk of the remainder of the costs would have to be picked upon at the local level, with the exception of some highway work that could qualify for combined state/federal funding. The street expenditures will also depend upon such private and value capture commitment in the timing. Their principal sources of funding will be from the streets and roads money of local jurisdictions, with their timing dependent to a certain extent, on this other participation.

In summary, the potential funds are not inadequate to the tasks, but whether and when each project gets done will depend upon how each fares in competition with other like projects in the region, how much private sector commitment it gets, and how much value capture can be generated for it.

VI. APPENDICES

APPENDIX A

TABLE A-I

ARTERIAL
1980 BASE YEAR AND YEAR 2000 TOTAL TRAFFIC VOLUMES
LARTS MODEL OUTPUT

	1980				2000			
LIMITS	ADT	AM	PM	OFF-PEAK	ADT	AM	PM	OFF-PEAK
SEPULVEDA BOULEVARD								
Rosecrans to El Segundo	225	43/5/48	24/57/81	111	295	67/7/74	30/80/110	96
El Segundo to Imperial	341	21/40/61	58/51/109	192	411	27/57/84	79/56/135	171
Imperial to Century	217	26/24/50	39/48/87	88	260	35/24/59	48/55/103	80
Century to Manchester	317	7/63/70	77/48/125	133	346	8/65/73	80/51/140	122
Manchester to Slauson	474	27/45/72	67/62/129	308	536	27/53/80	80/68/148	273
JEFFERSON BOULEVARD								
Slauson to Overland	606	42/38/80	69/72/141	425	666	37/48/85	76/80/156	385
Overland to La Cienega	711	55/46/101	92/96/188	462	772	58/46/104	100/106/206	422
CENTINELA AVENUE								
Rt. 90 to Culver	225	9/25/34	43/33/76	129	276	12/35/47	57/43/100	115
Culver to Venice	375	19/37/56	70/62/132	212	450	18/51/69	95/74/169	187
Venice to I-10	421	28/28/56	58/58/116	267	468	28/37/65	71/65/136	249
BUNDY DRIVE								
I-10 to Pico	545	42/43/85	78/70/148	331	597	43/47/90	95/81/176	312
Pico to Santa Monica	578	34/51/85	87/76/163	355	642	35/55/90	109/88/197	330
Santa Monica to Wilshire	678	33/60/93	94/81/175	441	740	36/63/99	108/92/200	410
Wilshire to San Vicente	837	36/68/104	103/90/193	569	888	38/71/109	108/102/210	540
San Vicente to Sunset	686	29/69/98	109/80/189	425	745	28/78/106	126/88/214	399
OVERLAND AVENUE								
Jefferson to Culver	404	25/34/59	68/70/138	242	478	31/45/76	84/76/160	207
Culver to Venice	554	41/48/89	94/89/183	316	628	44/62/106	109/97/206	282
Venice to I-10	510	38/33/71	74/75/149	332	584	40/44/84	85/83/168	290
I-10 to Pico	243	19/20/39	47/51/98	115	268	18/32/50	54/49/103	106
WESTWOOD BOULEVARD								
Pico to Olympic	393	33/40/73	76/73/149	187	452	33/56/89	94/82/176	171
Olympic to Santa Monica	309	21/32/53	61/55/116	156	361	19/52/71	75/59/134	140
Santa Monica to Wilshire	413	37/30/67	62/59/121	243	447	27/50/77	66/61/127	225
Wilshire to Sunset	715	50/36/94	80/91/171	456	762	58/60/118	95/93/188	450

Table A-I (continued)

LIMITS	1980 ADT	1980 AM	1980 PM	1980 OFF-PEAK	2000 ADT	2000 AM	2000 PM	2000 OFF-PEAK
BEVERLY GLEN BOULEVARD								
Santa Monica to Wilshire	266	11/28/39	54/33/87	153	313	12/35/47	69/44/113	140
Wilshire to Sunset	378	14/53/67	85/49/134	214	460	14/57/71	103/72/175	177
Sunset to Mulholland	126	1/40/41	48/13/61	27	173	2/52/54	63/29/92	24
Mulholland to Ventura	313	21/31/52	56/46/102	185	387	25/46/71	70/61/131	159

All volumes should be multiplied by 100.
AM and PM volumes are northbound/southbound/total.

Table A-I (continued)

LIMITS	1980 ADT	1980 AM	1980 PM	1980 OFF-PEAK	2000 ADT	2000 AM	2000 PM	2000 OFF-PEAK
BEVERLY GLEN BOULEVARD								
Santa Monica to Wilshire	266	11/28/39	54/33/87	153	313	12/35/47	69/44/113	140
Wilshire to Sunset	378	14/53/67	85/49/134	214	460	14/57/71	103/72/175	177
Sunset to Mulholland	126	1/40/41	48/13/61	27	173	2/52/54	63/29/92	24
Mulholland to Ventura	313	21/31/52	56/46/102	185	387	25/46/71	70/61/131	159

All volumes should be multiplied by 100.
AM and PM volumes are northbound/southbound/total.

TABLE A-II

I-405 CORRIDOR STUDY WORKSHEET
ARTERIAL TRAFFIC VOLUME CALCULATIONS

ARTERIAL/ LIMITS(1)	1980 AM PEAK HOUR-PEAK DIRECTION GROUND COUNT(2)	REGIONAL MODEL(3)	DIVERGENCE ADJUSTMENT FACTOR(4)	1980 PM PEAK HOUR PEAK DIRECTION GROUND COUNT(5)	REGIONAL MODEL(6)	DIVERGENCE ADJUSTMENT FACTOR(7)	1980 GROUND COUNT	REGIONAL MODEL	ADT DIVERGENCE ADJUSTMENT FACTOR
SEPULVEDA BOULEVARD									
Rosecrans to El Segundo	NA	2,150	NA	NA	1,900	NA	NA	225	NA
El Segundo to Imperial	NA	2,000	NA	NA	1,933	NA	NA	341	NA
Imperial to Century	2,329	1.300	1.79	3,072	1,600	1.92	611	217	2.82
Century to Manchester	1,295	3,150	.41	2,067	2,566	.81	466*	317	1.47
Manchester to Slauson	2,220	2,250	.99	2,494	2,233	1.12	511	474	1.07
JEFFERSON BOULEVARD									
Slauson to Overland	1,204	2,400	.50	1,493	2,400	.62	315	606	.51
Overland to La Cienega	830	2,750	.30	1,016	3,200	.32	204	711	.29
CENTINELA AVENUE									
Rt. 90 to Culver	1,637	1,250	1.31	1,902	1,433	1.33	408	225	1.81
Culver to Venice	1,143	1,850	.62	1,350	2,333	.58	251	375	.70
Venice to I-10	1,731	1,400	1.24	2,789	1,933	1.44	431	421	1.02
BUNDY DRIVE									
I-10 to Pico	1,475	2,150	.69	1,336	2,600	.51	327	545	.60
Pico to Santa Monica	1,248	2,550	.49	1,390	2,900	.48	301	578	.52
Santa Monica to Wilshire	720	3,000	.24	896	3,133	.29	193	678	.28
Wilshire to San Vicente	NA	3,400	NA	NA	3,433	NA	NA	837	NA
San Vicente to Sunset	23	3,450	.01	18	3,633	.01	291	686	.42
OVERLAND AVENUE									
Jefferson to Culver	NA	1,700	NA	NA	2,333	NA	NA	404	NA
Culver to Venice	730	2,400	.30	826	3,133	.26	185	554	.33
Venice to I-10	1,277	1,900	.67	1,199	2,500	.48	252	510	.49
I-10 to Pico	1,334	1,000	1.33	1,501	1,700	.88	299	243	1.23
WESTWOOD BOULEVARD									
Pico to Olympic	1,092	2,000	.55	1,648	2,533	.65	266	393	.68
Olympic to Santa Monica	885	1,600	.55	1,489	2,033	.73	249	309	.61
Santa Monica to Wilshire	1,009	1,850	.55	1,134	2,067	.55	287	413	.69
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table A-11 (continued)

ARTERIAL/ LIMITS(1)	1980 AM PEAK HOUR-PEAK DIRECTION GROUND COUNT(2)	REGIONAL MODEL(3)	DIVERGENCE ADJUSTMENT FACTOR(4)	1980 PM PEAK HOUR PEAK DIRECTION GROUND COUNT(5)	REGIONAL MODEL(6)	DIVERGENCE ADJUSTMENT FACTOR(7)	198 GROUND COUNT	REGIONAL MODEL	ADT DIVERGENCE ADJUSTMENT FACTOR
BEVERLY GLEN BOULEVARD									
Santa Monica to Wilshire	717	1,400	.51	848	1,800	.47	178	266	.70
Wilshire to Sunset	832	2,650	.31	554	2,833	.20	178	378	.47
Sunset to Mulholland	1,412	2,000	.71	1,490	1,600	.93	155	126	1.23
Mulholland to Ventura	1,804	1,550	1.16	2,130	1,866	1.14	273	313	.87

* Count is double one way ADT count of 233.

TABLE A-III

ARTERIAL
1980 BASE YEAR LANE NEEDS CALCULATIONS

ARTERIAL/ LIMITS	CURRENT LEVELS	XLOS D* CAPACITY LANE/HR.	=CURRENT LOS D* CAPACITY/HR.	NB/SB PEAK HOUR TRAFFIC VOLUMES AM	PM	NB/SB PEAK HOUR CAPACITY DEFICIENCIES AM	PM	ADDITIONAL NB/SB PEAK HOUR LANE NEEDS AM	PM
SEPULVEDA BOULEVARD									
Rosecrans to El Segundo	3	678	2,034	2,150/250	800/1,900	116/0	0/0	1/0	0/0
El Segundo to Imperial	4	678	2,712	1,050/2,000	1,933/1,700	0/0	0/0	0/0	0/0
Imperial to Century	3	678	2,034	2,350/2,150	2,500/3,067	316/116	466/1,033	1/1	1/2
Century to Manchester	3	678	2,034	150/1,300	2,066/1,300	0/0	32/0	0/0	1/0
Manchester to Slauson	3	678	2,034	1,350/2,250	2,500/2,300	0/216	466/266	0/1	1/1
JEFFERSON BOULEVARD									
Slauson to Overland	2	678	1,356	1,050/950	1,433/1,500	0/0	77/144	0/0	1/1
Overland to La Cienega	2	678	1,356	800/700	966/1,033	0/0	0/0	0/0	0/0
CENTINELA AVENUE									
Rt. 90 to Culver	2	678	1,356	600/1,650	1,900/1,467	0/294	544/111	0/1	1/1
Culver to Venice	2	678	1,356	600/1,150	1,367/1,200	0/0	20/0	0/0	1/0
Venice to Rt. I-10	2	678	1,356	1,750/1,750	2,800/2,800	394/394	1,444/1,444	1/1	3/3
BUNDY DRIVE									
I-10 to Pico	2	678	1,356	1,450/1,500	1,333/1,200	94/144	0/0	1/1	0/0
Pico to Santa Monica	2	678	1,356	850/1,250	1,400/1,200	0/0	44/0	0/0	1/0
Santa Monica to Wilshire	2	678	1,356	400/700	900/767	0/0	0/0	0/0	0/0
Wilshire to San Vicente	1	565	565	NA	NA	NA	NA	NA	NA
San Vicente to Sunset	1	565	565	15/35	100/80	0/0	0/0	0/0	0/0
OVERLAND AVENUE									
Jefferson to Culver	2	678	1,356	NA	NA	NA	NA	NA	NA
Culver to Venice	2	678	1,356	600/700	800/766	0/0	0/0	0/0	0/0
Venice to I-10	1	678	678	1,250/1,100	1,200/1,200	572/422	522/522	1/1	1/1
I-10 to Pico	2	678	1,356	1,250/1,350	1,367/1,500	0/0	11/144	0/0	1/1
WESTWOOD BOULEVARD									
Pico to Olympic	2	678	1,356	900/1,100	1,633/1,600	0/0	277/244	0/0	1/1
Olympic to Santa Monica	2	678	1,356	600/900	1,500/1,333	0/0	144/0	0/0	1/0
Santa Monica to Wilshire	2	678	1,356	1,000/850	1,133/1,067	0/0	0/0	0/0	0/0
[illegible]	3	678	2,034	1,500/600	1,133/1,300	0/0	0/0	0/0	0/0

Table A-III (continued)

ARTERIAL/ LIMITS	CURRENT LEVELS	XLOS D* CAPACITY LANE/HR.	=CURRENT LOS D* CAPACITY/HR.	NB/SB PEAK HOUR TRAFFIC VOLUMES AM	PM	NB/SB PEAK HOUR CAPACITY DEFICIENCIES AM	PM	ADDITIONAL NB/SB. PEAK HOUR LANE NEED AM	PM
BEVERLY GLEN BOULEVARD									
Santa Monica to Wilshire	2	678	1,356	300/700	833/533	0/0	0/0	0/0	0/0
Wilshire to Sunset	1	678	678	200/800	850/500	0/122	172/0	0/1	1/0
Sunset to Mulholland	1	678	678	35/1,400	1,500/600	0/722	822/0	0/2	2/0
Mulholland to Ventura	1	678	678	1,200/1,800	2,133/1,733	522/1,122	1,455/1,055	1/2	3/2

* LOS D = 1.13 LOS C capacity LOS C capacity = 600 vehicles/lane/hour on primary arterials and 500 vehicles/lane/hour or secondai arterials.

LE A-IV

ARTERIAL
YEAR 2000 LANE NEEDS CALCULATIONS

ARTERIAL/ LIMITS	CURRENT LANES	XLOS D* CAPACITY LANE/HR.	=CURRENT LOS D* CAPACITY/HR.	NB/SB PEAK HOUR TRAFFIC VOLUMES AM	PM	NB/SB PEAK HOUR CAPACITY DEFICIENCIES AM	PM	ADDITIONAL NB/SB PEAK HOUR LANE NEEDS AM	PM
SEPULVEDA BOULEVARD									
Rosecrans to El Segundo	3	678	2,034	3,350/350	1,000/2,667	1,316/0	0/633	2/0	0/1
El Segundo to Imperial	4	678	2,712	1,350/2,850	2,633/1,867	0/138	0/0	0/1	0/1
Imperial to Century	3	678	2,034	3,150/2,150	3,067/3,533	1,116/116	1,033/1,499	2/1	2/3
Century to Manchester	3	678	2,034	150/1,350	2,400/1,367	0/0	366/0	0/0	1/0
Manchester to Slauson	3	678	2,034	1,350/2,650	3,000/2,533	0/616	966/499	0/1	2/1
JEFFERSON BOULEVARD									
Slauson to Overland	2	678	1,356	950/1,200	1,567/1,667	0/0	211/311	0/0	1/1
Overland to La Cienega	2	678	1,356	850/700	1,067/1,133	0/0	0/0	0/0	0/0
CENTINELA AVENUE									
Rt. 90 to Culver	2	678	1,356	800/2,300	2,533/1,900	0/944	1,177/544	0/2	2/1
Culver to Venice	2	678	1,356	550/1,600	1,833/1,433	0/244	477/77	0/1	1/1
Venice to Rt. I-10	2	678	1,356	1,750/2,300	3,400/3,133	394/944	2,044/1,777	1/2	3/3
BUNDY DRIVE									
I-10 to Pico	2	678	1,356	1,500/1,800	1,600/1,367	144/444	244/11	1/1	1/0
Pico to Santa Monica	2	678	1,356	850/1,350	1,733/1,400	0/0	377/44	0/0	1/1
Santa Monica to Wilshire	2	678	1,356	450/750	1,033/900	0/0	0/0	0/0	0/0
Wilshire to San Vicente	1	565	565	NA	NA	NA	NA	NA	NA
San Vicente to Sunset	1	565	565	15/40	50/45	0/0	0/0	0/0	0/0
OVERLAND AVENUE									
Jefferson to Culver	2	678	1,356	650/950	933/833	N/A	N/A	N/A	N/A
Culver to Venice	2	678	1,356	900/967	1,367/1,333	11/0	0/0	0/0	0/0
Venice to I-10	1	678	678	1,350/1,450	1,367/1,333	672/772	689/655	1/2	1/1
I-10 to Pico	2	678	1,356	1,200/2,150	1,600/1,433	0/794	244/77	0/2	1/1
WESTWOOD BOULEVARD									
Pico to Olympic	2	678	1,356	900/1,550	2,033/1,767	0/194	677/411	0/1	1/1
Olympic to Santa Monica	2	678	1,356	550/1,450	1,833/1,433	477/94	477/77	1/1	1/1
Santa Monica to Wilshire	2	678	1,356	750/1,400	1,200/1,133	0/44	0/0	0/1	0/0
Wilshire to Sunset	3	678	2,034	1,500/1,550	1,367/1,333	0/0	0/0	0/0	0/0

Table A-IV (continued)

ARTERIAL/ LIMITS	CURRENT LANES	XLOS D* CAPACITY LANE/HR.	=CURRENT LOS D* CAPACITY/HR.	NB/SB PEAK HOUR TRAFFIC VOLUMES AM	PM	NB/SB PEAK HOUR CAPACITY DEFICIENCIES AM	PM	ADDITIONAL NB/SB PEAK HOUR LANE NEEDS AM	PM
BEVERLY GLEN BOULEVARD									
Santa Monica to Wilshire	2	678	1,356	300/900	1,067/700	0/0	0/0	0/0	0/0
Wilshire to Sunset	1	678	678	200/900	700/467	0/222	22/0	0/1	1/0
Sunset to Mulholland	1	678	678	50/1,850	1,967/900	0/1172	1,289/222	0/2	2/1
Mulholland to Ventura	1	678	678	1,450/2,650	2,667/2,333	772/1,972	1,989/1,646	2/3	3/3

* LOS D = 1.13 LOS C capacity LOS C capacity = 600 vehicles/lane/hour on primary arterials and 500 vehicles/lane/hour or secondary arterials.

TABLE A-V

ARTERIAL PEAK PERIOD VOLUME/CAPACITY RATIOS (LOS C)
ADJUSTED LARTS MODEL OUTPUT

LIMITS	1980 AM	1980 PM	2000 AM	2000 PM
SEPULVEDA BOULEVARD				
Rosecrans to El Segundo	1.19/.14	.44/1.06	1.86/.19	.56/1.48
El Segundo to Imperial	.44/.83	.81/.71	.56/1.19	1.09/.78
Imperial to Century	1.31/1.19	1.39/1.70	1.75/1.19	1.70/1.96
Century to Manchester	.08/.72	1.15/.72	.08/.75	1.33/.76
Manchester to Slauson	.75/1.25	1.39/1.28	.75/1.47	1.67/1.41
JEFFERSON BOULEVARD				
Slauson to Overland	.88/.79	1.19/1.25	.79/1.00	1.31/1.39
Overland to La Cienega	.67/.58	.80/.86	.71/.58	.89/.94
CENTINELA AVENUE				
Rt. 90 to Culver	.50/1.38	1.58/1.22	.67/1.92	2.11/1.58
Culver to Venice	.50/.96	1.14/1.00	.46/1.33	1.53/1.19
Venice to I-10	1.46/1.46	2.33/2.33	1.46/1.92	2.83/2.61
BUNDY DRIVE				
I-10 to Pico	1.21/1.25	1.11/1.00	1.25/1.50	1.33/1.14
Pico to Santa Monica	.71/1.04	1.17/1.00	.71/1.12	1.44/1.16
Santa Monica to Wilshire	.33/.58	.75/.64	.38/.62	.86/.75
Wilshire to San Vicente	NA/NA	NA/NA	NA/NA	NA/NA
San Vicente to Sunset	.03/.07	.20/.16	.01/.08	.10/.09
OVERLAND AVENUE				
Jefferson to Culver	NA/NA	NA/NA	NA/NA	NA/NA
Culver to Venice	.50/.58	.67/.64	.75/.81	1.14/1.11
Venice to I-10	2.08/1.83	2.00/2.00	2.25/2.42	2.28/2.22
I-10 to Pico	1.04/1.12	1.14/1.25	1.00/1.79	1.33/1.19
WESTWOOD BOULEVARD				
Pico to Olympic	.75/.92	1.36/1.33	.75/1.29	1.69/1.47
Olympic to Santa Monica	.50/.75	1.25/1.11	.46/1.21	1.53/1.19
Santa Monica to Wilshire	.83/.71	.94/.89	.62/1.17	1.00/.94
Wilshire to Sunset	.83/.33	.63/.72	.83/.86	.76/.74

Table A-V (continued)

LIMITS	1980 AM	1980 PM	2000 AM	2000 PM
BEVERLY GLEN BOULEVARD				
Santa Monica to Wilshire	.25/.58	.69/.44	.25/.75	.89/.58
Wilshire to Sunset	.33/1.33	1.42/.83	.33/1.50	1.17/.78
Sunset to Mulholland	.06/2.23	2.50/1.00	.08/3.08	3.28/1.50
Mulholland to Ventura	2.00/3.00	3.56/2.89	2.42/4.42	2.22/3.89

Table A-VI
I-405 Corridor Study Worksheet
Transit Ridership Calculations

Operator/ Line No.	Model Line No.	Route/Segment	1984 Model Hm.-Wk. One-Way Boardings/ Alightings	X2 = 1984 Model Hm.-Wk. Rnd.-Trip Boardings/ Alightings	1984 Observed Total Rnd.-Trip Boardings/ Alightings	Observed Model Ridership Factor	2010 Model Hm.-Wk. One-Way Boardings/ Alightings	X2 = 2010 Model Hm.-Wk. Rnd.-Trip Boardings/ Alightings	Adjusted 2010 Total Rnd.-Trip Boardings/ Alightings
SCRTD									
42	4-40	Imperial:							
		Main to Sepulveda	154	308			182	364	
		Sepulveda:							
		Imperial to 98th	739	1,478			6	12	
		Imperial/La Tijera:							
		98th to Manchester	14	28			5	10	
		Manchester to La Cienega	309	618			296	592	
		Total		2,432	406	.17		978	166
215	4-158	Inglewood:							
		Rosecrans to El Segundo	14	28			3	6	
		El Segundo to Imperial	19	38			3	6	
		Imperial to Century	13	26			5	10	
		Inglewood/Eucalyptus:							
		Century to Manchester	11	22			7	14	
		Manchester:							
		Eucalyptus to Terminal	10	20			3	6	
		Total		134	1,182	8.82		42	370
225/226*	4-163	Aviation/Douglas:							
	4-164	Rosecrans to El Segundo	16	32			71	142	
		Douglas:							
		El Segundo to Imperial	0	0			159	318	
		Imperial/Sepulveda:							
		Douglas to 98th	268	536			5	10	
		Total		568	568	1.00		470	470
232	4-166	Sepulveda:							
		Rosecrans to Grand	52	104			94	188	
		Grand to Imperial	149	298			33	66	
		Imperial to 98th	534	1,068			22	44	
		Total		1,470	1,740	1.18		298	352

Table 'I (continued)

Operator/ Line No.	Model Line No.	Route/Segment	1984 Model Hm.-Wk. One-Way Boardings/ Alightings	X2 = 1984 Model Hm.-Wk. Rnd.-Trip Boardings/ Alightings	1984 Observed Total Rnd.-Trip Boardings/ Alightings	Observed Model Ridership Factor	2010 Model Hm.-Wk. One-Way Boardings/ Alightings	X2 = 2010 Model Hm.-Wk. Rnd.-Trip Boardings/ Alightings	Adjusted 2010 Total Rnd.-Trip Boardings/ Alightings
234	4-167	Sepulveda:							
		Ventura to Burbank	475	950			367	734	
		Burbank to Victory	42	84			33	66	
		Total		1,034	1,162	1.12		800	896
236	4-168	Havenhurst/Burbank:							
		Ventura to I-405	0	0			0	0	
		I-405/Woodley:							
		Burbank to Victory	0	0			2	4	
		Total		0	152	1.15**		4	5
430	5-35	I-10/I-405/Sunset:							
		Westwood to Barrington	0**	0	44	--	0	0	88**
437	5-39	I-10/I-405/Rte. 90:							
		Westwood to Centinela	51	102	112	1.10	34	68	75
439*	5-41	Aviation/Douglas/Imperial:							
		Rosecrans to Sepulveda	135	270			1,063	2,126	
		Sepulveda:							
		Imperial to 98th	137	274			440	880	
		98th to Manchester	182	364			434	868	
		Manchester to Green Valley	173	346			166	332	
		Green Valley:							
		Sepulveda to Slauson	41	82			98	196	
		Slauson:							
		Green Valley to La Cienega	24	48			1	2	
		Total		1,384	1,076	.78		4,404	3,435
560*	5-94	Sepulveda/Jefferson:							
	5-95	98th to Manchester	737	1,474			662	1,324	
		Manchester to Green Valley	219	438			121	242	
		Green Valley to I-405	409	818			97	194	
		I-405:							
		Jefferson to Wilshire	208	416			443	886	
		Wilshire:							
		Sepulveda to Westwood	35	70			362	724	

Table _-VI (continued)

Operator/ Line No.	Model Line No.	Route/Segment	1984 Model Hm.-Wk. One-Way Boardings/ Alightings	X2 = 1984 Model Hm.-Wk. Rnd.-Trip Boardings/ Alightings	1984 Observed Total Rnd.-Trip Boardings/ Alightings	Observed Model Ridership Factor	2010 Model Hm.-Wk. One-Way Boardings/ Alightings	X2 = 2010 Model Hm.-Wk. Rnd.-Trip Boardings/ Alightings	Adjusted 2010 Total Rnd.-Trip Boardings/ Alightings
		Westwood/Hilgard:							
		Wilshire to UCLA	245	490			2,591	5,182	
		UCLA to Sunset	23	46			103	206	
		Sunset:							
		Hilgard to I-405	51	102			810	1,620	
		I-405:							
		Sunset to Ventura	610	1,220			356	712	
		Ventura:							
		I-405 to Van Nuys	173	346			492	984	
		Van Nuys:							
		Ventura to 101 Fwy.	361	722			1,142	2,284	
		101 Fwy. to Chandler	203	406			492	984	
		Chandler to Victory	291	582			642	1,284	
		Total		7,130	11,855	1.66		13,256	22,005
Culver City Muni. Bus:									
CC-3	6-138	Jefferson/Overland:							
		Green Valley to Culver	584	1,168			836	1,672	
		Culver to Washington	46	92			30	60	
		Washington/Motor:							
		Culver to Venice	382	764			279	558	
		Venice to National	430	860			474	948	
		Overland:							
		National to Pico	150	300			138	276	
		Total		3,184	3,184	1.00		3,514	4,041
CC-6	6-138	Sepulveda:							
	6-141	98th to Manchester	222	444			250	500	
		Manchester to Green Valley	18	36			25	50	
		Green Valley to Culver	99	198			50	100	
		Culver to Washington	0	0			0	0	
		Washington to Venice	109	218			84	168	
		Venice to National (I-10)	5	10			7	14	
		National to Olympic	29	58			40	80	

Table A-1 (continued)

Operator/ Line No.	Model Line No.	Route/Segment	1984 Model Hm.-Wk. One-Way Boardings/ Alightings	X2 = 1984 Model Hm.-Wk. Rnd.-Trip Boardings/ Alightings	1984 Observed Total Rnd.-Trip Boardings/ Alightings	Observed Model Ridership Factor	2010 Model Hm.-Wk. One-Way Boardings/ Alightings	X2 = 2010 Model Hm.-Wk. Rnd.-Trip Boardings/ Alightings	Adjusted 2010 Total Rnd.-Trip Boardings/ Alightings
		Sepulveda/Wilshire:							
		Olympic to Westwood	222	444			291	582	
		Westwood/Hilgard:							
		Wilshire to UCLA	210	420			181	362	
		Total		1,828	1,855	1.01		1,856	1,875
Santa Monica Muni. Bus:									
SM-5	6-185	Federal:							
		Wilshire to Santa Monica	174	348			271	542	
		Federal/Sawtelle:							
		Santa Monica to Olympic	0	0			0	0	
		Olympic:							
		Sawtelle to Sepulveda	121	242			42	84	
		Sepulveda to Westwood	0	0			0	0	
		Total		590	1,870	3.17		626	1,984
SM-8	6-187	Gateway/Barrington:							
	6-188	Bundy to National	148	296			146	292	
		National:							
		Barrington to Sepulveda	68	136			77	154	
		Sepulveda to Westwood	359	718			389	778	
		Westwood:							
		National to Olympic	640	1,280			706	1,412	
		Olympic to Santa Monica	57	114			63	126	
		Santa Monica to Wilshire	469	938			525	1,050	
		Wilshire to UCLA	579	1,158			593	1,186	
		Total		4,640	5,168	1.11		4,998	5,548
SM-12	6-192	Palms/Charmock:							
		Overland to Sepulveda	0	0			0	0	
		Sepulveda:							
		Charmock to National	1	2			1	2	
		National:					[illegible]	[illegible]	

Table A-VI (continued)

Operator/ Line No.	Model Line No.	Route/Segment	1984 Model Hm.-Wk. One-Way Boardings/ Alightings	X2 = 1984 Model Hm.-Wk. Rnd.-Trip Boardings/ Alightings	1984 Observed Total Rnd.-Trip Boardings/ Alightings	Observed Model Ridership Factor	2010 Model Hm.-Wk. One-Way Boardings/ Alightings	X2 = 2010 Model Hm.-Wk. Rnd.-Trip Boardings/ Alightings	Adjusted 2010 Total Rnd.-Trip Boardings/ Alightings
		Westwood/Hilgard:							
		National to Olympic	247	494			274	548	
		Olympic to Santa Monica	32	64			32	64	
		Santa Monica to Wilshire	180	360			209	418	
		Wilshire to UCLA	239	478			243	486	
		Total		1,670	2,265	1.36		1,810	2,462
S-14	6-194	Centinela/Bundy:							
		Washington to Venice	43	86			53	106	
		Venice to I-10	236	472			252	504	
		I-10 to Olympic	52	104			58	116	
		Olympic to Santa Monica	6	12			0	0	
		Santa Monica to Wilshire	175	350			201	402	
		Bundy/Barrington:							
		Wilshire to Sunset	148	296			121	242	
		Total		1,320	2,019	1.53		1,370	2,096
Subtotal					34,658				45,868
Century (I-105) LRT	8-1	Century Freeway: Aviation to Hawthorne	0	0	0	1.15***	10,472	20,944	24,086
Grand Total				27,486	34,658	1.15			69,954

* Minor modifications made for year 2010 network to provide feeder service to Century Freeway Light Rail Transit line.
** Model shows only one passenger on entire line in 1984 and only two in 2010.
*** Average study area 1984 observed versus model ridership adjustment factor.

APPENDIX B

SEPULVEDA BOULEVARD SPEED AND DELAY STUDY

1. Description

A speed and delay study was conducted on Sepulveda Boulevard between Burbank Boulevard on the north and Venice Boulevard on the south. This 13.3 miles long section of Sepulveda Boulevard, designated as a major highway, runs parallel to the San Diego Freeway (I-405). The northern and southern portions of the segment are located in urban centers with high population densities, while the mid-section is a major pass through the Santa Monica mountains between the San Fernando Valley and West Los Angeles.

Twenty-one speed and delay runs were conducted between March 26 and April 4, 1985. The weather ranged from sunny to overcast with occasional sprinkles. Three runs made during rainy conditions were not included in the data compilation because they would have skewed results of the study.

The test vehicle method was used to determine speed and delay. The driving strategy used the "average speed" technique in which the driver travels at a speed that, in his opinion, is representative of the speed of all traffic at a point and time. The arrival time at each signalized intersection was clocked, using the near-side limit line as the arrival point. Signal and non-signal related delays were roughly estimated. Timing was taken manually with a stop watch by personnel in the passenger seat. The same personnel and vehicle were used for all but the midday runs, when a different passenger logged travel times.

The runs were conducted during the AM peak, PM peak and midday. Seven runs were conducted during the AM peak, 9 during the PM peak and 2 during the midday. The breakdown by direction was: 3 AM runs northbound, 4 AM runs southbound; 5 PM runs northbound, 4 PM runs southbound, and one run in each direction mid-day.

Starting times for runs in the same direction were staggered to determine the limits of the peak periods. Starting times were 7:45-8:15 AM northbound, 7:00-8:15 AM southbound, 4:20-5:30 PM northbound, and 4:12-4:51 PM southbound. The midday runs were conducted at 11:00 AM northbound and 11:30 AM southbound.

2. Travel Time and Speed

Both AM and PM peak periods experienced a strong directional traffic flow which was predominantly southbound during AM period and northbound during PM peak period, as indicated in the following table. The mean travel times over this 13.3 mile section of

Delay from left-turns in the number one lane (no left turn pocket) was experienced at the following locations: Exposition Boulevard (southbound 8:10 AM, 15 seconds), Constitution Avenue (southbound approximately 25 seconds on one midday run), Constitution Avenue (northbound one run, 40 seconds at 9:00 AM), and I-405 on-ramp north of Chalon Road (northbound at 8:25 AM).

Right turn queuing caused delay at the I-405 southbound on-ramp near Chalon Road during the morning peak. Fifteen seconds of delay were experienced at 8:00 AM as the on-ramp traffic overflowed, interfering with through traffic in the curb lane.

Construction accounted for delay of approximately 10-12 seconds during northbound runs between Ohio Avenue and Wilshire Boulevard. During the southbound midday run, 56 seconds of delay were experienced at Chalon Road due to closure of the number two lane by CALTRANS crews working on the I-405 freeway shoulder.

An emergency vehicle caused 15 seconds of delay southbound between Camarillo Street and Ventura Boulevard in the morning peak during one run. Two separate pedestrian crossings caused another 30 seconds of delay.

4. Signal Delay

A rough estimate was made of the delay caused by traffic signal operation, including time to slow or stop for a red indicator, slowing in anticipation of the green indicator, or waiting in a queue through several signal cycles. Signal delay averaged approximately 20 percent for the combined 18 runs. As stated earlier, southbound traffic was heavier in the morning peak hour and northbound traffic was heavier in the afternoon peak hour. The greatest delay caused by signal timing occurred during the critical direction peak hour and ranged from 23% to 25% of travel time. However, it amounted to only 15-18% for the non-directional and midday travel time.

5. Congested Segments

Four intersections and two segments of Sepulveda Boulevard were repeatedly congested in the morning and afternoon peak direction. They were Sepulveda Boulevard respectively at Wilshire Boulevard; Montana Avenue; Moraga Drive and Rimerton Road; the segments from Fiume Walk to Ventura Boulevard; and within the tunnel north of Rimerton Road. Each is discussed below.

Sepulveda Boulevard ranged from 26 minutes for the off-peak midday and lighter direction peak hour conditions to 38 minutes for the heavier direction peak hour conditions. The very strongly directional character of this section is apparent when the lighter and heavier direction peak hour run times are compared with the off-peak midday results. The lighter direction peak hour times are virtually identical with the off-peak times, but the heavier direction peak hour times are much slower.

Distance: 13.3 miles	Travel Speed Range (MPH)*	Mean Travel Speed (MPH)	Travel Time Range (Minutes)	Mean Travel Time (Minutes)
AM Peak Northbound	30-33	32	24-27	25
AM Peak Southbound	21-30	25	26-38	33
PM Peak Northbound	25-31	28	26-32	29
PM Peak Southbound	30-32	31	25-26	26
Midday Northbound	31	31+	26	26+
Midday Southbound	29	29+	27	27+

* MPH = miles per hour

+ Only one run during midday.

3. Delay

Several types of delay were experienced. Signal timing delay was the major form of delay experienced and is discussed separately below. The other types of delay experienced were a result of left turns, right turns, construction activities, pedestrian and emergency vehicles.

Left turn delay, after signal timing delay, was the second greatest source of delay. Two types of left-turn delay were experienced: left turns from the number one lane and overflow from left-turn pockets. Delay from left-turn lane overflow was experienced at the following locations: Moraga Drive (southbound 4:30 PM, 5 seconds), Wilshire Boulevard (northbound 8:23 AM, 5 seconds), and Moraga Drive (northbound 5:00 PM, 30 seconds). A left-turn overflow incident affecting the southbound traffic stream at Montana Avenue was viewed at 8:25 AM during a northbound test run.

speeds, especially during bad weather. Rimerton Road and Sepulveda Boulevard form a "T" intersection. An I-405 signalized off-ramp is located on Rimerton Road just east of Sepulveda Boulevard, allowing southbound freeway traffic to exit onto Rimerton and then onto Sepulveda. The signal is timed to synchronize with the signal at Rimerton Street and Sepulveda Boulevard.

The greatest amount of delay for combined runs was experienced at Rimerton Road. The southbound AM peak experienced up to five minutes of delay, with traffic backing up through the tunnel one mile north of Rimerton Road during one run. This congestion at the intersection is caused by southbound freeway drivers who encounter slowing on the freeway, exit at Rimerton, and join the traffic stream southbound on Sepulveda Boulevard. A traffic back-up existed at this intersection during the northbound PM peak but to a lesser extent. Increasing the right-of-way on Sepulveda Boulevard at Rimerton Road would require extensive cutting into the hillside to the east.

e. Ventura Boulevard to Fiume Walk

This segment of Sepulveda Boulevard includes four signalized intersections extending from Ventura Boulevard on the north to Fiume Walk on the south. Despite traffic conditions, time of day, or direction of travel, platoons were repeatedly stopped at each signal on all but one day of che study. During peak periods it was not uncommon for the survey vehicle to be stopped at three of the four intersections. During the off-peak the survey vehicle was stopped at two of the intersections. Two of the four intersections also experienced high volume peak period cross-traffic from Ventura Boulevard and Fiume Walk. Southbound AM traffic on Sepulveda Boulevard north of Ventura Boulevard was found backing up northerly to the westbound off-ramp of the Ventura Freeway (I-134). During one test run on a rainy day this back up was over one-quarter mile long.

f. Tunnel

The tunnel lies one-half mile north of Rimerton Road. It is channelized for two southbound lanes and one northbound lane. The tunnel is poorly lit. Southbound delay during the AM peak hour and congestion in the tunnel is a product of signal delay at Rimerton Road. Travel time through the tunnel averaged 8 seconds during moderate traffic conditions, 12 seconds during the peak period and as many as 60 seconds during the congested conditions.

1549D

a. Wilshire Boulevard

Signal delay was experienced at Wilshire Boulevard on all but two runs and for as long as four signal cycles, during the peak and off-peak directions. The intersection of Sepulveda Boulevard and Wilshire Boulevard is situated near the I-405 ramps. A high volume left-turn demand northbound, which overflows into the number one through lane, compounds the signal delay problem. There are several driveways along Sepulveda Boulevard south of Wilshire Boulevard which cause interference with through traffic, especially during the peak periods.

Potential for widening of Sepulveda Boulevard in the immediate vicinity of Wilshire Boulevard is limited by the proximity of the I-405 freeway on the west and the Veterans Cemetery immediately to the east. Freeway retaining walls supporting the I-405 ramp overpass on Sepulveda Boulevard immediately north of Wilshire Boulevard further limit widening.

b. Montana Avenue

A pattern of delay was experienced at Montana Avenue during the southbound morning runs. The southbound left-turn lane was noted to overflow and block the number one lane during the AM peak. Similar delay was also encountered during the midday southbound run. Delay was experienced at the I-405 off-ramp south of Montana Avenue during the afternoon northbound runs as well as during the morning northbound off-peak run. The freeway's proximity and its off-ramp limits opportunities for street widening in this area.

c. Moraga Drive

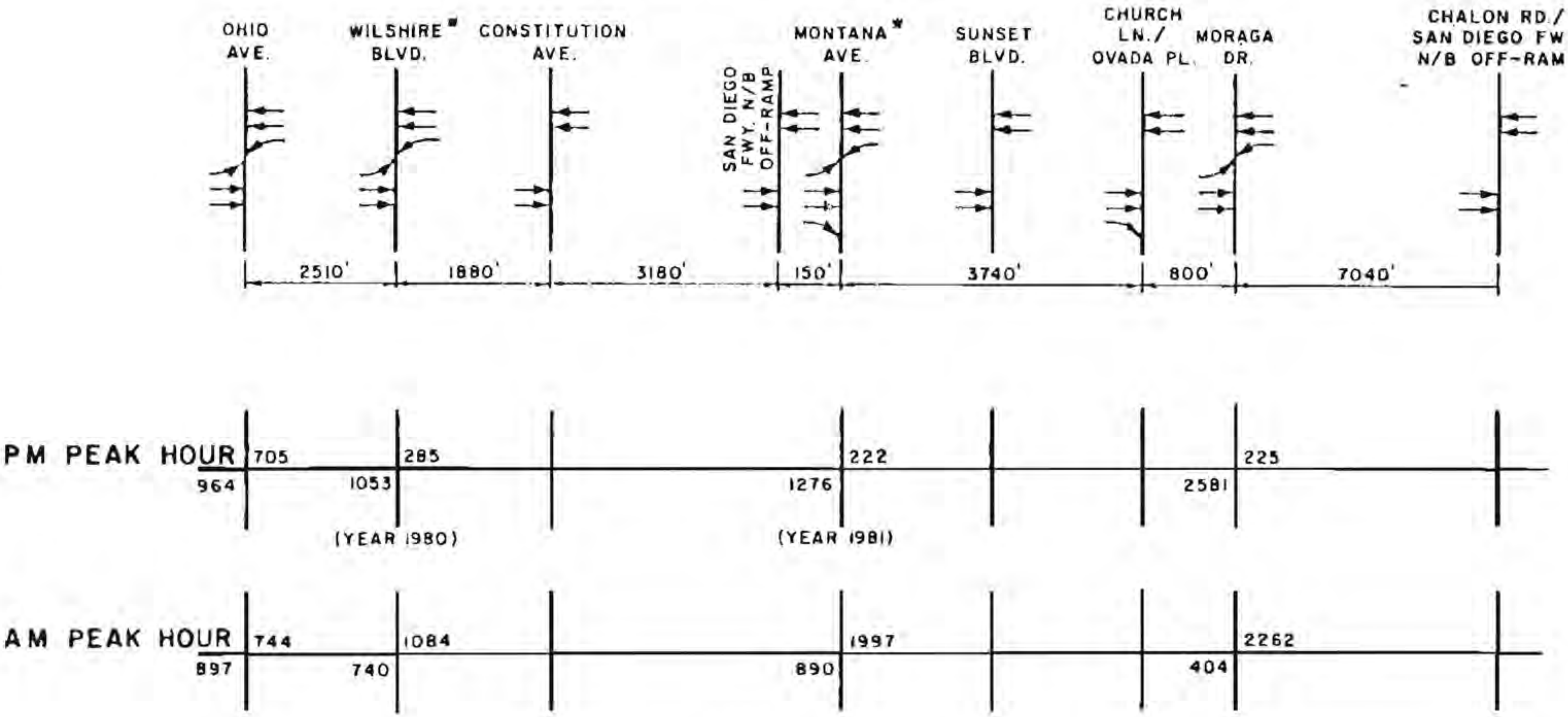
Both signal and left-turn delay were experienced at Moraga Drive. Left turn delay occurred in both directions in the afternoon. Signal delay was longest during the morning peak in the peak direction (southbound) lasting as long as seven minutes. Heavy congestion existed between Moraga Drive and a point just south of Chalon Road causing stop-and-go conditions and speeds under 10 miles per hour.

Street widening would require cutting into the hillside along the east side of Sepulveda Boulevard. Any widening along the west side is limited by the proximity of the I-405 freeway.

d. Rimerton Road

Sepulveda Boulevard in the vicinity of Rimerton Road snakes through the Santa Monica Mountains. Hillside curves reduce

TRAFFIC VOLUMES
YEAR 1984-85
SEPULVEDA BOULEVARD
BETWEEN OHIO AVE. AND CHALON RD./ SAN DIEGO FWY. N/B OFF-RAMP



* YEAR OTHER THAN 1984-85

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
Donald R. Howery General Manager

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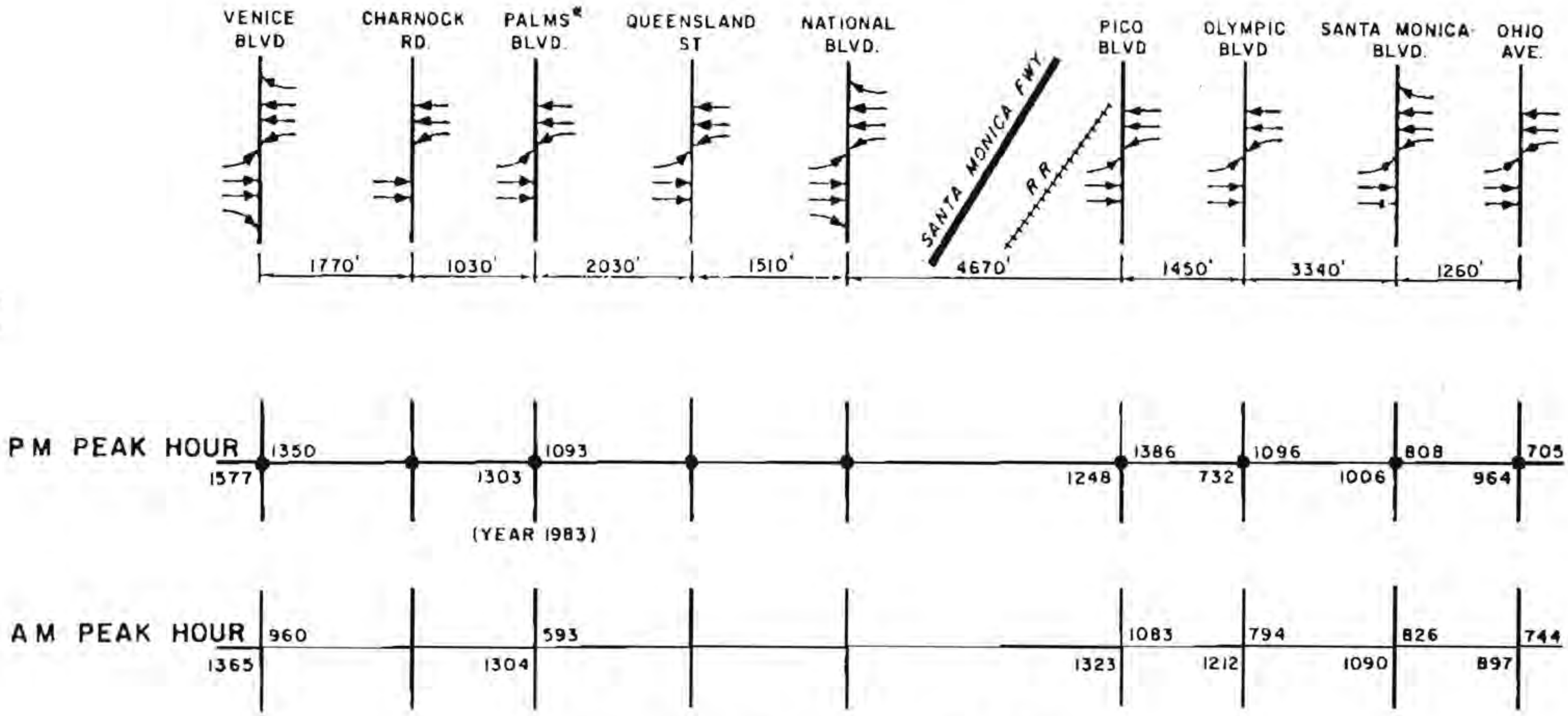
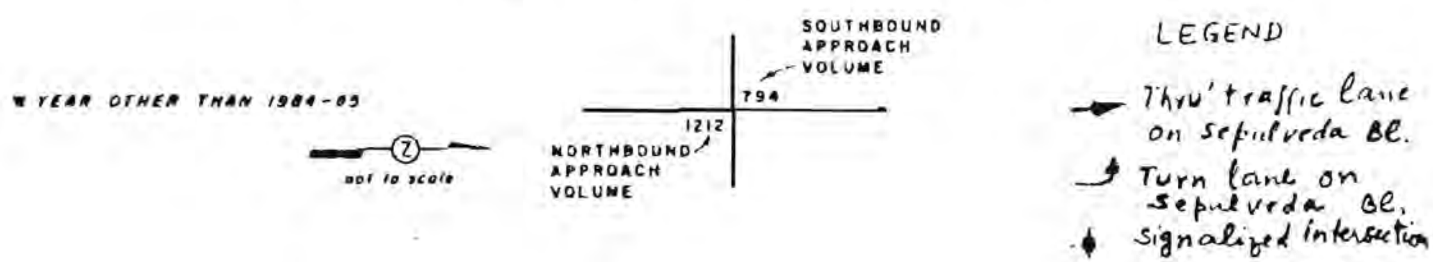
TRAFFIC VOLUMES
YEAR 1984-85
SEPULVEDA BOULEVARD
BETWEEN VENICE BLVD. AND OHIO AVE.





CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
Donald R. Howery, General Manager

APPENDIX A
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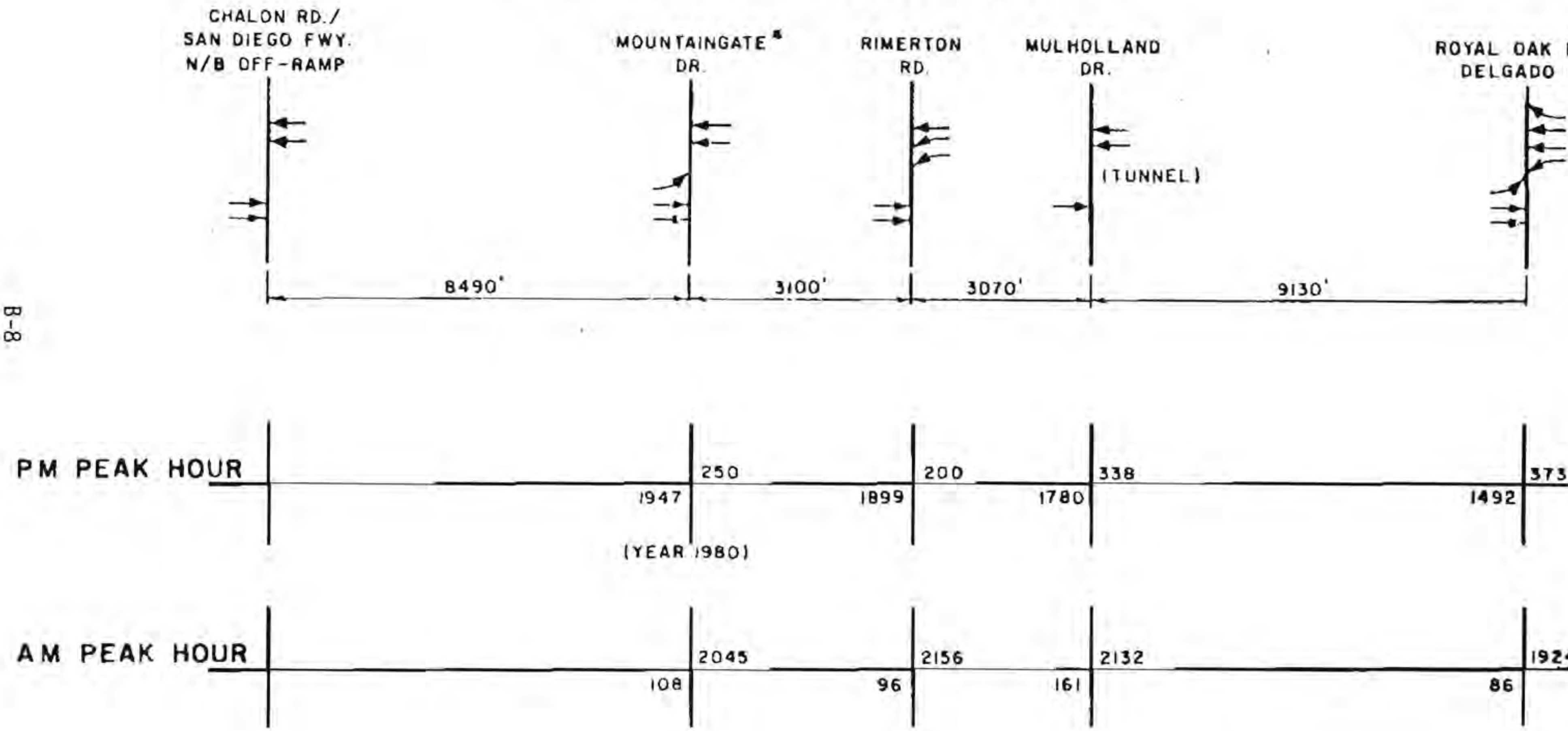
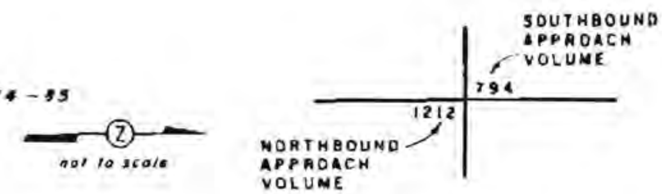
TRAFFIC VOLUMES
YEAR 1984-85
SEPULVEDA BOULEVARD
BETWEEN CHALON RD./SAN DIEGO FWY. N/B OFF-RAMP AND ROYAL OAK RD./DELGADO PL.



* YEAR OTHER THAN 1984-85



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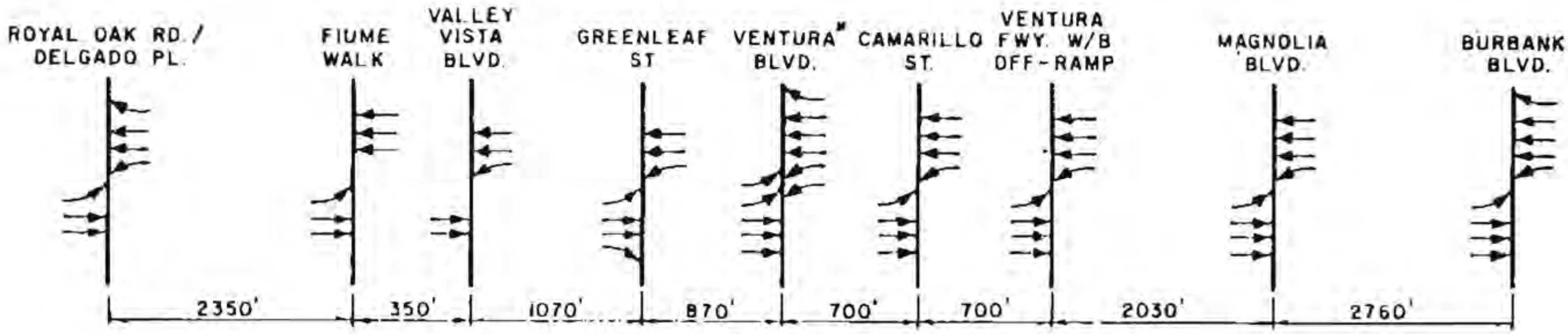
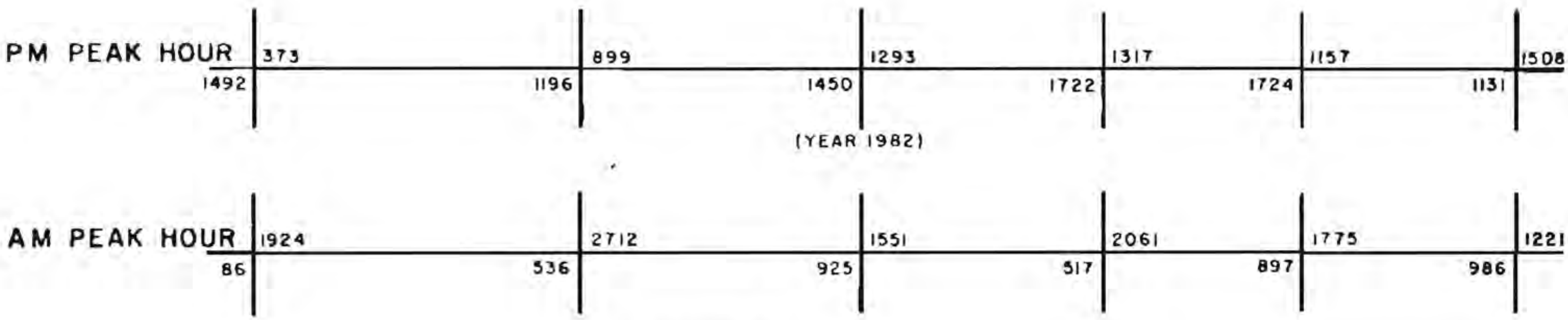
TRAFFIC VOLUMES
YEAR 1984-85
SEPULVEDA BOULEVARD
BETWEEN ROYAL OAK RD./DELGADO PL. AND BUBANK BLVD.





* YEAR OTHER THAN 1984-85

CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
Donald R. Howery General Manager

APPENDIX A
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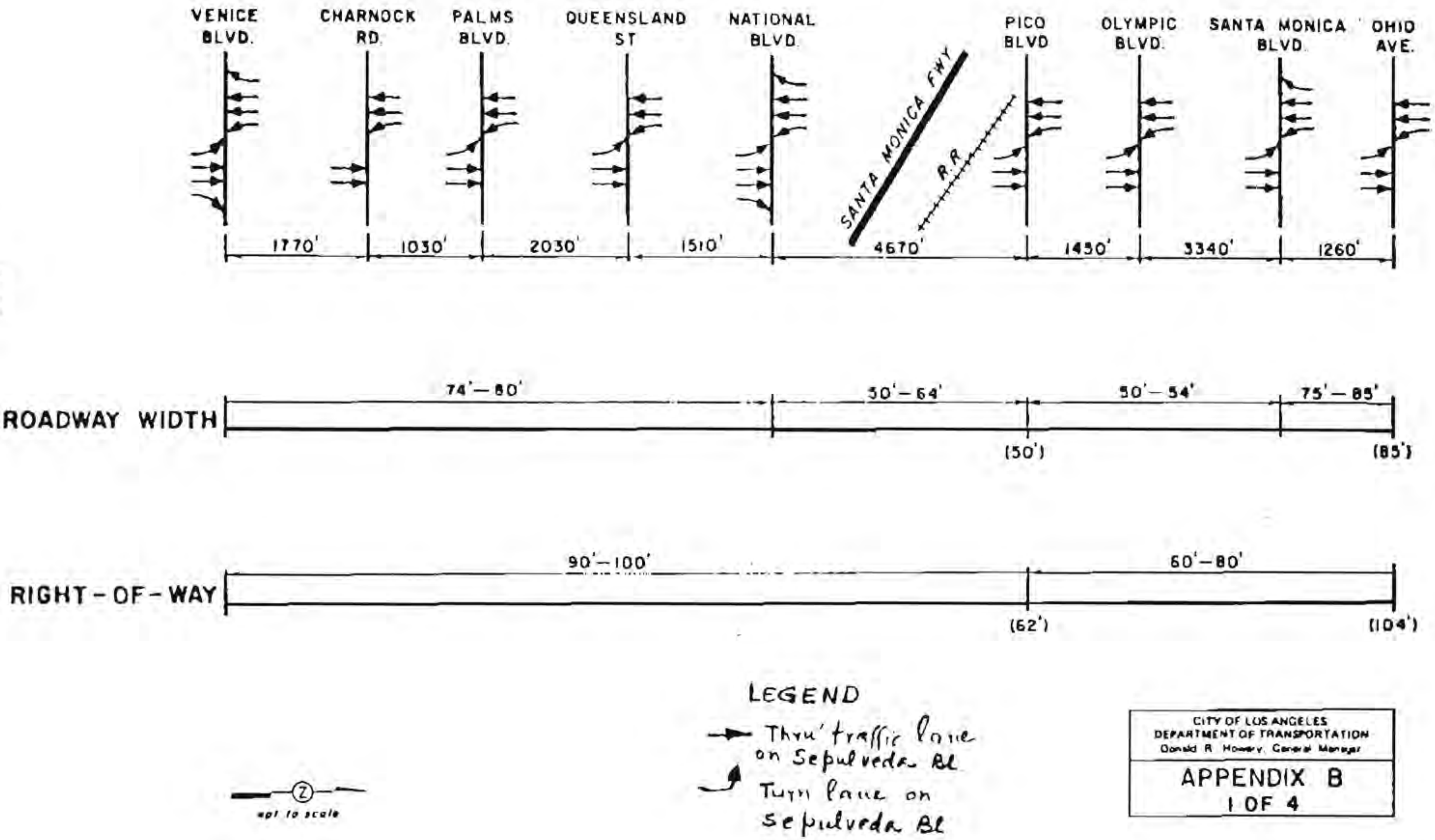
SEPULVEDA BOULEVARD

BETWEEN VENICE BLVD. AND OHIO AVE.



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APPENDIX B
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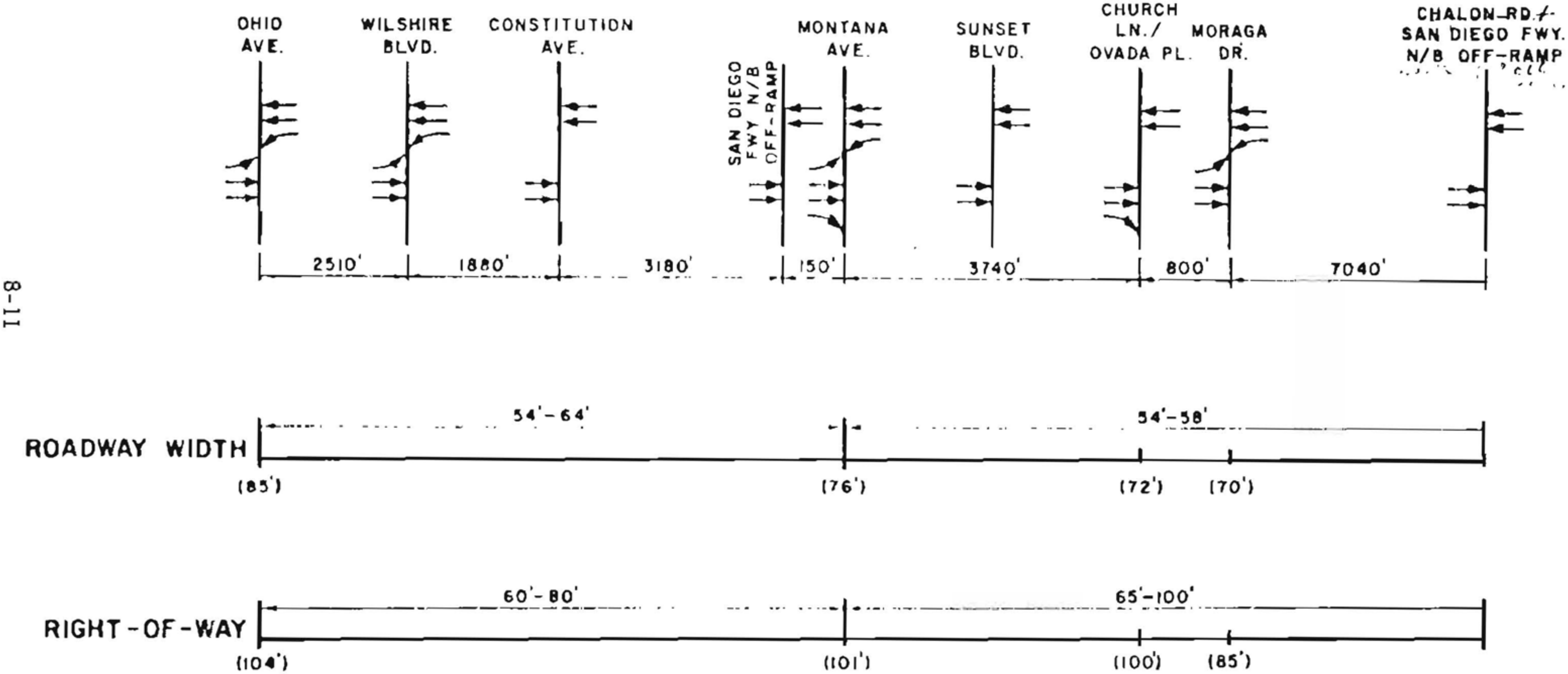
SEPULVEDA BOULEVARD

BETWEEN OHIO AVE. AND CHALON RD./ SAN DIEGO FWY. N/B OFF-RAMP



not to scale

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DEPARTMENT OF TRANSPORTATION
Donald R. Howery, General Manager

APPENDIX B
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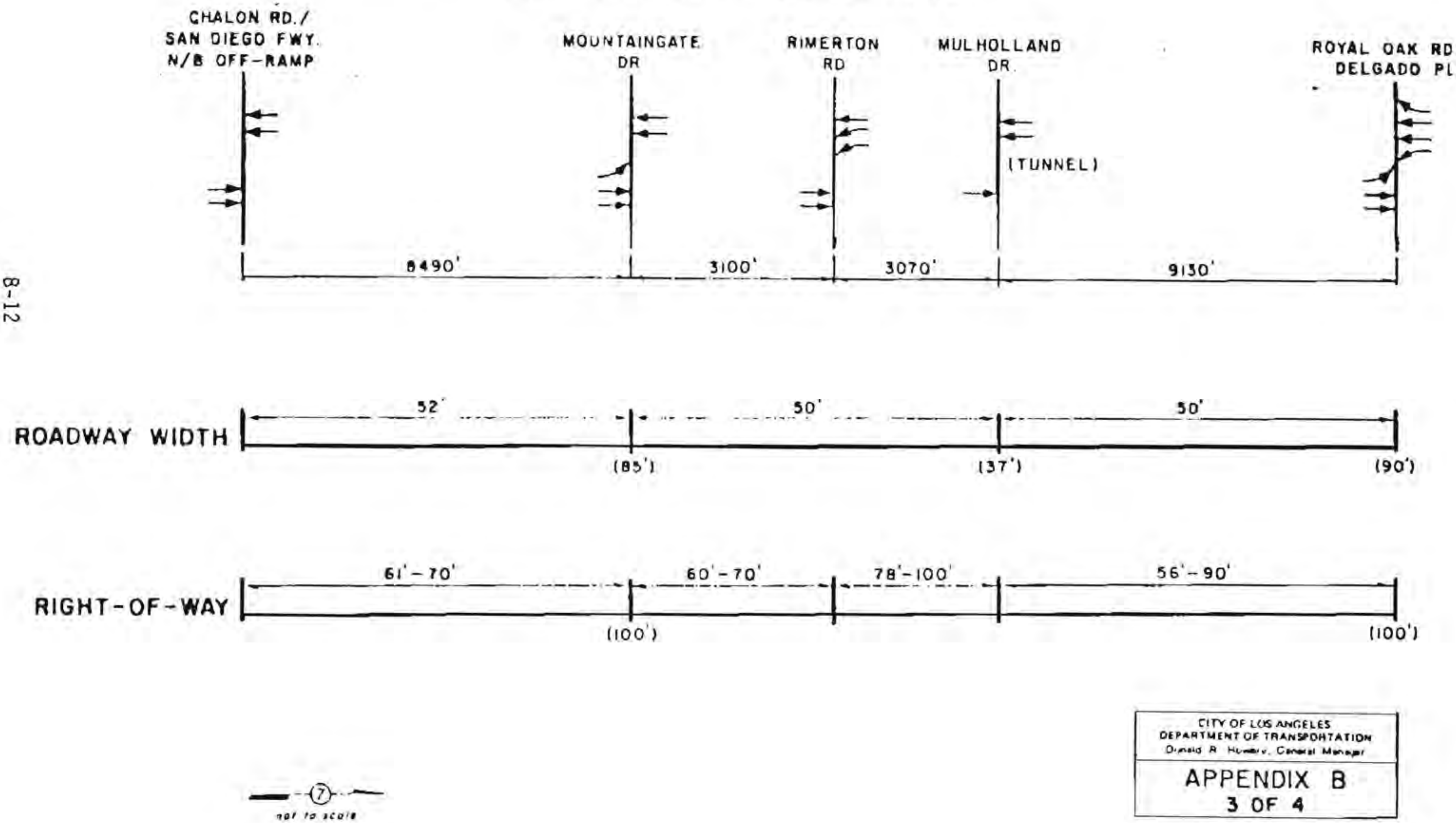
SEPULVEDA BOULEVARD

BETWEEN CHALON RD./SAN DIEGO FWY. N/B OFF-RAMP AND ROYAL OAK RD./DELGADO PL.



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CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
Donald R. Howery, General Manager

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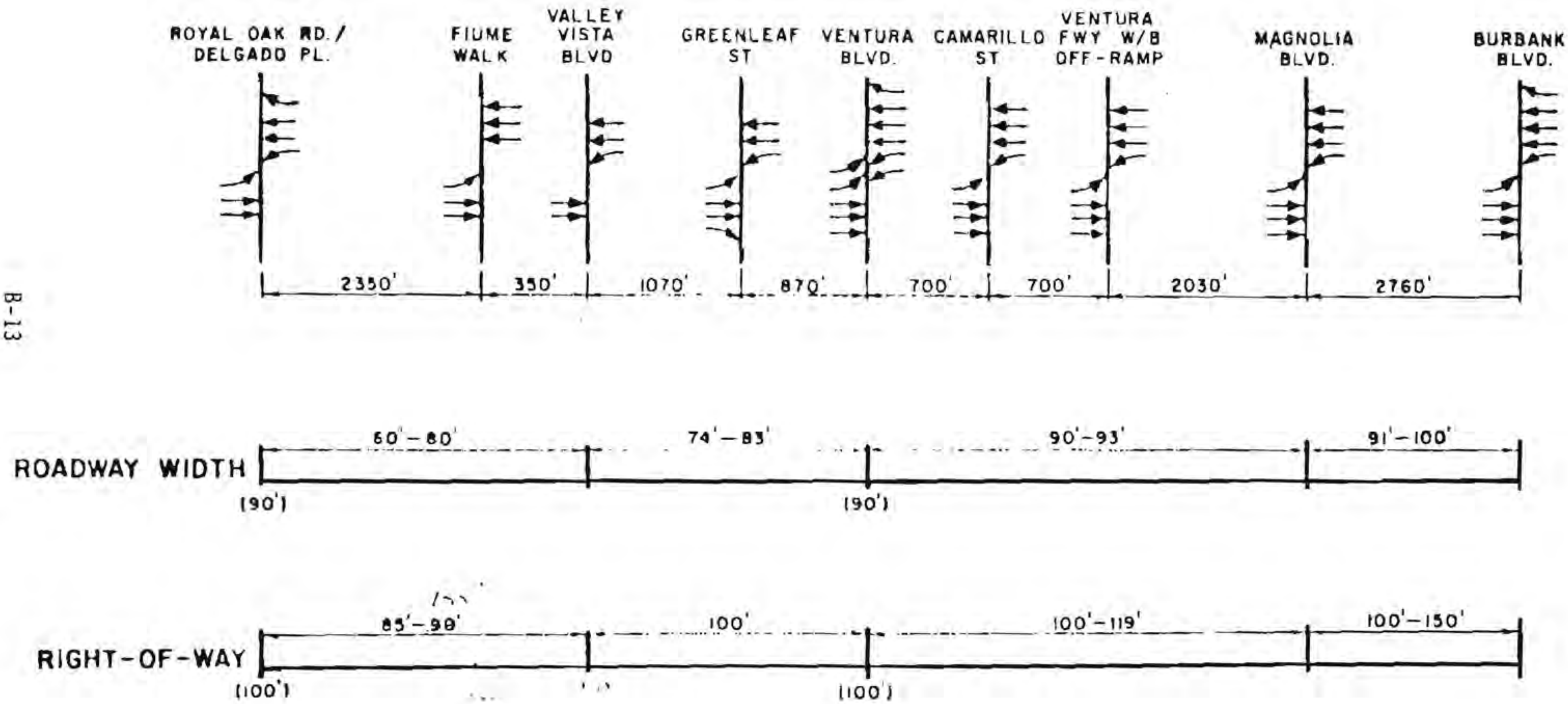
SEPULVEDA BOULEVARD

BETWEEN ROYAL OAK RD./DELGADO PL. AND BUBANK BLVD.



CITY OF LOS ANGELES
DEPARTMENT OF TRANSPORTATION
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APPENDEX C

APPENDIX C

GLOSSARY OF TERMS

Arterial	General term denoting a roadway primarily for through traffic, usually on a continuous route.
Auto Occupancy	The number of people occupying an automobile including driver and passengers.
Auxiliary Lane	A lane adjoining through traffic lanes which provides additional capacity and improved safety for speed changes, truck climbing, or other purposes supplementary to through traffic movement.
Annual Average Daily Traffic (Annual ADT)	Annual average daily traffic is the total traffic volume for the year divided by 365 days.
Bypass	A reserved traffic lane in a metered freeway ramp entry which permits buses or high-occupancy vehicles to bypass the ramp traffic control signal when entering the freeway.
California Transportation Commission (CTC)	The 11-member state commission charged with advising and assisting the Legislature and the Administration in formulating and evaluating state policies and plans for transportation programs in California.
Capacity Deficiency	A condition of a transportation corridor or facility in which the demand for service volume exceeds the ability of that corridor or facility to efficiently provide service.
Commuter Computer	Common name for the non-profit corporation, Commuter Transportation Services, Inc., which provides information and marketing services to aid the formation of ride sharing.

Corridor Planning	A study of transportation problems in a corridor, which examines short and long range solutions, evaluates highway and/or transit system options, and sets the parameters for a subsequent detailed Project Planning study.
Disincentives	Measures designed to discourage certain actions or behavior. These include: increased gasoline taxes, toll roads, congestion pricing, etc.
Demand Management	Implementing measures which encourage people to change their mode of travel or not to make a trip at all, e.g., ride-sharing, pricing incentives and disincentives, parking management, and telecommunications.
Federal Aid Interstate (FAI)	The national system of interstate and defense highways connecting principal metropolitan areas and industrial centers.
Federal Aid Primary (FAP)	A system of connected main roads which are important to interstate, statewide, and regional travel, consisting of rural arterial routes and their extensions into or through urban areas.
Federal Aid Urban (FAU)	A system of urban arterial and collector routes which serve major activity centers in urbanized areas and is confined to urban areas.
Fixed-Route Transit Service	Scheduled service operating repeatedly over the same street or highway pattern on a determined schedule.
General Aviation	All aircraft which are not commercial airlines, air-carrier aircraft or military aircraft.
Highflow Arterial	An arterial whose capacity and/or flow has been increased through the implementation of a variety of TSM and other strategies.
High-Occupancy Vehicle (HOV)	Motor vehicle occupied by two or more persons. Vehicles include automobiles, vans, buses, and taxis.

Incentives	Measures designed to encourage certain actions or behavior. These include inducements for the use of carpools, buses, and other high-occupancy vehicles in place of single-occupant automobile travel, e.g., HOV lanes, preferential parking, and financial incentives.
Infrastructure	The basic facilities, equipment, services, and installations needed for the growth and functioning of a community.
Level of Service	A measure (denoted by the letters, A, B, C, D, E, and F) of the congested level on a highway facility based primarily on the comparison between the facility's capacity and the traffic volume it carries.
Local Transportation Fund	Pool of funds from state sales tax established by SB 325 and SB 821 for local transportation purposes, e.g., community level bus system, bikeways.
Mixed Flow	Traffic movement having autos, trucks, buses, and motorcycles sharing traffic lanes.
Mobility	Mobility is a transportation system user characteristic. It refers to the ability of the user to take advantage of the available transportation services.
Mode	A means or method of conveyance, e.g., auto, transit, airplane, bicycle, bus, etc.
Mode Split	The proportion of total person-trips using various specified modes of transportation.
Operations Improvements	Regulation and control of the movement of traffic to expedite flow and reduce congestion. Techniques include signal synchronization and restriping to provide left turn lanes.
Paratransit	Those types of public transportation whose characteristics are between those of the private automobile and conventional scheduled transit, e.g., taxis, jitneys, dial-a-ride, carpools, vanpools, subscription bus service.

Park-and-Ride	A procedure that permits a patron to drive a car to a transit station, park in the area provided for that purpose, and ride the transit system to his or her destination.
Parking Management	Planned procedures whereby automobile parking in metropolitan areas is controlled or managed for purposes of controlling traffic, access, and mobility.
Peak Direction	The direction favored by the preponderance of traffic during the heaviest use period of the day.
Peak Period/Peak Hour Demand	The time of most intensive use of a service or facility. In terms of travel, generally there is a morning and an afternoon peak on the region's streets and highways.
Preferential Treatment	Privileged treatment for high-occupancy vehicles and buses in the use of traffic lanes, freeway lanes and entry ramps, parking facilities, and traffic control for the purpose of encouraging shifts to HOVs and buses.
Prop A (Proposition A)	A measure approved by the voters of L. A. County on November 4, 1980 to increase the sales tax by one-half cent for the purpose of improving public transit in the county and to construct rail rapid transit facilities.
Ramp Metering	Traffic signal control on an entry ramp to a freeway for regulating vehicle access.
Regional Development Guide/ SCAG-82 Modified	SCAG adopts forecasts of future population, housing, land use, and employment which modify current trends. These growth forecast policies then become the basis for planning, grant reviews, and sizing future public facilities.

Regional Transportation Improvement Program (RTIP)	A five year multimodal program of regional transportation improvements for highways, transit, and aviation. The RTIP consists of projects drawn from the Regional Transportation Plan. The projects are directed at improving the overall efficiency and people-moving capabilities of the existing transportation system while incrementally developing into the long-range plan.
Revenue Bond	Bonds whose principal and interest are payable exclusively from earnings of a public enterprise.
Screenline	Imaginary line drawn across single facilities or an entire corridor for analyzing numbers of trips in and out.
Section 5	The UMTA Act of 1964, as amended by the Urban Mass Transit Assistance Act of 1974, provides a six-year mass transportation assistance program (capital or operating assistance) for urbanized areas apportioned on the basis of a statutory formula.
System Management	Increasing the flow or travel on existing facilities through such improvements as ramp metering, signal synchronization, removal of on-street parking, and others. Improvements typically have a low capital cost, do not call for major construction, and can be implemented in a relatively short time frame.
Telecommunications	The conveyance of information by electronic means. Examples include the telephone, interactive cable facilities, computer networks, and video conference centers. The sharing of information via these channels is being recognized as an alternative to personal, physical tripmaking.
Traffic Signal Synchronization	A process by which a number of traffic signals are synchronized to affect efficient progression.

Transportation Corridor	A broad geographical band that follows a general directional flow connecting major sources of trips and that may contain a number of streets and highways and transit route alignments. The RTP identifies 27 corridors in the SCAG region.
Transportation Development Act (TDA)	A pool of funds from a 1/2% state sales tax established by SB 325 for local transportation purposes.
Value Capture Financing	The various measures and practices by which government raises funds to pay for public facilities and services from those who specially benefit from the facilities and services in question. Such funding is normally in proportion to the benefit conferred to each person or entity. These measures and practices are to be distinguished from taxation, which is general rather than specific (i.e., benefit related) in its application.
Vehicle Miles Traveled (VMT)	The total miles travelled by all vehicles in a particular geographic area, measured over a 24-hour period.