



U.S. Department
of Transportation

**Urban Mass
Transportation
Administration**

Headquarters

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400 7th Street S.W.
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AUG 15 1984

Dear Sir:

The Urban Mass Transportation Administration (UMTA) in cooperation with the Southern California Rapid Transit District (SCRITD) has prepared the enclosed Environmental Assessment to analyze the environmental impacts of a four-mile rail line running from Union Station, through downtown Los Angeles, and terminating at the intersection of Wilshire Boulevard and Alvarado Street. This is the downtown portion of SCRITD's proposed 18.6-mile Metro Rail subway which was the subject of a December, 1983, Final Environmental Impact Statement (EIS).

This four-mile rail line has been identified by SCRITD as an independently operating segment because there currently are insufficient Federal funds to construct either the 18.6- or 8.8-mile rail alternative evaluated in the Final EIS. This four-mile line is identical to the downtown portion of the longer rail alternatives except that the Wilshire/Alvarado Station is a terminal station. If a subway were to be built in the Wilshire Corridor, it may eventually extend beyond Alvarado Street. However, this segment must be evaluated as an independently operating unit because of the possibility that Alvarado may remain a terminal station.

The Environmental Assessment has been prepared to aid UMTA in determining the significance of the environmental effects of this project. Because most of the line has been previously evaluated in the Final EIS and remains unchanged, this assessment focuses on the project with a terminus at Wilshire/Alvarado.

The Environmental Assessment is being circulated to interested agencies and the public for a 30-day comment period. Written comments should be sent to: Mr. Nadeem Tahir at the Southern California Rapid Transit District, 425 South Main Street, Los Angeles, California 90013. A public hearing on the project will be held on AUG 30 1984 at 1 p.m. in the board room of SCRITD at the address given above.

UMTA will consider all substantive comments and, at the conclusion of the comment period, determine whether there are significant environmental effects which would require the preparation of a Supplemental EIS or whether a Finding of No Significant Impact can be made.

Sincerely,

Robert H. McManus
Robert H. McManus
Associate Administrator for
Grants Management

Enclosure

10021

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1. NEED FOR AND DESCRIPTION OF THE PROPOSED ACTION

1.1 Introduction

In December, 1983, the U.S. Department of Transportation/Urban Mass Transportation Administration (UMTA) and the Southern California Rapid Transit District (SCRTD) published a Final Environmental Impact Statement (FEIS) on the Los Angeles Rail Rapid Transit Project, Metro Rail. The FEIS described the impacts of 4 alternatives:

- (a) Locally Preferred Alternative (LPA) -- an 18.6 mile subway with 18 stations.
- (b) Subway Alternative With Aerial Segment (Aerial Option) -- an 18.6 mile subway and aerial alignment with 18 stations.
- (c) Minimum Operable Segment (MOS) -- an 8.8 mile subway with 12 stations.
- (d) No Project Alternative -- Continuation of existing bus service.

UMTA determined that it was unable to commit to the full 18.6 mile system or the 8.8 mile system. Because of budget constraints and authorization legislation that prohibits committing federal funds past Fiscal Year 1986, UMTA has requested that SCRTD define a project that could be funded within the current authorization limits. SCRTD has proposed to UMTA a 4-mile, 5-station rail line (MOS-1) extending from the yard and shop facility to the Wilshire/Alvarado Station as an initial segment for funding purposes.

Because of continuing uncertainty of federal capital funds, this analysis has been undertaken to ensure that the 4-mile project would be an independent operable segment. Additionally, the SCRTD will address other operable segments in subsequent environmental documents.

Subsequent to completion of the FEIS, UMTA awarded the SCRTD a grant to proceed with final design for a rail project in the Wilshire corridor. This grant also includes funds for land acquisition in the Central Business District.

This Environmental Assessment (EA) is being prepared to document the impacts of the 4-mile line, particularly the impacts of a terminal at Wilshire/Alvarado and the cost and patronage implications. This document considers two alternatives: the 4-mile line and the No Project Alternative. The EA is required because the 4-mile line was not one of the alternatives included in the Final Environmental Impact Statement (FEIS). This EA will be available for public review and comment for a period of 30 days. After that period, UMTA will either make a formal "Finding of No Significant Impact", which declares that the MOS-1 would have no significant impacts that have not been covered already by the FEIS, or will require the preparation of a Supplemental Environmental Impact Statement. This EA also serves as an "Initial Study" in accordance with the requirements of the California Environmental Quality Act. After the 30 day circulation of this report, the SCRTD Board will consider adoption of a proposed Negative Declaration.

1.2 Need For and Objectives of The Project

The FEIS listed three key reasons why rail transit is needed in the Regional Core of the Los Angeles area (Figure 1-1). As stated in the FEIS, the purposes of the 18.6 mile Locally Preferred Alternative were to: (1) improve accessibility and mobility; (2) support land use and development goals; and (3) carry out the public mandate for rail transit in the region (see the FEIS for details). As a component of the full LPA, the MOS-1 is a necessary initial step in meeting these objectives. However, because of the shorter length of the line and lower patronage, the 4-mile line cannot achieve the same level of benefit projected for the 18.6-mile LPA.

1.3 Description of the Proposed Action

In this section, the 4 mile (Metro Rail Project: Yards and shops near Union Station to Wilshire/Alvarado Station) MOS-1 is described.

1.3.1 Route Description and Alignment

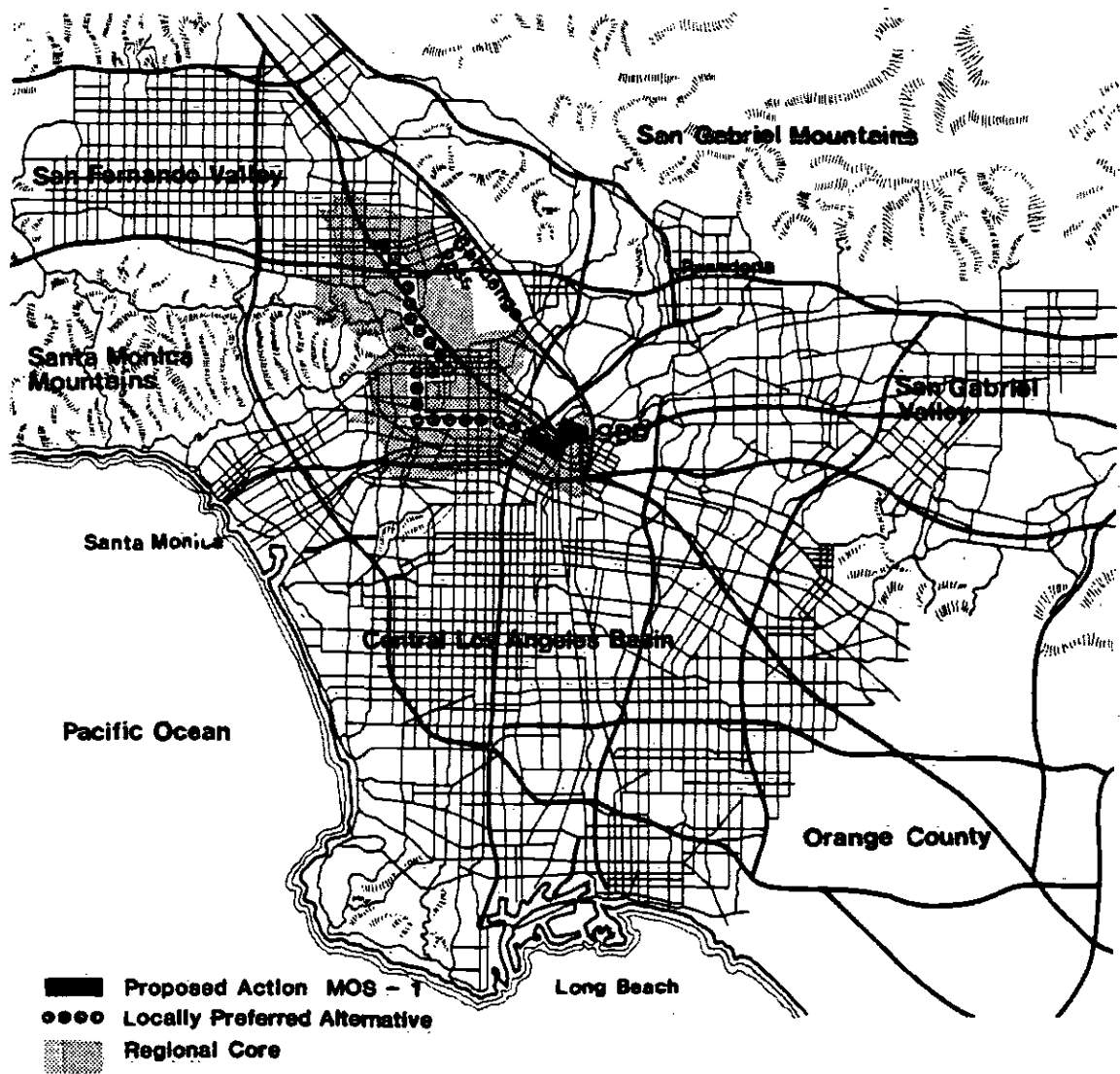
The rail rapid transit route will contain five stations (Figure 1-2). The route begins at Union Station, where it turns northwest and runs through the CBD along Hill Street. Turning on Seventh Street, the route heads toward the west side of downtown, past the Harbor Freeway, and continues to the Wilshire/Alvarado Station where crossover tracks would be constructed just east of the station to provide operational feasibility.

The rail line is proposed as a subway system, with virtually all line segments tunneled by tunnel boring machines and stations excavated from street level by cut-and-cover construction techniques. Plans and profiles are shown in Figures 1-3 through 1-6.

1.3.2 Stations

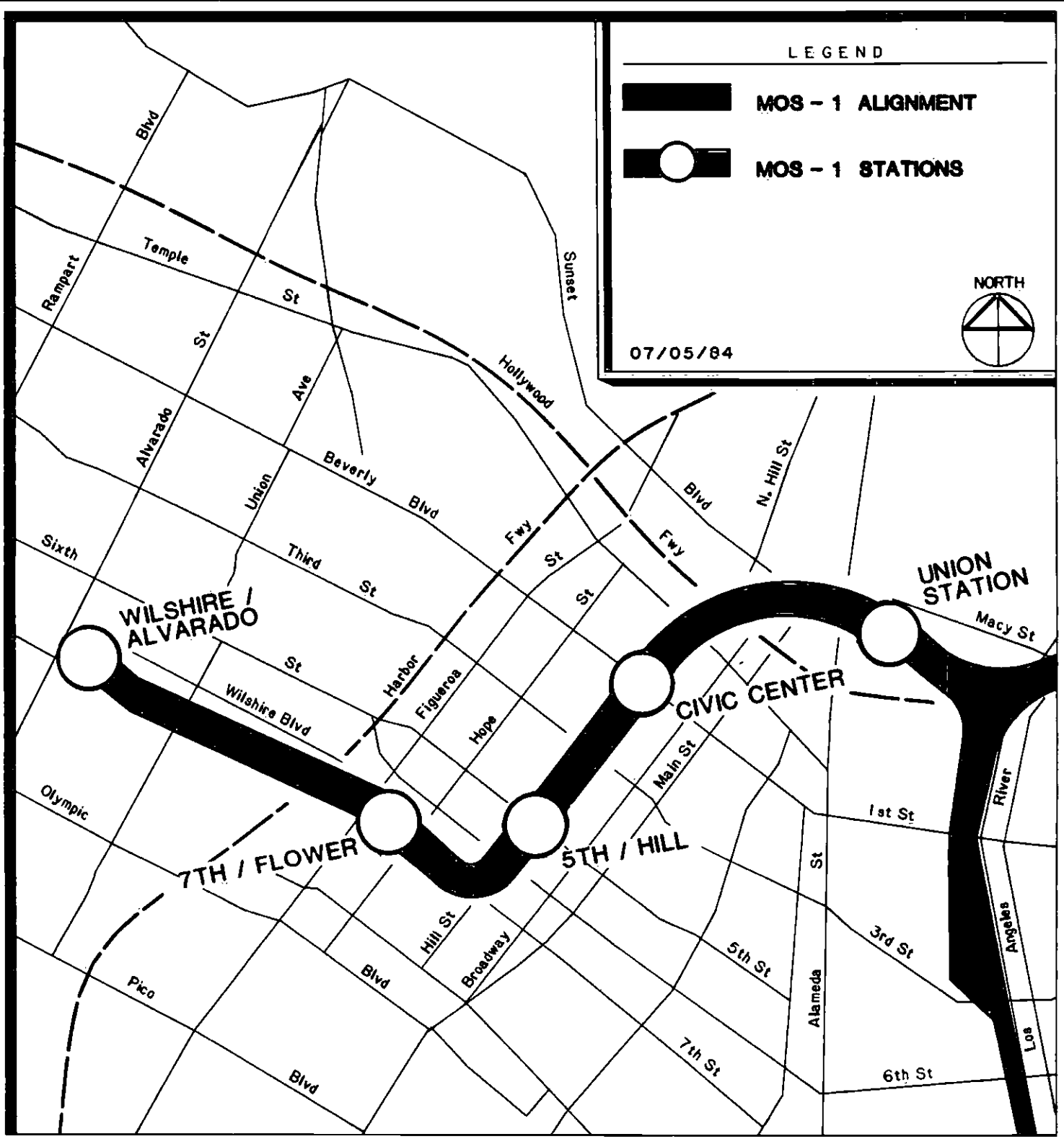
The following discussion describes some of the components and features of station design. A detailed presentation can be found in SCRTO's Milestone 10 Report: Fixed Facilities.

1.3.2.1 Platform. Station loading platforms would be approximately 450 feet long to accommodate trains consisting of six, 75-foot-long cars. The platform size is based on the ultimate system design capacity (generally thought of as being reached about 20 years after system opening) and provides for the safe and efficient circulation of passengers. Platforms are "center" type, with a single platform flanked by the two tracks, or "side" type, with the tracks between two platforms.



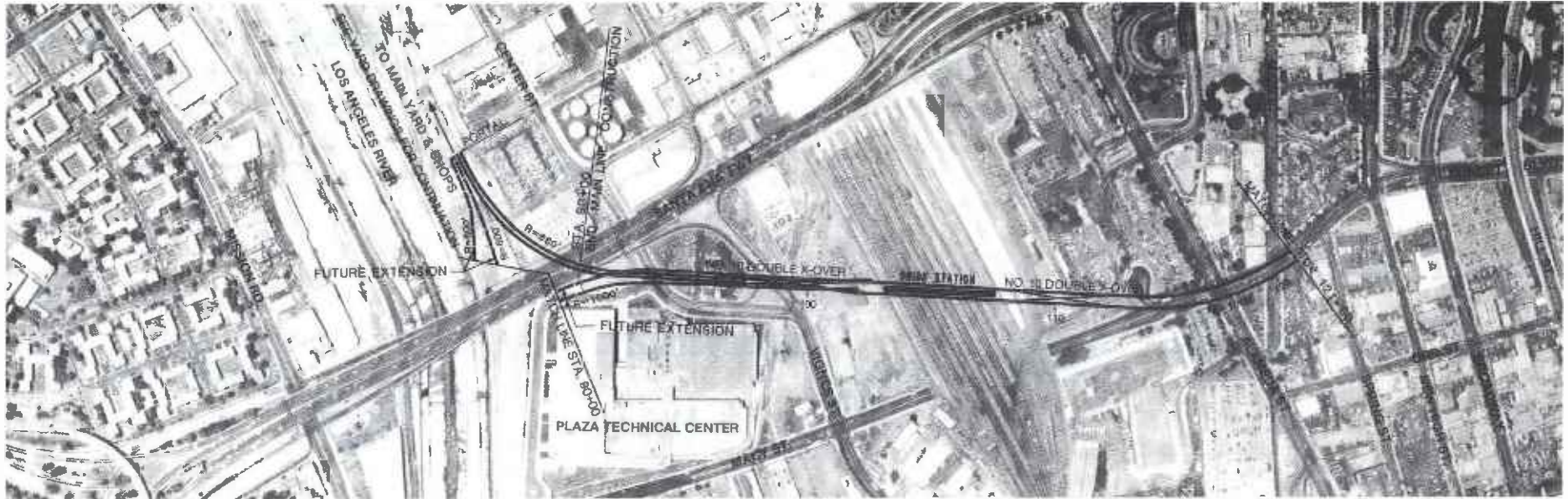
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Figure 1-1
Regional Setting

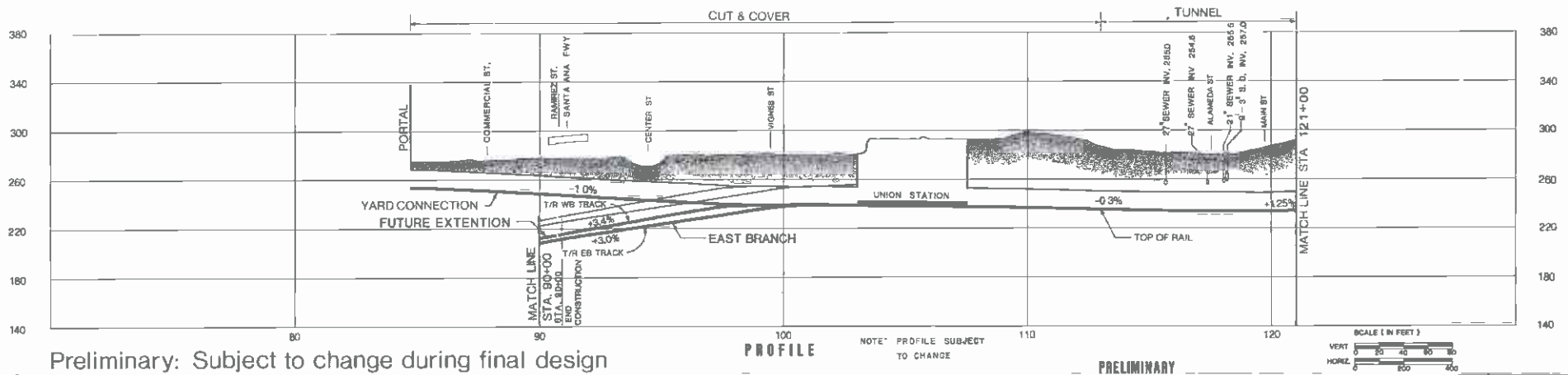


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**Figure 1-2 MOS-1
 Alignment & Stations**



PLAN

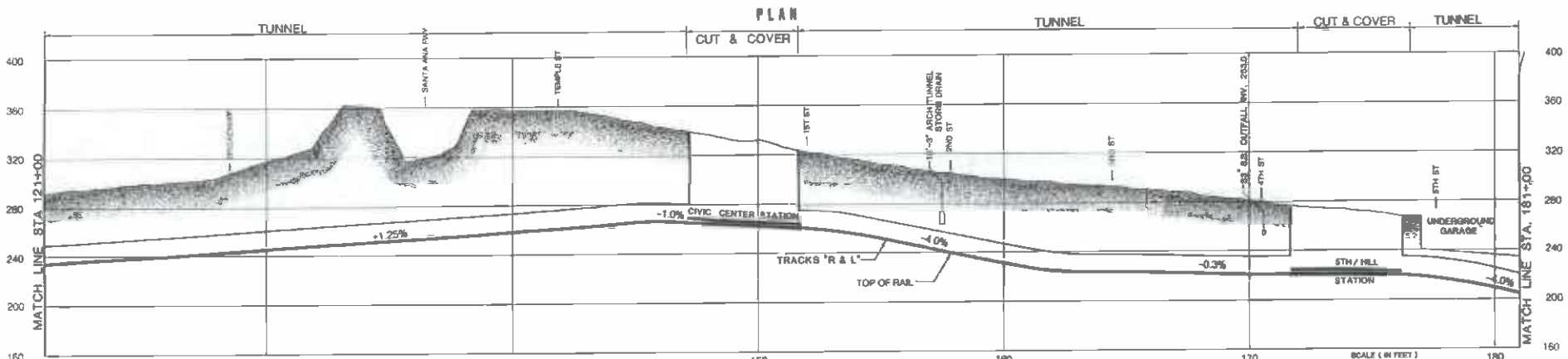


Preliminary: Subject to change during final design

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Figure 1-3 Alignment for MOS-1 Alternative
 Union Station to the Santa Ana Freeway

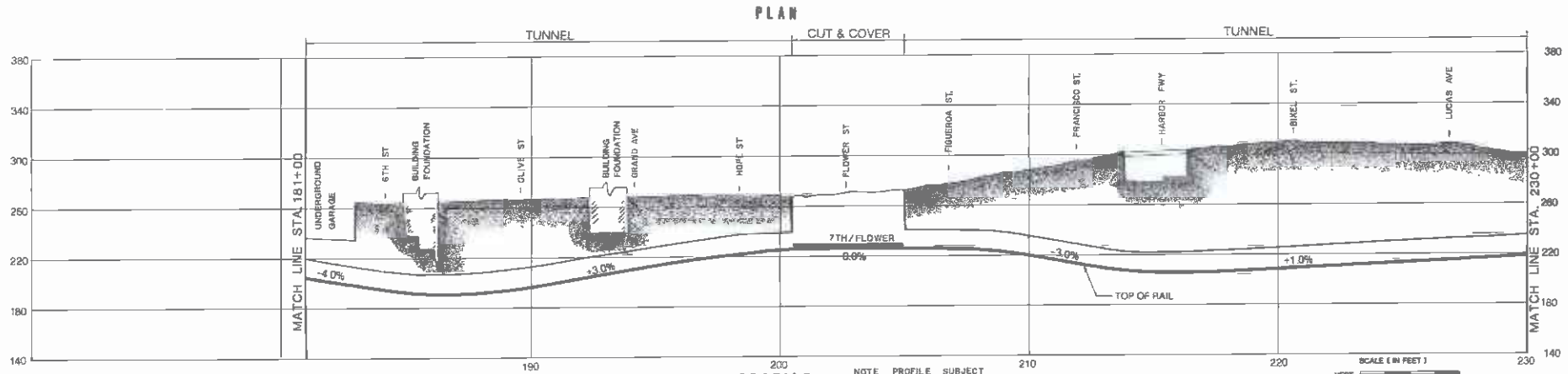


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Figure 1-4 Alignment for MOS-1 Alternative
 5th Street to Spring Street



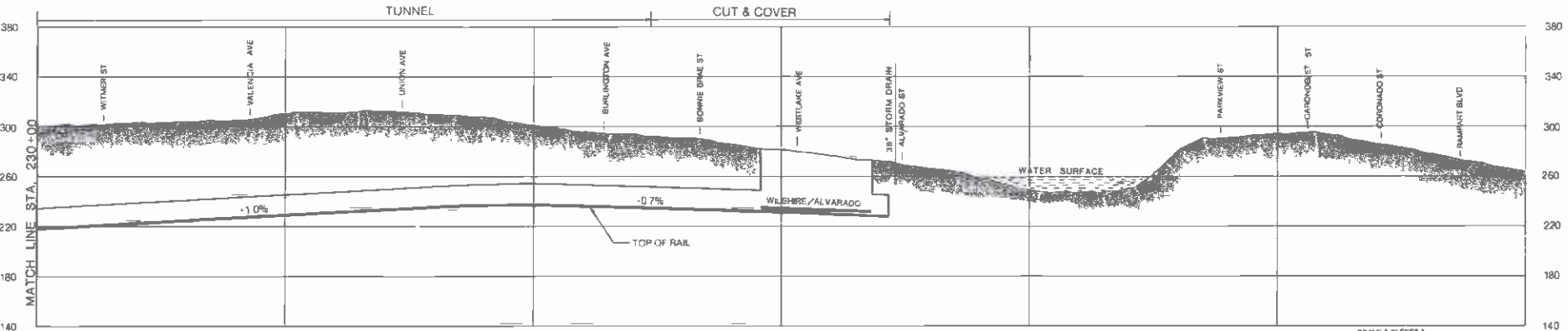
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**Figure 1-5 Alignment for MOS-1 Alternative
 5th Street To Lucas Avenue**



PLAN



PROFILE

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**Figure 1-6 Alignment for MOS -1 Alternative
 Lucas Avenue To Alvarado Street**

1.3.2.2 Entrance. Plaza entrances and entrances within existing or planned developments are favored. Where such off-street entrances are not possible, on-street entrances leading directly from the sidewalk to the fare collection area are proposed.

1.3.2.3 Mezzanine/Concourse. This is the transition area between the entrance to the station and the train loading platform. This area is between the street surface and the platform(s), where it is called a mezzanine, or at street level, where it is called a concourse. The mezzanine/concourse provides space for various functions and typically includes the entire fare collection process, direction and information signs, and amenities for patrons' needs and comforts. The space that patrons enter before ticketing is designated a "free" area, and the space after ticketing is designated a "paid" area.

1.3.2.4 Architectural Design. Certain station elements will be standardized for economy and ease of use and to establish an identity for the system as a whole. Escalators, stairs, and elevators connect access points to fare collection areas and train platforms. All stations will have appropriate lighting and ventilation.

1.3.2.5 Fare Collection. This subsystem deals with the collection of fares from passengers as well as the provision of change and tickets. Locations and types of fare collection areas vary at individual stations. The quantity of equipment at individual stations will vary according to patronage projections for that station, and arrangements may vary as a function of site specific mezzanine and station entrance configurations. A barrier-type ticketing system is to be used for the Metro Rail transit project.

1.3.2.6 Parking. At various rail transit station locations, two types of parking are to be provided as may be appropriate:

(a) Drop-off and pick-up of patrons by auto (termed "kiss-and-ride") requiring only a small amount of space for temporary parking.

(b) "Park-and-ride" locations providing long-term parking where a significant number of patrons are expected to drive themselves to the station. This will consist of surface parking lots and will be provided at Union Station in the MOS-1.

1.3.2.7 Bus Access. An important criterion in the location of stations is their proximity to major bus routes that provide feeder service. Bus access is provided either at

off-street loading platforms or on-street bus bays. An off-street facility is planned for Union Station. This will include separate areas for passenger boarding/alighting and bus layover and will be used in most cases by buses terminating at the station. On-street bus bays, or turnouts, will be provided adjacent to two stations and will generally be used by buses not terminating at the stations. Bus access facilities are described in Table 1-1.

TABLE 1-1
SUMMARY OF STATION ACCESS FEATURES

Station	Right-of-Way Location	Bus Facilities (spaces)		Auto Facilities (spaces)	
		Off-Street ¹	On-Street Turnout	Park & Ride ²	Passenger Drop-off/ ³ Pick-up
Union Station	Off-street	27 + 20	--	300/2,500	--
Civic Center	Hill	--	Hill	--	--
Fifth/Hill	Hill	--	--	--	--
Seventh/Flower	Seventh	--	--	--	--
Wilshire/Alvarado	Off-street	--	Alvarado & Westlake	--	26

Source: SCRTD, Milestone 10 Report: Fixed Facilities 1983.

Note: Bicycle racks or lockers will be provided at the Union and Wilshire/Alvarado Stations.

¹Bus capacities shown are (de) boarding and layover locations, respectively.

²Park and ride capacities shown are surface-only initially, with structures to be built later.

³Also referred to as kiss and ride.

1.3.2.8 Bicycle Access. Bicycle racks or lockers for bicycles are provided at the Union Station and Wilshire/Alvarado stations.

1.3.2.9 Equipment Spaces. These facilities house the equipment required to operate and maintain the station. The facilities include electrical distribution rooms, fan rooms,

and traction power substations that supply power to propel the passenger trains, as well as rooms for more general purpose functions such as trash collection. Equipment spaces would generally be located at mezzanine level beyond the public areas.

1.3.2.10 Station Locations. Station locations and design characteristics for the MOS-1, with a selected rendering, are shown in Figures 1-7 through 1-12. Special provisions for Rail-Bus interface activities at the Wilshire/Alvarado station are presented in Figure 1-13. These modifications are to be implemented to provide for terminal activities for the MOS-1. Like the plans and profiles, these station plans are subject to change during Final Design.

1.3.3 Yards and Shops

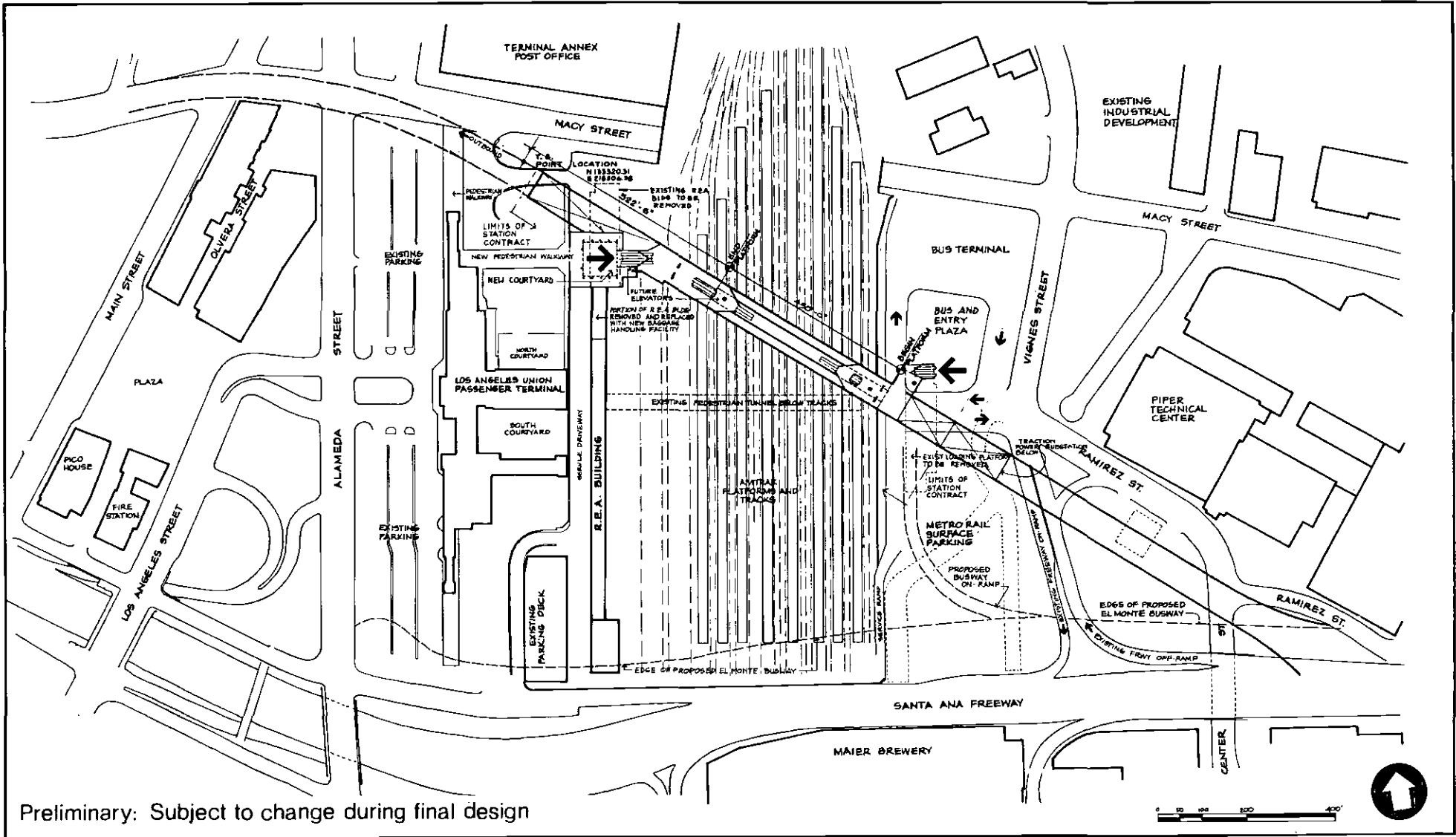
A 45-acre major repair shop and storage yard is proposed in the downtown industrial area (Figure 1-14). The yards and shops provide space for the following functions: storage of trains when not in mainline service; dispatch, receipt, and change in trains for mainline service; interior and exterior cleaning of trains; preventive and corrective maintenance of cars; and testing of cars before revenue service and after major repairs.

1.3.4 Subsystems

Subsystems involve the operating equipment portions of the rail transit project including passenger vehicles, train control, communications, traction power, and fare collection. The following discussion covers train control, communication, and traction power only, since the other subsystems have already been described.

1.3.4.1 Train Control. MOS-1 would be controlled automatically and manually. The Central Control Facility would be located in the main shop building at the systems yard facility. The facility would house the necessary displays, control consoles, communication apparatus, and operating personnel responsible for the overall safety and security of passengers, and for the daily operation of trains, stations, and all supporting wayside apparatus. Central Control would serve as the focal point from which all MOS-1 operations would be supervised. Automated train controls would be installed to ensure train protection.

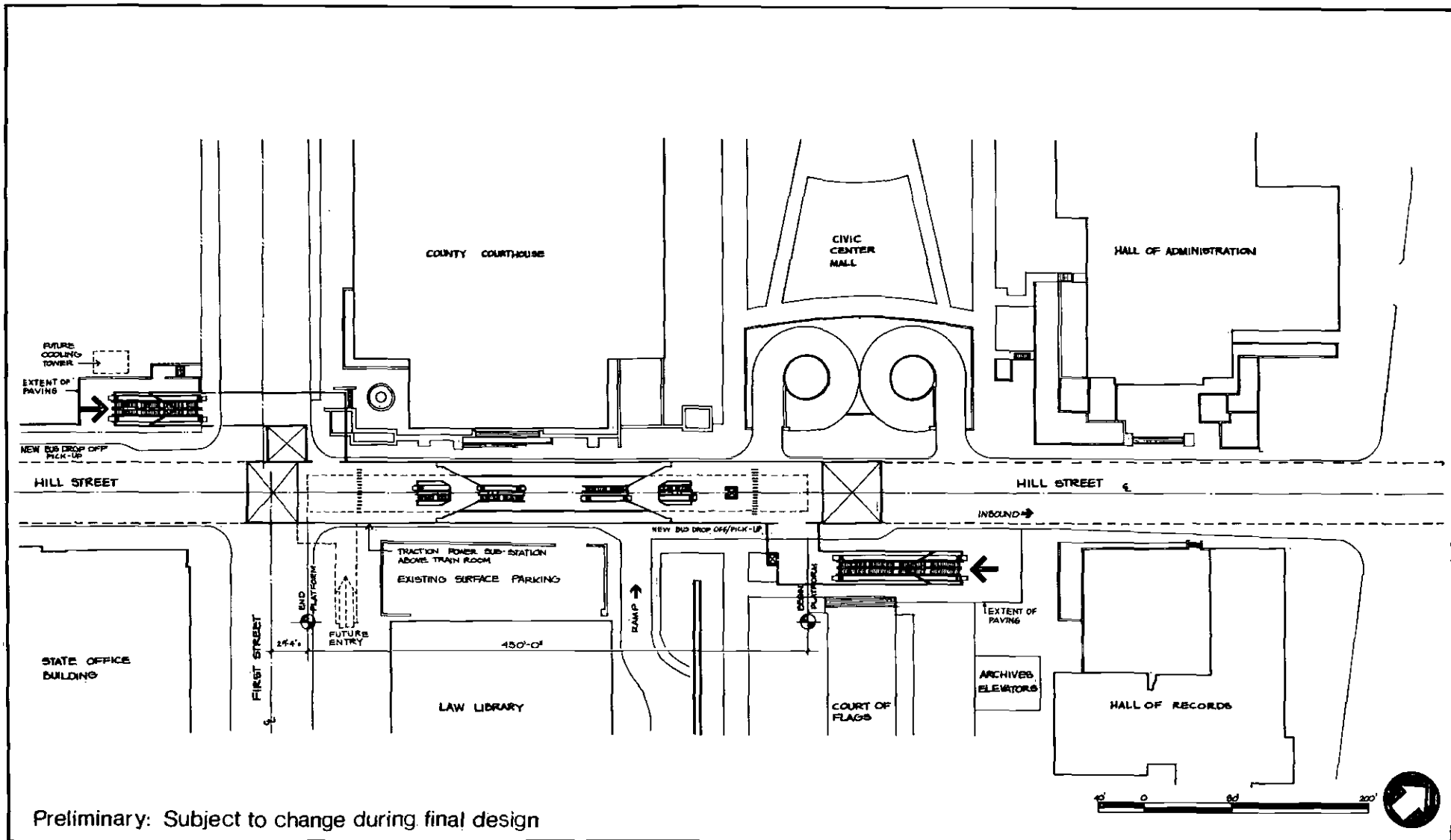
1.3.4.2 Communications. The communications subsystems would convey information among management, operations, maintenance, and security personnel, and to transit patrons. The communications subsystems include the following services:



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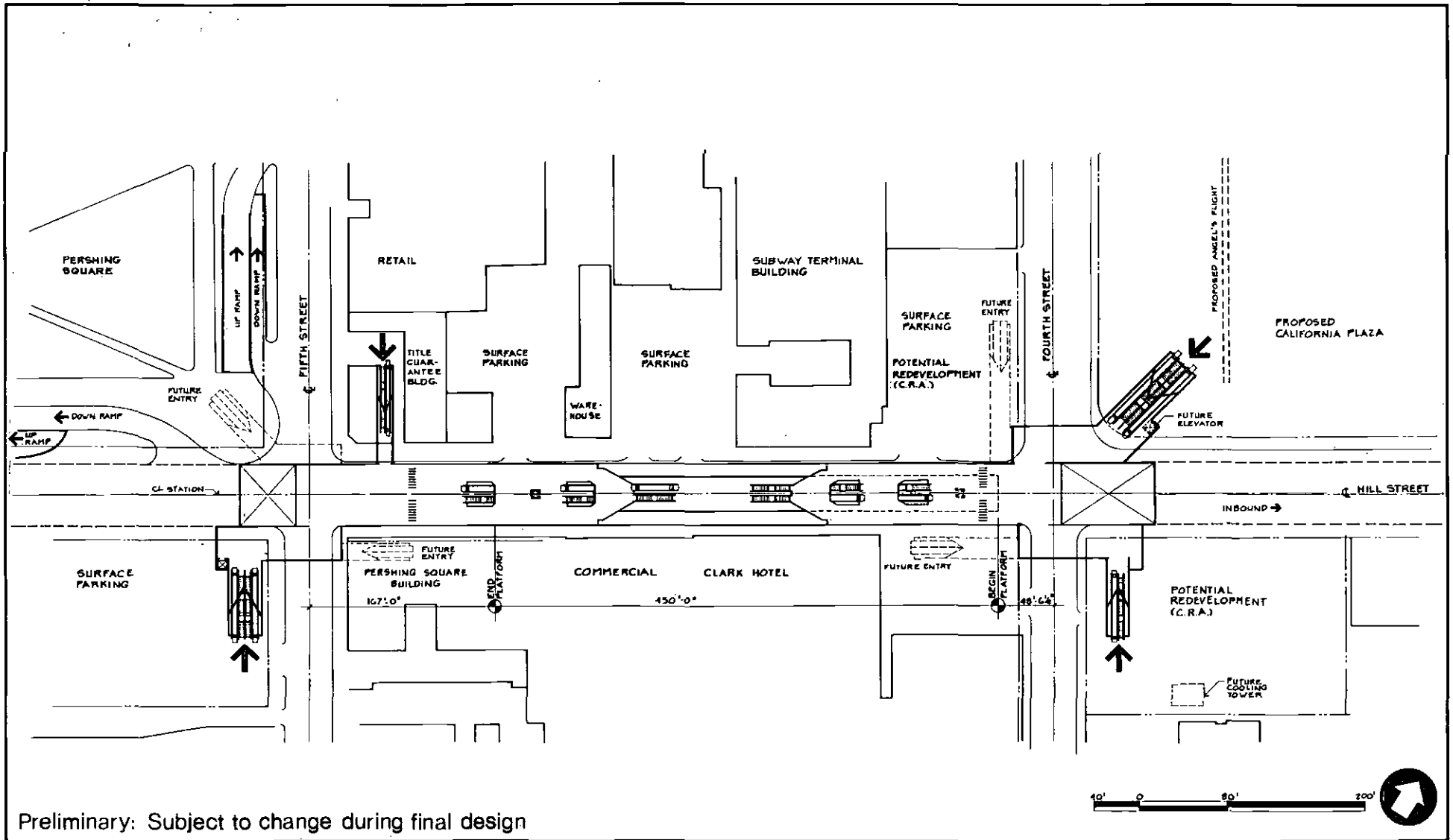
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Figure 1-7 Union Station - Station Location for MOS -1 Alternative



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Figure 1-8 Civic Center - Station Location for MOS -1 Alternative



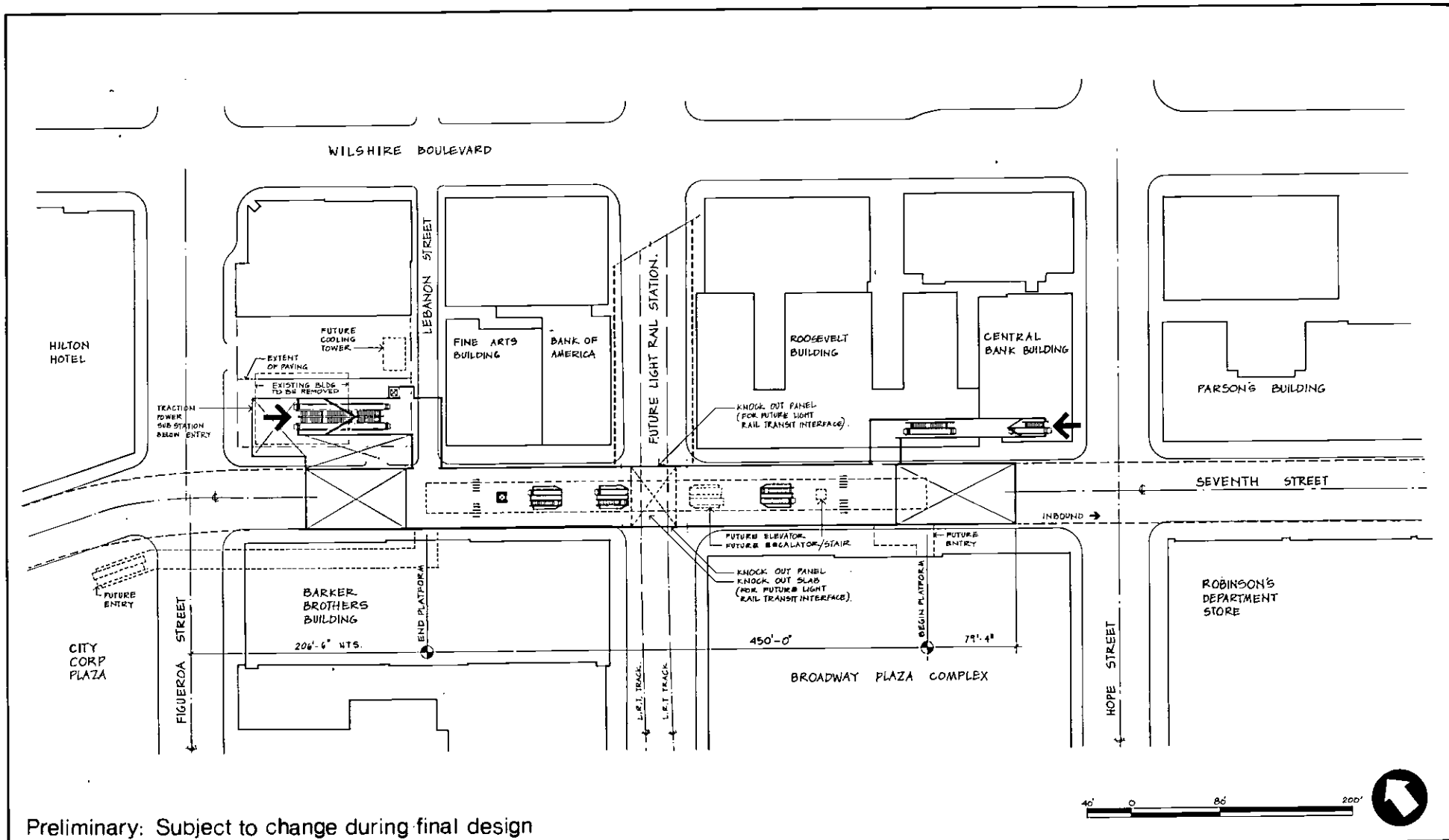
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Figure 1-9 Fifth/Hill - Station Location for MOS -1 Alternative



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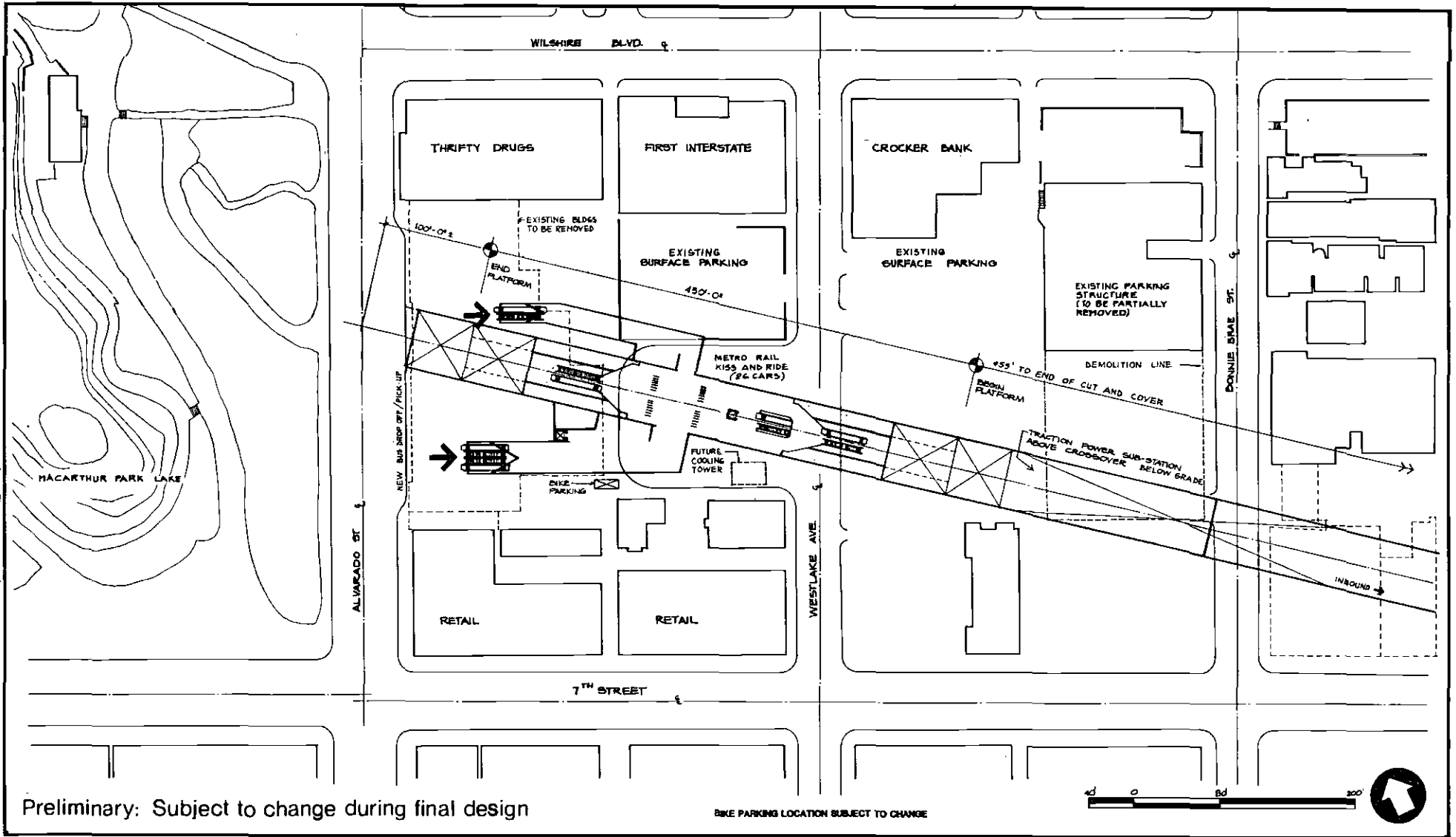
Figure 1-10 Fifth/Hill Station
Cutaway Looking West



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Figure 1-11 7th/Flower - Station Location for MOS -1 Alternative

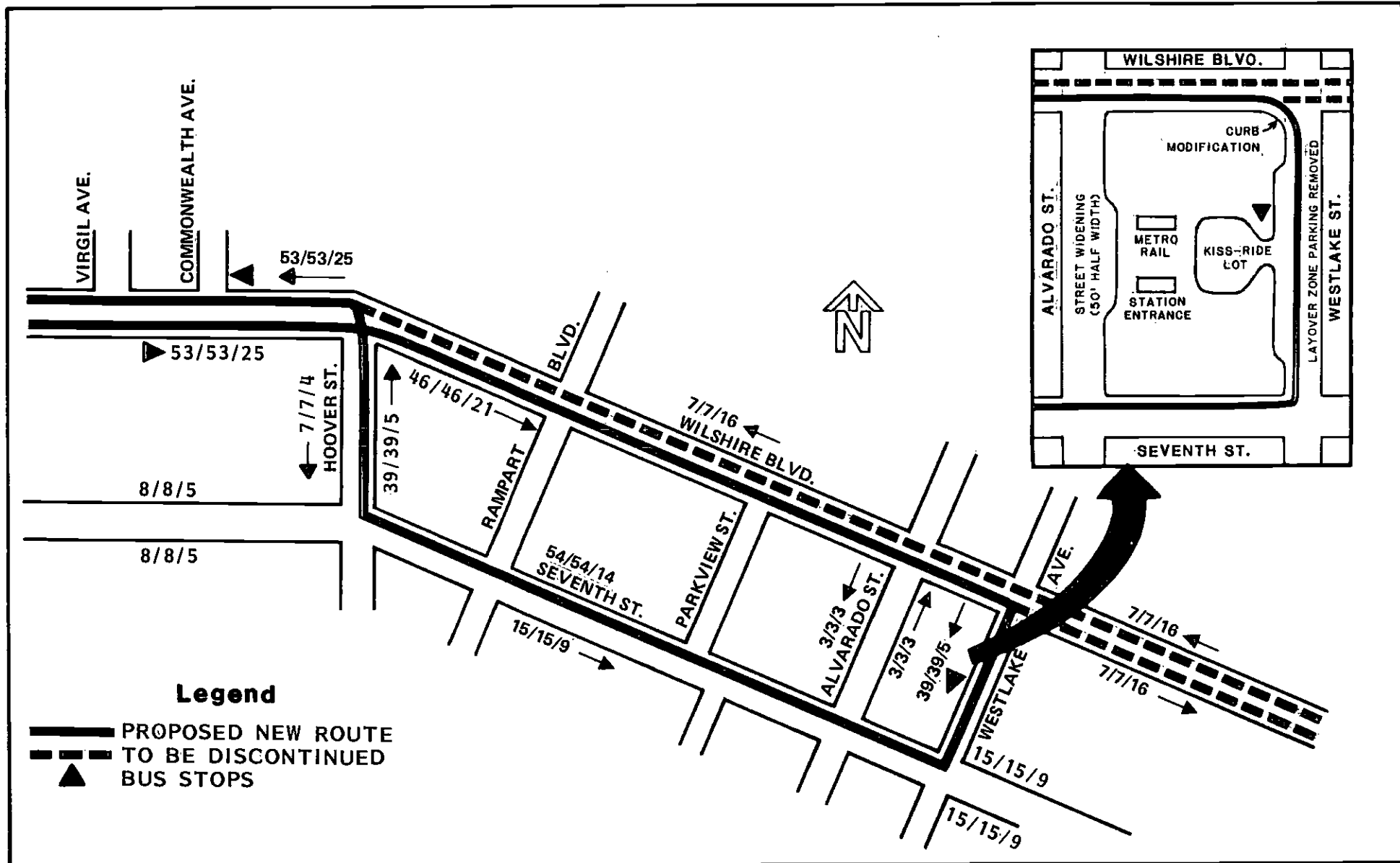
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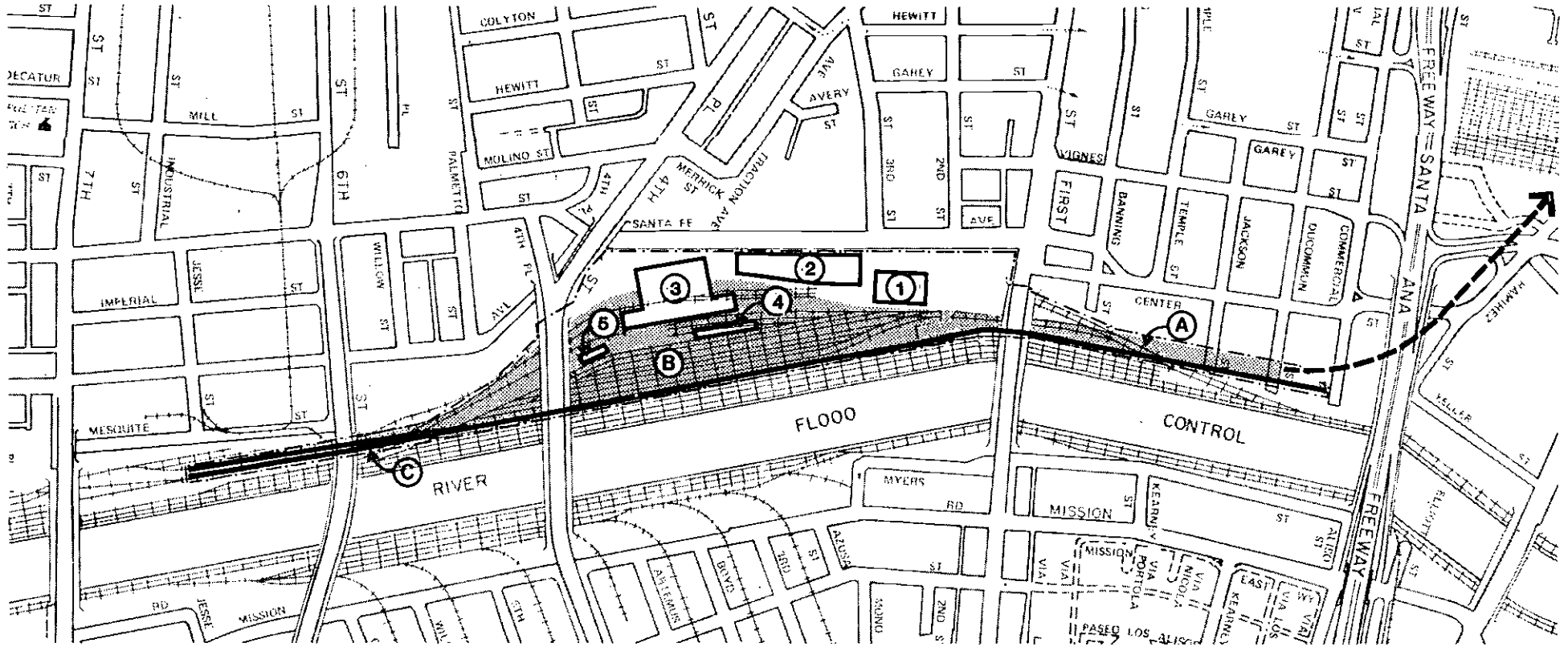




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Figure 1-12

**Wilshire/Alvarado - Station
 Location for MOS -1 Alternative**





- | | |
|--|---|
|  Proposed Locations for Buildings and Parking |  Proposed Locations for Tracks |
| ① Maintenance of Way Shop | ④ Car Washing Facility |
| ② Parking | ⑤ Car Cleaner's Building |
| ③ Main Shop Building | Ⓐ Transfer Zone |
| | Ⓑ Storage Yard |
| | Ⓒ Tail Track and Test Track |



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(a) Radio service between various areas for operations and maintenance, security, and emergency needs;

(b) Telephone services, including direct line emergency, administrative, maintenance, and public telephone service;

(c) Public address and intercommunication systems services within the passenger stations;

(d) Closed circuit television surveillance at passenger stations;

(e) Transmission via wire and cable to carry communications between the stations and Central Control.

1.3.4.3 Traction Power. The traction power system provides power to the passenger vehicles. Substations along the route would convert the higher commercial AC voltage to the lower DC voltage (600-750 volts) used by the trains. From the substations, the energy would be transferred to the third rail that supplies power to the train. Components of the traction power subsystem include transformers, rectifiers, switches, and circuit breakers.

1.3.5 Operating Characteristics

The MOS-1 will use proven two-track, steel wheel, steel rail components. Operating characteristics of the MOS-1 are based on an analysis of hours of operation, train size, vehicle loading, duration of each station stop (dwell time), and average operating speed.

1.3.5.1 Patronage. Under the MOS-1, it is estimated that 55,000 passengers will board the rail system daily during the year 2000. However, with the addition of the rail line and bus service improvements, bus ridership would also increase for the region.

Under the MOS-1, daily transit ridership for the region increases to 1,719,000 linked transit trips. A linked trip is defined as a trip from the point of origin to the final destination, regardless of the number of vehicles used (transfers); whereas each vehicle used or bus boarding is considered an unlinked trip.

Other transit operators in the region (non-SCRTD) would be required to reduce a total of 3 buses to the peak vehicle requirements to meet demand. The rail line offers the

potential for a considerable increase in the productivity of buses, with respect to patronage per peak vehicle. The total peak vehicle fleet for all operators in the region is 173 buses lower under MOS-1.

Table 1-2 shows the mode of arrival at the stations of the MOS-1. In total, 64.8 percent of station arrivals come by bus, 15.4 percent come on foot, 11.4 percent are driven to the station (kiss-and-ride), and 8.4 percent park at Union Station and ride.

1.3.5.2 Hours of Operation. The operating characteristics described here assume a 20-hour day, Monday to Friday, plus modified weekend rail service for purposes of estimating fleet size, operating costs, and other system information. The 20-hour day allows a regular period for maintaining the tracks and other parts of the system. Table 1-3 shows the proposed hours of rail operation during the week and the frequency of rail service.

1.3.5.3 Estimated Travel Time. For the MOS-1, a one-way trip from Wilshire/Alvarado Station to Union Station would take about 7 minutes. A round trip requiring two turn-arounds of three minutes each could be made in 20 minutes.

1.3.5.4 Train Size and Fleet. The proposed MOS-1 train size is four cars, with each car approximately 75 feet long. This train size will provide the required peak capacity to carry projected passenger demand with about 5 minutes between trains. A fleet of 30 cars will be required initially. This fleet size includes vehicles needed for revenue service plus those vehicles required for standby, maintenance, etc.

1.3.5.5 Vehicle Loading. The peak passenger load planned per car over the heaviest link during the peak 20 minutes is 94 passengers. This loading standard is based on a 5-minute headway and provides capacity for 76 seated passengers plus 3.3 square feet per standing passenger which will accommodate 94 standees. This permits standing comfort and free movement within the car. Any degree of passenger turnover at stations near the heaviest link means that few passengers would have to stand for more than one station during the peak 20-minutes.

1.3.5.6 Buses. The MOS-1 has a peak-vehicle requirement of 2051 buses (for the SCRTD) in the Year 2000. A smaller bus fleet will be required for years prior to 2000, but the Year 2000 fleet size is used in this Environmental Assessment for consistency with the FEIS. This fleet has been constrained by the operating capacity of the streets (including those with bus lanes) in the Los Angeles CBD.

TABLE 1-2
 RAIL BOARDINGS BY STATION AND MODE OF ARRIVAL
 MINIMUM OPERABLE SEGMENT - 1
 YEAR 2000

STATION	WALK	BUS	KISS/RIDE	PARK/RIDE	TOTAL
Union Station	571	5,046	2,566	4,971	13,154
Civic Center	432	6,567	-	-	6,999
5th & Hill	1,633	6,541	-	-	8,174
7th & Flower	2,270	8,413	-	-	10,683
Wilshire/Alvarado	3,539	8,585	3,670	-	15,793
TOTAL	8,455	35,486	6,236	4,971	54,803

Source: SCRTD, 1984

TABLE 1-3
 SERVICE FREQUENCY
 MINIMUM OPERABLE SEGMENT - 1

WEEKDAYS ⁽¹⁾	PERIOD	MAXIMUM SCHEDULED HEADWAY (MIN.)	NUMBER OF CARS PER TRAIN
EARLY Morning	5:00 A.M. - 6:30 A.M.	10	4
AM - Peak	6:30 a.m. - 8:30 a.m.	5	4
Midday	8:30 a.m. - 3:30 p.m.	10	2
PM - Peak	3:30 p.m. - 5:30 p.m.	5	4
Evening	5:30 p.m. - 8:00 p.m.	10	4
Late Evening	8:00 p.m. - 1:00 a.m.	15	4

(1) Weekend Service: 20 hours per day, 30 minute headways.

Source: SCRTD, 1984

1.3.6 Costs

Capital and operating costs are presented in this section. The most general cost estimate is the concept level, which uses basic unit costs for typical sections. These estimates have been refined from that level. The estimates presented here for the MOS-1 include a 15 percent design contingency for facilities, a 10 percent contingency for systems, and an allowance for uncertainties during subsequent engineering design work. The need for this factor diminishes as design progresses to the final stages. Cost estimates for the bus support system also are included.

1.3.6.1 Capital Costs. Capital costs are presented in 1983 base year dollars and in escalated dollars (considering inflation). The escalated capital costs of the project are determined by escalating each design construction contract to its midpoint. This midpoint of design/constructive contract ranges from 1985 for the first contract unit to 1989 for the last contract unit. Capital costs are investments for the design and construction of permanent facilities and procurement of equipment required for the operation and maintenance of the rail rapid transit system.

Each major cost item is presented in Table 1-4 and is described here. The estimated total cost for the rail portion of the MOS-1 is \$853,796,000 in constant 1983 dollars and \$1.17 billion in escalated dollars.

Facilities costs include all structures necessary to support, store, and dispatch the transit vehicle. Facilities include guideways, stations, yards and shops, and trackwork. Guideways and stations costs include the basic heavy construction for the transit line and station facilities, and all structures necessary to support the transit vehicle, such as line structures, station shells, yards, and shop buildings. Central Control Facility and Main Yard costs include the facilities necessary for the storage and dispatch of rail vehicles and the control tower, from which all movement within the yard would be directed. Trackwork cost items include procurement and installation of the running rails and turnouts, crossovers, track fasteners, ties, and ballast. These are the facilities required for the vehicles to respond to the command-and-control system and to follow the guideway. Utilities cost items account for utilities within construction sites that must be temporarily or permanently relocated, or supported in place and maintained. The estimate includes work on storm and sanitary sewers; water, gas, and steam lines; electric duct lines for power, telephone, telegraph, traffic lights, police, and fire; manholes; catch basins and storm drains; and overhead power and utility lines. Parking costs cover various SCRTD-provided parking facilities, including bus terminals, park-and-ride lots, and kiss-and-ride areas.

TABLE 1-4
CAPITAL COSTS OF MOS-1
(in 1983 dollars)

<u>Item</u>	<u>Cost</u>
Guideways	\$139,849,000
Stations	162,948,000
Utilities	4,900,000
Parking	1,200,000
Central Control Facility	1,500,000
Main Yard	36,586,000
Trackwork	34,076,000
Train Control	22,000,000
Communications	12,304,000
Traction Power	13,200,000
Fare Collection	8,600,000
Vehicle-Passenger	38,700,000
Vehicle-Auxiliary	<u>1,300,000</u>
Capital Cost Subtotal	\$477,161,000
Design Contingency	47,716,000
15% - Facilities	
10% - Systems	
Right-of-Way	99,000,000
Design and Construction Management	131,519,000
13% - Facilities	
10% - System	
Agency Cost	73,000,000
Insurance	<u>25,400,000</u>
TOTAL COST (in base year 1983 dollars)	\$853,796,000
ESCALATED COST (at 7% to midpoint of construction design/ construction contracts)	\$1,174,900,000

Source: SCRTD

System costs include the operating equipment portions of the project involving passenger and auxiliary vehicles, train control, communications, traction power, and fare collection. Each component is described below. Train control costs include the cost of systems for train protection, train operation, and train supervision. Specific facilities include track circuits, switch and lock movements, and signals; yard control power; control consoles and supervisory computers; and automatic train operation and protection. Communications cost cover the communication system between Central Control, auxiliary and supervisory personnel, rapid transit vehicles, and stations. Also included are the public address systems and a closed circuit television for security. Traction power cost covers the cost of furnishing and installing equipment to provide power for vehicle propulsion and system operation, including all equipment for power transmission, conversion, and distribution. Fare collection includes facilities like ticket vending machines, bill changers, entry and exit consoles, and handicapped/emergency gates. Passenger vehicle costs include vehicles for rail passengers. Auxiliary vehicle costs include vehicles for servicing the system like locomotives, self-propelled cranes, and flat cars.

Other construction related cost items include the aspects of construction not related specifically to facilities and systems. Right-of-way costs reflect the cost of obtaining easements, the permanent taking of real property required for the construction and operation of the system, and the cost of relocating the displaced residents and businesses. Engineering design and construction management costs include indirect costs for project design and for procurement and construction management during construction of the system, and is estimated as a percentage of the total facilities cost. Agency costs account for indirect costs incurred by SCRTD for administration of the project. Included are costs for construction inspection; staff support on design matters, cost estimating, and cost control; special consultants; operational planning; and preoperating and start up costs. Insurance costs include insurance for facilities and contractors during construction.

1.3.6.2 Operating and Maintenance Costs. Operating and Maintenance (O&M) costs are annual recurring costs necessary for safe and dependable rail rapid transit service. Over the life of the system, they represent a major portion of the total investment for the project. Projections for Year 2000 annual O & M costs, including labor costs, are based on the experience of comparable rail rapid transit systems, including BART (San Francisco), MARTA (Atlanta), NYCTA (New York), and CTA (Chicago). Unit costs were developed for each of the following major categories: General

and administrative maintenance of ways and structures, maintenance of vehicles, electrical power, transportation operations and maintenance of subsystems and liability. The unit costs for estimating the rail rapid transit system's annual O & M costs were developed from cost accounts and operating statistics provided by each transit system in its Section 15 reports to UMTA and were then applied to the operating statistics projected for the system in Year 2000.

The operating and maintenance costs for bus for the MOS-1 are estimated to be \$481 million annually, cost figures are expressed in 1983 constant dollars. The operating and maintenance costs for rail for the MOS-1 are \$15,384,000. Table 1-5 shows a summary of the annual rail operating costs in 1983 dollars. Rail costs are based on 13,000 train hours, 692,640 car miles, 5 stations, and 43 system miles. Bus costs for the MOS-1 are based on a 8.23 million revenue-vehicle hours, 108.55 million revenue-vehicle miles, and a fleet ratio of 2.18 for peak-to-base bus requirements.

TABLE 1-5

ANNUAL OPERATING AND MAINTENANCE COSTS
MINIMUM OPERABLE SEGMENT - 1 YEAR 2000
(in millions of 1983 dollars)

Item	Cost
General Administration	\$1.90
Maintenance of Ways and Structures	1.49
Maintenance of Vehicles	2.19
Electrical Power	2.34
Operations	3.78
Subsystems	3.23
Liability	0.45
Total Rail Costs ¹	\$15.38
Total Bus Costs ²	\$481.00

Source: ¹SCRTD, 1984

²SCRTD Planning and Metro Rail Departments.
When estimates and funding availability become more definite, a more specific cash flow can be prepared.

1.3.7 Financing

SCRTD is currently securing funds for the construction and operation of the project. Because the exact source and amounts are

uncertain, this discussion focuses on the primary sources of funding potentially available for the rail project. All of the following sources are assumed to be available, but the relative share of federal versus other funding sources has not been determined. Primary sources of funding are divided into federal and non-federal categories and the totals and percentages of these proposed capital funds are shown as follows:

	<u>DOLLARS</u> (millions)	<u>PERCENTAGES</u>
Section 3	574.2	49
State	214.0	18
LACTC	152.4	13
Local/Private	130.3	11
Section 9	80.0	7
City of LA	<u>24.0</u>	<u>2</u>
TOTAL	1,174.9	100

1.3.7.1 Federal Share. UMTA is the federal agency that provides transit funding. Federal funds could finance up to a maximum of 75 percent of the capital costs of the project subject to UMTA's funding constraints. On very costly capital construction projects, greater reliance is placed on local share because of the increased competition for federal funds nationwide. Because of these constraints, SCRTD is proposing to increase the local share so that federal funding levels are reduced. The UMTA funding programs include Section 3 (Discretionary Capital Assistance) and Section 9 (Formula Capital Assistance).

1.3.7.2 Local Share. Non-federal sources of financing include state and local assistance programs and SCRTD revenue programs. The California Transportation Commission (CTC), and the Los Angeles County Transportation Commission, allocate a major source of nonfederal transit funding. Primary local funding programs include the following:

- (a) Article 19 Mass Transit Guideways Program (Proposition 5) - State program which allows motor vehicle revenues to be used for rail transit projects.
- (b) Transportation Planning and Development Funds (TPD) - Fund allocates "spillover" revenues from the state sales tax on gasoline through AB2551 (formerly SB620). Recent legislation, SB 1331, calls for the combining of Article 19 and TPD Funds into one mass transit guideway fund.
- (c) Proposition A - Measure which allows a 1/2 cent sales tax in Los Angeles County to help finance lower bus

fares, local transit improvements and construction of a rail rapid transit system.

- (d) Joint Development/Value Capture Funds - Techniques to generate revenues for capital and operating costs. Joint development may result in cost efficiencies in construction, a limited recovery of capital costs, and increased farebox revenues. Value capture may create revenues by tapping the increased real estate value generated around station areas by the proposed action. Benefit Assessment District formulation provides an avenue through which locally committed business support may offset project costs.
- (e) Other - Other non-federal sources of financing to be considered by SCRTD include Equipment Trust Certificates, Grant Anticipation Notes, Certificates of Participation, and Revenue Bonds.

1.3.8 Revenue Estimates.

The estimated annual revenue (1983 dollars) for the rail component of the MOS-1 for Year 2000 is \$6.5 million. This figure is based on an estimate of the numbers of boarding fares on rail and the number of transfer fares from bus to rail, and represents estimated revenues that would be collected on rail. The figures are also based on a fare structure with an average base fare on SCRTD vehicles of \$1.00, an additional zone fare of \$.50 for each 3 mile zone on rail and a \$.20 transfer fee between bus and rail. The MOS-1 falls within one fare zone and generates an average total fare of \$1.50.

2. ALTERNATIVES

This section discusses alternatives to the proposed construction of the 4 mile, five station MOS-1 (the proposed action treated in this Environmental Assessment). The only alternative under consideration is the No Project Alternative. Other rail alternatives were described in detail in the Final Environmental Impact Statement but are not carried forward in this document because of the need to focus on a less costly rail alternative.

2.1 No Project Alternative

As a basis for comparison for the MOS-1, a No Project Alternative was evaluated. Travel in the regional core would continue to be served by the existing road network and the SCRTD bus system. This alternative includes 184 regularly scheduled bus routes in the region. The present transit system would be improved in accordance with SCRTD's 1980 Sector Improvement Plan (SIP), which calls for an expanded and revised network of local and express services.

Key elements of the SIP included:

- o Rationalization of bus lines from a collection of lines that had been inherited from predecessor rail and bus companies into an integrated system of local, limited and express lines.
- o Creation of a grid system in which lines run primarily east-west or north-south. In most cases, one line would serve one street instead of having up to three lines serving portions of one street. The grid system allowed most trips to be made with only one transfer. Prior to the SIP, up to three transfers were required.
- o Creation of a line numbering system that used separate blocks of numbers to identify local lines to downtown, east-west and north-south local lines that do not enter the downtown, limited service, express freeway to downtown and express that does not enter downtown and special service lines such as to the race track, Hollywood Bowl or the Rose Bowl.

Many of the plan's recommendations have already been implemented. This alternative was formulated to examine conditions in the Year 2000 without major capital investments or significant transit service improvement.

The No Project Alternative is expected to serve 1,632,000 linked transit trips daily in the Year 2000 as compared to 1.2 million existing link trips. With this alternative, transit would serve an ever decreasing share of regional trips.

The estimated annual operating and maintenance costs for this all-bus system would be \$502.3 million. The alternative would employ a fleet of 2,221 buses and would have a capital cost of \$331,150,000. Existing service employs 2,073 buses and costs \$415 millions per year to operate.

2.2 Metro Rail Project: Union Station to Alvarado Street (MOS-1)

The 4 mile, five station Metro Rail Project (Union Station to Alvarado Street) route begins at the yard and shops near Union Station, proceeds to Hill Street and through the CBD, turns northwest on 7th Street, leaving the CBD and proceeding to the Wilshire/Alvarado Station where cross-over track would be constructed east of the station to provide operational feasibility. The line is subway throughout its extent with bored tunnels and cut-and-cover station construction. Characteristics of the stations (platforms, entrances, mezzanines/concourses, architectural design, fare collection, parking, bus access, bicycle access, equipment spaces and station locations) are described earlier in this Environmental Assessment (Section 1.3). Similarly, Section 1.3 presents plan and profile sheets for the MOS-1 alignment, a summary of station access features and a generalized site plan for each of the five MOS-1 stations. An architectural rendering of the 5th and Hill Street Station is presented in Section 1.3 as is a detailed description of the rail/bus interface at the Wilshire/Alvarado terminal, a description of the MOS-1 yards and shops facilities, and a description of system wide elements serving the MOS-1. Operating characteristics are described and rail boardings by station and by mode of arrival are presented. Rail service frequencies are presented as are details relating to capital and operating costs. Finally, funding sources and revenue estimates are discussed.

3. ENVIRONMENTAL CONSEQUENCES

The environmental consequences of the proposed action are described in this section. Where pertinent, a comparison is made to the No Project Alternative.

3.1 Transportation

Transportation impacts are described in terms of transit impacts, feeder bus operations, and auto traffic and parking.

3.1.1 Transit/Feeder Bus Operations

Transit operations are discussed in this section.

3.1.1.1 Existing Conditions. SCRTD provides an extensive and well-utilized bus system within the Southern California region. During an average weekday in 1980, SCRTD operated 1,860 peak hour buses which traveled 334,000 miles and carried 1,386,349 passengers. More than 120 separate bus routes offer service to, from and within the Regional Core. The most heavily patronized corridor is along Wilshire Boulevard. Within a one-half mile band along either side of Wilshire Boulevard (six streets including Wilshire), local bus lines accommodate about 177,000 daily boardings.

Patronage is expected to continue to increase because of the reduced bus fares made possible through the passage of a 1/2 cent sales tax for transit funding and the continuing rise in auto operating costs. Though transit ridership is increasing, limits of effective bus service are being approached:

- (a) Bus operating speeds are hampered by street congestion. Local buses in the CBD operate at about 6 to 8 miles per hour.
- (b) Buses operating on several heavily used lines are already over capacity. Adding more buses will not fully alleviate the problem.
- (c) More than 20 million square feet of office, retail, commercial, and other space is currently being constructed or is in final planning stages in the CBD. If transit is to maintain its modal share for peak trips, peak hour buses will need to be added to the current total. The street system cannot accommodate the additional buses needed to meet future travel demand. A high volume rail rapid transit system is a logical solution to relieve overloaded streets and freeways and to add needed capacity to the transit system.

3.1.1.2 No Project Alternative Impacts. Bus service under the No Project Alternative would be based on the existing bus system, plus the Sector Improvements now underway. If the MOS-1 were not implemented, the logical alternative would be one of expanding the present bus system. However, bus system expansion is constrained by the number of vehicles that can be accommodated on the street system in the downtown. Within the downtown, moreover, convenient curb space for loading buses in the afternoon peak hour is almost fully utilized. Accordingly the No Project Alternative is virtually a "do-nothing" alternative, reflecting Year 2000 conditions without major transit improvements. Consequently a reduced share of trips would be made using transit.

3.1.1.3 MOS-1 Impacts. A bus feeder operating plan has been developed to determine the range of environmental impacts which can be anticipated as a result of the proposed action. The routes serving the Wilshire/Alvarado Station are depicted in Figure 3-1. The key characteristics of the routes (Year 2000) are summarized in Table 3-1. This operating plan will be refined during continuing bus planning efforts. The emphasis on evaluating the impacts of the MOS-1 is on the impacts of transit operations in the vicinity of the Wilshire/Alvarado Station. In the MOS-1, the Wilshire/Alvarado Station is a terminal station. The station will serve approximately 3670 kiss-and-ride passengers, 8585 bus passengers, and almost 3540 passengers walking in from nearby residential areas. The bus passengers (54 percent of rail boardings at the Wilshire/Alvarado Station) will be dropped off and picked up from six local bus lines, two limited-stop lines, and one express line accessing the station. The limited and express lines, providing service from the west and northwest, will terminate at the station. Local buses currently serving Wilshire Boulevard will continue on that street, and will drop-off and pick-up passengers on the corner of Wilshire and Alvarado, approximately 250 feet from a station entrance. Local buses in service on 7th Street will also continue to serve that street, with passenger pick-up and drop-off on the corner of 7th and Alvarado, about 250 feet from another station entrance. Buses on Alvarado Street will stop on the street, outside the station entrances. The express buses will provide a pre-Metro service (Line 426 now follows the approximate route of the ultimate Metro Rail Line with a limited stop operation at each of the planned station locations along Wilshire Boulevard) to the Wilshire/Alvarado Station, for distribution to the CBD and connection to buses serving the eastern suburbs of Los Angeles.

Two basic traffic operational elements have been evaluated. The first is an analysis of surface traffic (forecast to the Year 2000) including background vehicular and pedestrian traffic plus auto, bus and pedestrian traffic interfacing with the Wilshire/Alvarado Station. The second is an evaluation of the bus operations. The purposes of these analyses were to determine if auto and pedestrian traffic would be negatively impacted beyond

TABLE 3-1

WILSHIRE/ALVARADO STATION BUS ROUTE CHARACTERISTICS

Route	Days of Operation	Weekday Hours of Operation	Peak* Ridership	Off Peak Ridership	Date of Ridership Count	Daily Arrivals at Alvarado
20	Daily	24 hours				
21	Mon-Sat	6AM-2AM				
22	Daily	4AM-10PM	32,307	34,295	10/12/83	2,603
320	Mon-Fri	6AM-7PM				
322	Mon-Fri	6AM-6PM				
26	Daily	24 hours	6,243	12,476	4/27/84	1,014
51	Daily	5AM-3AM	15,764	12,164	6/7/84	1,188
200	Daily	5AM-1AM	7,447	7,575	9/27/83	2,471
426	Mon-Fri	5AM-7PM	2,198	0	7/18/83	60

*Bus trips which begin during the 6AM-9AM and 3PM-6PM periods are considered peak period service, otherwise the trips are considered off-peak.

an acceptable Level of Service due to the proposed function of the Wilshire/Alvarado Station and if sufficient street capacity is available to accommodate the needed bus access to the station.

Five intersections were identified as having potential for being impacted by the Wilshire/Alvarado Station bus routings: the intersections of Hoover Street with Wilshire Boulevard, Hoover Street with 7th Street, Alvarado Street with 6th Street, Alvarado Street with Wilshire Boulevard, and Alvarado Street with 7th Street. A review of the physical characteristics, traffic control, and traffic volumes and an observation of traffic operations in the field indicated that the intersections with Alvarado Street would be the critical intersections. The traffic volumes in the Hoover Street area are significantly lower and Hoover Street has an additional exclusive lane for left turns.

The traffic volumes used in the analysis were Year 2000 volumes assuming a terminal station at Alvarado Street. Also used were existing traffic count data provided by the City of Los Angeles Department of Transportation. Bus volumes were generated based on travel demand forecasts. Pedestrian volumes of station walk and feeder bus access patrons also were considered in the analysis. The numbers of buses anticipated are shown in Figure 3-1. The bus routing allows buses eastbound on Alvarado to continue east to Westlake, turn right with drop-off/pick-up from the Westlake side of Wilshire/Alvarado Station, with buses then continuing right onto 7th and back to Wilshire via Hoover.

It was determined that the AM operations would be at an acceptable Level of Service but that two intersections were potentially critical during the PM peak period. The two intersections analyzed were Wilshire/Alvarado and 7th/Alvarado. The 7th/Alvarado intersection operates acceptably but the Wilshire/Alvarado intersection operates at Level of Service E. Transit traffic, specifically the buses eastbound on Wilshire in the PM peak to serve the station, do not add to the critical movements. Table 3-2 presents the passenger car equivalents (PCE) (a measure of the number of autos plus trucks and buses converted to an equivalent number of autos) per lane per hour for each approach in the No Project Alternative and MOS-1 transit condition. This table shows that the buses added to the intersection are added to the smallest traffic stream (558 PCE before vs. 629 PCE after with buses added) and that this addition leaves the eastbound movement far short of the critical volume (841 PCE) on the westbound approach. Therefore, the additional bus traffic contributes nothing to cause deterioration of the Level of Service. Improvements that will be made to facilitate bus operations will have a positive impact on traffic flow.

Table 3-2

WILSHIRE/ALVARADO APPROACH VOLUMES (PCE)

INTERSECTION APPROACH	TOTAL PCE (Passenger Car Equivalents) [per car per hour]	
	No Project	MOS-1
Wilshire & Alvarado		
Eastbound	588	629
Westbound	841(c)	841(c)
Southbound	641	641
Northbound	835(c)	835(c)
Sum of Critical Volumes	1,676	1,676
Level of Service	E	E
(c) = critical volume		

In conclusion, the bus routing operates efficiently. The additional bus traffic does not add to the PM peak surface traffic congestion since it operates eastbound on Wilshire against the major traffic flow and 7th Street and Hoover Street both have sufficient excess capacity to accept the additional buses.

3.1.1.4 Mitigation. Bus operations are enhanced through the provision of a layover space along the west curb-face of Westlake Avenue south of Wilshire. The removal of 10 metered parking spaces is of no significance due to high availability of commercial parking projected to continue in the area. It is further recommended that the curb radius on the southwest corner of Wilshire and Westlake be improved to a minimum of 36 feet to enhance bus operations for the right turn bus movement, allowing the buses to turn without "cutting the corner" or infringing onto other traffic lanes. If it became necessary, additional parking on the west side of Westlake from Wilshire to 7th Street will be removed without having a negative impact on present and future parking supply in the area. A document entitled "Alvarado Station Bus Interface Traffic and Operational Analysis", August, 1984, supports the above conclusions and is available from the SCRTD.

SCRTD is responsible for certain specific mitigations, primarily those in the immediate vicinity of stations and in coordination with LADOT. Mitigation measures which will be implemented to enhance traffic flow in the vicinity of the Wilshire/Alvarado Station include the following:

1. Re-route of east-west local buses that will terminate at the station on to Westlake Avenue to service the station.
2. As mentioned in the FEIS, the east side width of Alvarado will be increased from the current 33 feet to 50 feet in the vicinity of the station.
3. Add a 10' wide bus lane on Alvarado, at the station. This increases the street half width to 60' and makes a significant reduction in interference of regular traffic with bus movements.
4. Restrict left turn movements at Wilshire/Alvarado from all directions, except for buses.

In addition, SCRTD is proposing the following mitigation measures. A final decision will be made jointly by SCRTD and the City of Los Angeles.

1. Eliminate on-street parking on both sides of Alvarado. This will further facilitate the north-south bus route on Alvarado.

2. Eliminate on-street parking on west side of Westlake to facilitate passenger loading/unloading of buses stopping on Westlake.

Other mitigation measures for other intersections in the station's vicinity will be considered during project Final Design.

3.1.2 Auto Traffic Parking

Traffic and parking impacts are considered in this section.

3.1.2.1 Existing Conditions. In the City of Los Angeles, there are 156 miles of freeways and 6,415 miles of surface streets. During a typical weekday, 45 percent of the Regional Core vehicle miles traveled (VMT) occurs on the freeway system. Freeways which skirt the Regional Core are the Hollywood, Santa Monica, Golden State, and Ventura Freeways. While more than half of the Regional Core travel occurs on arterial streets, there are only six continuous arterial streets extending westward from the CBD: Beverly Boulevard, Third Street, Sixth Street, Wilshire Boulevard, Olympic Boulevard and Pico Boulevard.

The Regional Core freeways are loaded to capacity and are severely congested during peak commuter periods. In spite of present congested conditions, by the Year 2000, the demand for daily travel on freeways in the Regional Core is expected to increase nearly 1.5 million vehicle miles, a 24.2 percent increase over 1980 estimates. Without a major transit improvement, traffic congestion will worsen on all freeways in the area. Two proposed freeways which would have provided direct regional access to the Regional Core were cancelled because of public opposition and potential disruption to the community.

Given the absence of convenient freeways and capacity constraints on existing ones, the majority of the traffic moving between major destinations within the Regional Core travel on arterial streets. The projected growth in residential and job development will further burden a circulation system ill-equipped to handle even current demand. By the Year 2000, there will be an increased demand on the Regional Core's arterial system of nearly two million more vehicle miles daily, a demand that will result in severe delays. In the Year 2000, assuming no major transportation improvements and only currently planned intersection and roadway improvements, it is projected that the number of severely congested key intersections will be more than three times greater than in 1980. With the projected travel demand resulting from the increased densities in the Year 2000, the present Regional Core's freeway and arterial street system simply will not function efficiently.

The CBD in 1979 had a total of 111,000 parking spaces. Of this total, 5,900 spaces (5 percent) were located at the curb with the remaining 105,200 spaces located off-street. Over the previous 13 years, the CBD experienced only a 13 percent increase in parking spaces*. Changes in the type of parking facilities providing these spaces have been dramatic. Curb spaces have decreased by 19 percent and off-street surface lot spaces have decreased by 26 percent, while spaces in garages have increased 142 percent. Many of the surface parking lots have been replaced by new construction, and curb spaces have been eliminated to improve traffic flow. Parking charges are high in certain sections of the CBD. Off-street parking now costs as much as \$5.00 per hour or \$15.00 per day near the Financial District. This area is bounded by Seventh on the south, Hill Street on the east, First Street on the north, and Figueroa Street on the west. The rates range from \$5.00 near Hill Street to \$15.00 near Flower/Sixth Street area. In the areas surrounding each of the three proposed CBD stations, more than 80 percent of the parking supply is used.

Outside the CBD, parking is more available and less expensive, but it remains a major concern especially where residential neighborhoods adjoin commercial centers. In April 1983, a new Parking Management Plan was implemented by the City of Los Angeles. The plan will have the effect of reducing parking spaces, especially in the CBD. It allows developers to reduce by up to 40 percent the number of parking spaces provided in a building if they can implement an effective ridesharing or vanpooling program. The plan provides special protection for residential neighborhoods near commercial centers by requiring participating developers to prove that the parking reduction will not result in spillover parking into residential neighborhoods.

3.1.2.2 No Project Alternative. The traffic impacts of the No Project Alternative at selected locations are summarized in Table 3-3. By the Year 2000, traffic conditions at First/Hill and Fifth/Hill (PM only) will deteriorate to Levels of Service E or F. Level of Service D is usually acceptable during peak travel periods. It denotes a moderate level of congestion such that not all waiting cars will make it through a traffic signal in one phase. Level of Service A is free flow conditions and Level of Service F is a totally congested condition.

*Based on CBD parking studies conducted in 1966 and 1979 by Wilbur Smith and Associates

With the No Project Alternative, parking deficiencies around the Civic Center, Fifth/Hill and Seventh/Flower downtown stations will continue in localized areas. The problem will grow worse as new development occurs. At Union Station and at the Wilshire/Alvarado Station there are no existing or projected parking deficiencies. A surplus in excess of 2,000 spaces has been estimated to exist under the No Project conditions around each of these two station areas.

3.1.2.3 MOS-1 Impacts. The magnitude of diversion of daily auto and bus trips to rail trips for MOS-1 is 55,000. Traffic impacts at intersections and station locations were analyzed (see Table 3.3). Volume/capacity ratios were calculated as were Levels of Service. The result indicated that the MOS-1 will decrease the Level of Service at Alameda/Macy in the P.M. and improve intersection Level of Service at Seventh/Flower in the A.M. and Wilshire/Alvarado in the P.M. as compared to the No Project Alternative.

The absence of rail rapid transit serving the CBD necessitates reliance on buses and autos. Without the MOS-1, the parking supply will have to be increased or prices increased to reduce demand. Increases in parking prices will discourage CBD growth.

Parking supply and demand has been estimated within a 1/2 mile radius of each station area for the Year 2000. Parking demand in the downtown area is greater than supply in the vicinity of stations at Civic Center, Fifth/Hill, and Seventh/Flower. At these stations, a parking shortage in excess of 4,700 spaces is expected by the Year 2000. Because of limited availability and the high price of downtown parking spaces, these Metro Rail Stations will not contribute to parking shortages since they are not likely to attract Park-and-Ride patrons. The parking deficiencies in the downtown are anticipated to continue and increase at these station areas due to continuing development expansion of activities within the Central Business District. Adding a fast and efficient means of transportation to the downtown area will reduce the overall demand for parking. The 4-mile rail line, although it will divert a smaller number of auto drivers to transit, will have a negligible effect in reducing parking demand downtown.

Table 3-3

YEAR 2000 TRAFFIC CONDITIONS

Location		NO PROJECT		MOS-1	
		Volume/ Capacity	Level of Service	Volume Capacity	Level of Service
Alameda/Macy	am	.85	D	.89	D
	pm	.83	D	.94	E
First/Hill	am	1.19	F	1.13	F
	pm	.92	E	.92	E
Fifth/Hill	am	.82	D	.81	D
	pm	.93	E	.92	E
Seventh/Flower	am	.70	C	.69	B
	pm	.76	C	.76	C
Wilshire/Alvarado	am	.74	C	.74	C
	pm	1.02	F	.96	E

SOURCE: Los Angeles Department of Transportation,
Schimpeler-Corradino Associates

The demand created by development will more than offset any reduction contributed by rail transit. There is a potential for spillover parking to areas that surround Union Station. This potential is not considered serious since the surrounding land use area is of commercial and industrial uses. A total of 2,500 park-and-ride spaces will be provided at Union Station. The demand for parking (if there were unlimited parking capacity) at that location for the MOS-1 is estimated to be 4,599. The excess auto arrivals at Union Station of approximately 2,090 trips will be accommodated by the commercially available parking surplus of over 3,000 spaces projected to be available within the Union Station area. A parking price structure would be put into place to maximize use of the parking supply.

The Wilshire/Alvarado Station will have no provision for park-and-ride spaces because this station does not serve the main park-and-ride commuter sheds of the San Fernando Valley, Hollywood, and the West Los Angeles areas of Century City, Beverly Hills, Westwood and Culver City. Furthermore, a surplus in excess of 2,000 commercial spaces is projected to be available in this station area. While this station is not designed to accommodate park-and-ride patrons on site, any latent park-and-ride demand from a very limited commuter shed is estimated to be a small percentage of the parking surplus which exists and is projected to continue. The Transit Corridor Specific Plan will establish development controls which ensure the continued existence of the area's parking surplus.

Twenty-six kiss-and-ride spaces will be provided at this station. There are 3,670 patrons expected to arrive at and leave this station daily. During the peak hour 865 patrons would exit the station to be picked up. Assuming that each driver would wait an average of 3 minutes to pick up their passengers the 26 kiss-and-ride spaces would handle 520 of the passengers leaving the station during the peak hour. The remaining 345 automobiles in the peak hour would add to the traffic stream around the station block but would not be expected to change the Level of Service E projected for the Wilshire/Alvarado intersection. There is additional project land east of Westlake that could be converted to kiss-and-ride spaces if operating experience shows the need. Results of an inventory by the City of Los Angeles Department of Transportation indicate a parking supply in the vicinity of the station of 5,847 spaces with usage of 3,617 spaces. These projections take into account future development and parking requirements for the station area.

Cumulative transportation impacts for the MOS-1 would be positive and less than those identified with a longer rail segment due to lesser magnitude of residential and commercial development directly served by the MOS-1.

3.1.2.4 Mitigation. Traffic mitigation measures will be needed in the vicinity of Union Station. Factors to be considered in designing mitigation measures include costs, public acceptance, effectiveness and responsibility for funding and/or enforcement. Mitigation measures are based upon a traffic analysis done by LADOT in late 1982, and in early 1983. Measures will be refined as the project moves toward construction. SCRTD is responsible for specific mitigation measures in the immediate vicinity of Union Station. Other measures are suggested for consideration by LADOT and the County Road Department for possible inclusion in their Capital Improvement Programs subject to the adequacy and availability of funds. Such measures can serve to improve traffic flow in the station vicinity. At the intersection of Alameda/Macy, with the MOS-1 it is observed that the Level of Service (LOS) will decrease from D to E in the p.m. peak. This is not an unanticipated condition, since it was previously discussed in the FEIS. The following mitigation measures are considered: provide left-turn channelization and provide three through lanes in each direction and a northbound right turn lane on Alameda. This action requires some right-of-way acquisition, and the replacement of two railroad tracks with one in Alameda Street. These are proposed for LADOT consideration.

Possible parking mitigation measures (as mentioned in the FEIS) that require the cooperation of other agencies and/or the private sector and that may be applied to these stations are as follows:

- (a) Encourage or require employer-sponsored rideshare or transit incentive programs to reduce potential parking usage.
- (b) Encourage developers and employers to take advantage of the city's new Parking Management Plan. Use of the provisions in this plan can effectively reduce both the cost of providing parking (by allowing off-site facilities) and the need for it by encouraging vanpools, ride-sharing, and transit.

Parking supply increases can be counterproductive to diverting auto trips to the MOS-1. The MOS-1 itself is a principal parking mitigation measure, since it makes transit a more attractive alternative to the automobile.

3.2 Land Use and Development

Land use and development impacts are discussed in this section.

3.2.1 Existing Conditions

The Regional Core encompasses most of 7 planning areas of the city and 2 planning areas of the county. Two planning areas, Central City and Central City North, have been combined as the CBD. The portion of the MOS-1 outside of the CBD up to the Wilshire/Alvarado Station is included in the Westlake Planning area. The Regional Core contains more than half of all the high-rise commercial space in the Los Angeles Urbanized Area and represents the greatest concentration of development in the Southern California region. During the 1970's, 68 percent of the 12 million square feet of high-rise commercial development in the Regional Core occurred in the CBD. As of 1980, there were 40.9 million square feet of high-rise commercial space in the Regional Core; of this space, the CBD accounted for 24.9 million square feet with the Westlake area having 2.1 million square feet of commercial space. The CBD has 10 percent of its parcel area in residential uses, the most prominent land uses in terms of area are industrial and public facilities, and open space. In the Westlake area, the greatest percentage of parcel area is devoted to multi-family residential (40 percent) and to commercial mixed use (20 percent).

An overview of MOS-1 station area land use is provided in Table 3-4. In the CBD station areas, the predominant land use is regional commercial, except in the Union Station area, where 70 percent of the land is used for industrial purposes. The Union Station site and the Terminal Annex Post Office site occupy 50% of the station area. All downtown station areas contain a substantial amount of land that is either vacant or used for commercial surface parking not directly servicing any particular facility. Multi-family and community commercial are the dominant land uses in the Wilshire/Alvarado Station area.

The basic principle for the organization and planning of the Los Angeles area is the City Centers Concept. The Centers Concept was developed during the late 1960's and early 1970's and adopted by the City of Los Angeles in 1974 as a fifty-year plan. The Concept Plan envisions a series of regional centers connected by a regional rapid transit system, with low to medium building intensity between centers. The concept of a series of regional centers connected by a rapid transit system was also adopted by the County of Los Angeles in 1970 and by the Southern California Association of Governments (SCAG). The county's concept is incorporated into its General Plan and identified as the "Urban Form Policy." The city's Concept Plan is refined and localized in the twenty-year City-wide Plan and short-term Community Plans. In some cases, the Community Plan is further refined by Specific Plans that define both the planning and the zoning for an area. The City of Los Angeles Department of Planning (LADOP) is

TABLE 3-4

STATION AREA LAND USE PROFILES, YEAR 1980
Percent of Parcel Area in Generalized Land Use Categories

	<u>Single Family Residential</u>	<u>Multiple Family Residential</u>	<u>Community (Low Intensity)² Commercial</u>	<u>Regional (High Intensity)² Commercial</u>	<u>Industrial</u>	<u>Public Facilities/ Open Space</u>	<u>Vacant/ Commercial Surface Parking³</u>
UNION STATION							
Community Plan	-	-	5%	-	70%	5%	20%
Land Use	-	-	10%	-	80%	10%	-
Zoning	-	-	20%	-	80%	-	-
CIVIC CENTER							
Land Use	-	2%	-	35%	-	38%	25%
Redevelopment Project Designation	-	10%	-	40%	-	50%	-
FIFTH/HILL							
Land Use	-	2%	30%	45%	-	3%	20%
Redevelopment Project	-	2%	-	95%	-	3%	-
SEVENTH/FLOWER							
Land Use	-	-	8%	50%	-	2%	40%
Community Plan	-	34%	40%	8%	-	18%	-
Zoning	-	40%	36%	4%	-	20%	-
WILSHIRE/ALVARADO							
Land Use	2%	45%	30%	39%	-	20%	-
Community Plan	-	34%	40%	8%	-	18%	-
Zoning	-	40%	36%	4%	-	20%	-

Source: Sedway/Cooke from existing land use data provided by the County Regional Planning Department and the City of Department of Planning.

¹Each station area contains 100 to 150 acres of parcel area.

²Includes on-site parking required by Code to service the commercial facilities.

³Commercial parking consists of facilities not affiliated with or required by Code to serve a commercial facility.

developing a single Specific Plan for the areas around proposed stations. The Specific Plans are being prepared with input from Citizens Advisory Committees in each station area.

Zoning is the regulatory mechanism by which the Community Plans (and the General Plan) are implemented, and California State law requires that zoning conform to land use plans. Zoning in most station areas basically conforms to the jurisdiction's General Plan (and its constituent parts such as Community or District Plans) land use designations.

Specific Plans are ordinances, unlike General Plans, Community Plans, District Plans, and other policy documents. Specific Plans have the force of law and are intended to implement a jurisdiction's General Plan. Where adopted, Specific Plans supersede zoning and can regulate a broad range of activities including details of signage, facades, landscaping, and parking that are important in a particular locality but are not feasible for the city's or county's zoning ordinances to address. Specific Plans, therefore, are a principle tool for guiding a station area's development in conformance to community desires and public policy objectives.

The Los Angeles Community Redevelopment Agency (CRA), a state empowered body, has designated some areas in the Regional Core as Redevelopment Projects. In these areas, the CRA and LADOP jointly oversee the development process. All downtown stations lie within the Central Business District Redevelopment Project area. The CRA has primary responsibility for steps leading to the preparation and adoption of redevelopment plans and for their implementation. Once adopted, redevelopment plans become the governing land use plans for redevelopment areas and supersede zoning. The process leading to adoption generally takes 12 to 18 months. The CRA is preparing the Specific Plans for all four CBD stations. Within the CBD, the CRA has established a single land use regulation in the form of the redevelopment plans which establish average Floor Area Ratios (FARs) ranging from 3 in the Civic Center area to 6 in the Central City area.

3.2.2 Growth Projections and Cumulative Impacts of MOS-1 and the No Project Alternative

Population and density in Westlake will grow from 92,500 and 26,200 persons per square mile in 1980 to 126,600 population and 35,800 per square mile in Year 2000 with the No Project Alternative. The levels of the MOS-1 should be between No Project and the Base MOS levels of 159,400 population and 45,200 persons per square mile.

Impacts on land use from the operation of the MOS-1 can be expected primarily within a one-quarter mile radius around each station, on the basis of experience with rail rapid transit systems in other North American cities. For each station in the MOS-1, a potential impact

area or "station area," with a radius of approximately one-third mile was established. The boundaries of the station areas generally correspond to the boundaries of the City of Los Angeles Department of Planning's (LADOP) Specific Plan areas and represent a walking time of about 10 minutes from any point in the station area to a station entrance. Each station area consists of 150 to 200 acres, of which about 75 percent is parcel area and 25 percent is street right-of-way. Throughout this section, the term parcel refers only to the buildable parcel and does not include the adjacent street right of way.

Total development at the five stations of the MOS-1 would be at a range between the No Project and Base MOS conditions because of lower patronage levels to stimulate development. Total development was projected to reach 2.0 to 2.7 million square feet of commercial and 5,440 dwelling units for Base MOS. Under the MOS-1, these levels will be lower but greater than the No Project Alternative prediction of 1.6 million square feet of commercial development.

Accommodation of projected growth in station areas is a desirable goal in that it implements the Centers Concept and places jobs, services, and housing within walking distance of public transit. The impact assessment is based on a station area's ability to accommodate projected residential and commercial growth on land susceptible to reinvestment and within walking distance of stations. Residential growth is potentially beneficial if it can be accommodated without disrupting the planned land use pattern on land that is zoned for multifamily housing and currently occupied by single family dwellings, or duplexes. It is potentially adverse if there is insufficient residentially zoned land susceptible to reinvestment, since new residential development could displace existing single family housing in the station area.

As previously discussed in the FEIS, there is insufficient residentially zoned land to accommodate projected residential growth at Union Station. However, this potentially adverse impact can be mitigated. Speculative increases in land value could lead to increased rental and lease rates for both existing and new commercial and residential space which could, in turn, displace current tenants. The Transit Corridor Specific Plan specifically addresses the development of units to accommodate such displacement.

Land values will increase to some extent at all stations where development occurs. They may increase abruptly when construction on the MOS-1 begins and when operation begins. Land costs are likely to stabilize except where there is a limited supply of land relative to demand to develop. This situation could occur at Fifth/Hill and Seventh/Flower. Land values are already relatively high in these areas due to current development activity. Thus, additional increases may not be as dramatic as might otherwise be expected and could not be attributed specifically to the MOS-1. There are and will be other projects which will have cumulative impacts on these areas. The MOS-1 will serve to manage these impacts on land use and development.

Historic and cultural resources within station areas could be affected either positively or negatively by growth induced by the MOS-1. Where zoning permits an FAR of 13, historic structures frequently represent an underutilization of the parcels on which they are located. Underutilized parcels are prime candidates for reinvestment, which can take the form of either renovation and expansion or removal and replacement of existing structures. This situation is possible at Union Station and mitigation measures would be required to ensure that reinvestment takes the form of renovation rather than removal.

The Fifth/Hill and Seventh/Flower Station areas also containing historic and cultural resources. Zoning in these areas permits an average FAR of 6, while many of the historic structures are developed at an FAR of 6 or greater. This situation creates an incentive for renovation rather than removal.

Under the land use control mechanisms of the City of Los Angeles, all land in the vicinity of the Wilshire/Alvarado Station is zoned for maximum intensity commercial utilization. Much of this land however is utilized for low income residential purposes. That land which is zoned as commercial but used as residential will be down-zoned to residential under the Transit Corridor Specific Plan of the City of Los Angeles. This down-zoning from commercial to residential will create an economic disincentive to the redevelopment of the current housing in the Wilshire/Alvarado area. Even though the residential zoning permitted by the Specific Plan provides for higher densities than exist today, redeveloping low density housing to a higher housing utilization provides to a developer a much narrower economic margin than is offered when one redevelopes low density housing for commercial purposes.

It is anticipated that land use will be intensified in immediate proximity with the Wilshire/Alvarado Station. While FAR's are drastically reduced under Transit Corridor Specific Plans, a FAR of 13 will be permitted at transit stations only for properties with physical connection to the transit stations. Experience of property owners in Washington, D. C. and Atlanta, Georgia with CBD property in close proximity to WMATA and MARTA stations shows that specific benefits to commercial property owners extend from one city block to three city blocks from station entrances. Therefore, the land use control mechanisms of the Transit Corridor Specific Plans, coupled with the realities of the land marketplace suggests that from 500 feet to 1500 feet from rapid transit stations limits the area wherein intensified Metro Rail related commercial development is expected to occur. It is in this one to three block radius area surrounding the Wilshire/Alvarado Station that intensified commercial development is expected occur; beyond this area, existing residential land use patterns are expected to be retained.

Effects of the MOS-1 will be positive in that growth will continue to be concentrated at centers, economically stagnant areas will be revitalized, more jobs will be created, and governmental agency plans will be implemented through the concentration of activity within designated centers in accordance with the Centers Concept.

3.2.3 Mitigation Measures

SCRTD has limited authority in implementing land use mitigation measures. The District's cooperation with other responsible agencies will be required. The recently executed agreement between the SCRTD and the CRA establishes the CRA's responsibility for preparation of Specific Plans within existing redevelopment areas.

The Transit Corridor Specific Plan of the City of Los Angeles is a document intended to guide growth for a 20 year to 40 year planning horizon, while the development plans for each station area (currently under preparation also) are short range development guides. The Transit Corridor Specific Plan are ordinances of the City of Los Angeles carrying the force of law in their implementation. The specific plan mechanisms are created by legislation of the State of California.

At Union Station, the availability of residentially zoned land susceptible to reinvestment limits the opportunity for residential development within walking distance of the station. Two mitigation measures have been proposed: the development of residential projects on commercially zoned land and the increase in density of new residential development in existing multifamily residential zones. At Union Station, residential development would be most appropriately located on commercially zoned land in the northwest corner--in Chinatown, where the CRA would be responsible for implementation.

At the Fifth/Hill and Seventh/Flower stations, the construction of the MOS-1 will increase pressure for the redevelopment of historic or cultural resources. Two mitigation measures have been proposed: the promotion of use of existing tax incentives and rehabilitation loans and downzoning to create a mechanism to transfer unused development potential.

The Fifth/Hill station is adjacent to the Broadway and Spring Street historic districts. Substantial tax incentives and current CRA policies, including the following, have been successful in encouraging preservation of historic structures in this area:

- (a) The average permitted FAR for new construction is 6 (reduced from an FAR of 13). This FAR is exceeded by many historic structures, creating an incentive to preserve them.
- (b) When a historic building's FAR is less than 6, its unused density can be transferred to other sites in the CBD.
- (c) Low interest loans are available for rehabilitation.

The Specific Plan will address potential redevelopment impacts on and mitigation measures for the historic properties within the specific plan areas. In addition, the Memorandum of Agreement contained in the FEIS includes a provision for addressing the indirect effects of developmental pressure on historic resources.

The Seventh/Flower Station is located along Seventh Street, the CBD's original shopping street. Although it is not a historic district, it includes numerous historic buildings and provides a very pleasant pedestrian-scale streetscape. All the tax incentives and CRA policies described above apply to historic buildings in this area as well. The FAR limit and transfer of density policies apply to all buildings. In the CBD, then, preservation of historic buildings has been effectively integrated into CRA's development program, but careful monitoring will be necessary to ensure their preservation as pressure for development increases. SCRTD and private developers should cooperate with this program.

The Transit Corridor Specific Plans have been prepared by the Planning Department of the City Los Angeles and are currently under intensive review by the City Planning Advisory Board. The review process will take the documents to the City Director of Planning and on to the Planning Commission where they will be adopted through an intensive public review process. The Transit Corridor Specific Plans will incorporate a range of attractive economic bonuses to developers to perpetuate low income and elderly housing. The zoning roll back program (also mandated by the California legislature) to align the city's general plan with zoning, further specifies "rollback" zoning in the Wilshire/Alvarado area, creating additional protections for the existing low income housing stock.

3.3 Land Acquisition and Displacement

In this section, the land acquisition and displacement impacts are discussed.

3.3.1 Existing Conditions

Displacement deals with the removal of existing land uses for project right-of-way (ROW) requirements. The right-of-way is the composite of total requirements of all interests and uses of real property needed to construct, maintain, protect, and operate the transit system, including tunnels. SCRTD will either acquire the land or obtain easements from the owners. This section provides an inventory of the residences, businesses and nonprofit organizations which would be displaced as a result of SCRTD's ROW needs.

SCRTD has the power to acquire "by grant, purchase, gift, devise, or lease, or by condemnation...real and personal property of every kind within or without the District to the full or convenient exercise of its powers," as outlined in the California Public Utilities Code Section 30600. Section 30503 of the Code gives SCRTD the power to "exercise the right to eminent domain within the boundaries of the District to take any property necessary or convenient to the exercise of the powers granted in this part. The exercise of the right of eminent domain must comply with the requirements of the California Eminent Domain Law. (Code of Civil Procedure Section 1230.010 et seq.)

3.3.2 No Project Alternative

Under the No Project Alternative, no displacements or relocations will occur.

3.3.3 Impacts of MOS-1

During the construction and operation of the MOS-1, SCRTD would need to make different types of real property acquisitions. Full and partial acquisition of parcels would be necessary for the yard and shop, for stations, and for equipment storage. Easements, which are interests in land owned by another that entitles its holder to a specific limited use, would be necessary for both construction and the underground alignment. Temporary construction easements would be necessary for construction sites, and underground easements would be required for the alignment to pass under private property.

Construction of the MOS-1 would directly displace residents, homes, and businesses. Indirect displacement, because of development induced by the MOS-1, may also occur. This section discusses only the direct physical removal of structures for project construction and operation. Indirect displacement is discussed in the Social and Community Impacts section of this chapter. The MOS-1 will add to the land acquisition and displacement impacts that have occurred and are expected to take place in station areas. Known projects include the Oxford Plaza near 7th and Figueroa, the California Plaza and previous developments on Bunker Hill, the Title Guarantee Building and the theatre near 5th and Hill Streets. In all cases the acquisition of property and the relocation of residents and businesses by SCRTD will be in accordance with the federal Uniform Relocation and Real Property Acquisition Policies Act of 1970 (Uniform Relocation Act) and the procedures adopted under this law.

Table 3-5 presents general information on the type and extent of displacement that would occur because of construction of the MOS-1. Off-street siting of stations and facilities creates considerable displacement in some areas, as shown by the high number of commercial establishments displaced and the numerous residential displacements around the Wilshire/Alvarado Station.

Displacements under the MOS-1 do not increase or change displacements identified in the FEIS for the MOS-1 stations. Displacement of residential structures under the MOS-1 would include 24 multifamily dwellings in the Wilshire/Alvarado Station area. Table 3-6 presents population and housing characteristics of residents in the affected areas. This information was obtained from interviews with owners of the residential properties and a sampling of the tenant population. Additional population characteristics were obtained from the 1980 census statistics. The relocation report (SCRTD Staff Report on Preliminary Property Acquisition and Relocation Costs; Feb., 1983), has identified that sufficient resources should be available to meet the projected needs for replacement housing in all station environs.

Service and office businesses account for the overwhelming majority of displaced commercial and nonprofit establishments. On the average, they are small to medium-sized businesses. Table 3-7 presents detailed information about displacement of commercial/service establishments. This data was obtained from a complete occupancy survey of all

TABLE 3-5
MOS-1 DISPLACEMENTS¹

<u>AFFECTED AREAS</u>	<u>TOTAL RESIDENTIAL UNITS</u>	<u>TOTAL COMMERCIAL ESTABLISHMENTS</u>
Main Yard and Shop	0	8
Station		
Union Station ²	0	2
Civic Center	0	1
Fifth/Hill	0	3
Seventh/Flower	0	14
Wilshire/Alvarado	24	17
TOTAL	24	45

Source: SCRTD Staff Relocation Analysis/Report, August 1983.

¹These estimates are subject to change during Final Design as more detailed information is developed.

²Does not include parking structures or rail tracks.

TABLE 3-6

ESTIMATED POPULATION AND HOUSING CHARACTERISTICS
OF RESIDENTIAL DISPLACEMENTS¹

AFFECTED AREA	HOUSING TYPE			UNIT TENURE			HOUSEHOLD	
	SINGLE FAMILY	MULTI- FAMILY	NUMBER OF RESIDENTS	OWNER	RENTER	VACANT	MEDIAN INCOME	PERCENT MINORITY ²
Wilshire/ Alvarado	0	24	50	0	24	0	\$6,941*	91

Source: SCAG, 1980 Population and Housing Report.

*Since the median income in these areas is less than 80 percent of the County's median income, they are considered low income by the State of California.

¹These estimates are subject to change upon confirmation of Final Design.

²Minority is defined to include Hispanic, Black, Asian, Indian, and other.

TABLE 3-7
DISPLACEMENT OF COMMERCIAL/NONPROFIT ESTABLISHMENTS¹

<u>Affected Areas</u>	<u>Commercial Parking</u>	<u>Retail</u>	<u>Service/Office</u>	<u>Restaurant</u>	<u>Industrial</u>	<u>Total Commercial Establishments</u>	<u>Total Nonprofit/Services</u>	<u>Preliminary Estimate of Total Employees</u>
Main Yard and Shop and Line Segment	0	0	1	1	6	8	0	322
Stations								
Union Station	0	0	1	0	1	2	0	0
Civic Center	1	0	0	0	0	1	0	0
Fifth/Hill	2	1	0	0	0	3	0	20
Seventh/Flower	0	4	8	2	0	14	0	51
Wilshire/Alavardo	3	8	1	5	0	17	0	110
TOTALS	6	13	11	8	7	45	0	503

Source: SCRTD Staff Report on Preliminary Property Acquisition and Relocation Costs, April, 1983.

¹These estimates are subject to change upon confirmation of Final Design.

affected businesses. The relocation report indicates that, in most cases, it will be feasible to relocate businesses in the general vicinity of their displacement.

3.3.4 Mitigation

The Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646) mandates certain relocation services and payments by SCRTD to eligible residents, business concerns, and nonprofit organizations displaced by the MOS-1.

The Act provides for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by federal and federally assisted programs and establishes uniform and equitable land acquisition policies. The State of California's revised Government Code Section 7260 et seq. brings the California Relocation Act into conformance with the Federal Uniform Relocation Act.

In the acquisition of real property by a public agency, both the federal and state acts seek to ensure consistent and fair treatment for owners of real property; to encourage and expedite acquisition by agreement in order to avoid litigation and relieve congestion in the courts; and to promote confidence in public land acquisition. One of the fundamental requirements of the legislation is that no person be required to move from his or her home unless affordable, decent, safe, and sanitary replacement housing is available and not generally less desirable with regard to public utilities and public and commercial facilities than the home from which the individual is being displaced.

In addition to the legislation discussed above, owners of private property acquired for public use have a federal and state constitutional guarantee that their property will not be taken or damaged for public use unless they first receive just compensation. Just compensation is measured by the market value of the property taken. Generally, the fair market value of property taken is the

"highest price on the date of valuation that would be agreed to by a seller, being willing to sell but under no particular or urgent necessity for so doing, nor obliged to sell, and a buyer, being ready, willing and able to buy but under no particular necessity for so doing, each dealing with the other with full knowledge of all the uses and purposes for which the property is reasonably adaptable and available." (Code of Civil Procedure Section 1263.320a.)

The preferred approach to dealing with displacement is avoidance by modifying either the alignment or station entrance locations.

However, it is not always feasible to make such a change without causing more displacements. Where this is infeasible, SCRTD will follow the provisions of the Uniform Re-

location Act (UMTA's Circular 4530.1 dated March 1, 1978 covers the appraisal and acquisition of real property, relocation services, moving and replacement housing payments, and other allowable expense payments mandated by the Uniform Relocation Act) by identifying replacement sites for housing, businesses, and nonprofit organizations. A detailed relocation report has been developed which contains an inventory of all displaced persons and businesses and identifies those that may be difficult to relocate. The plan also evaluates the availability of replacement resources. SCRTD will establish a relocation advisory program that will coordinate all such assistance efforts by using a staff of experienced real estate specialists.

As part of the relocation advisory program, public informational meetings will be held to describe the relocation program and to identify the impacted parcels. These meetings will be held as frequently as necessary in the project station areas and at times that are convenient for the displaced persons to attend. Individual letters announcing the public meetings will be mailed to the affected owners and occupants and will also be advertised in local newspapers. Written information which explains the relocation benefits, the related eligibility requirements, and the procedures for obtaining assistance will be distributed. Each residential and commercial occupant will have a Real Estate Specialist assigned to work directly with the occupant throughout the relocation process.

Policies and procedures to ensure that displaced residential and commercial owners and occupants obtain information regarding acquisition and relocation services are described in SCRTD's Milestone Report 5: Right-of-Way Acquisition and Relocation Policies and Procedures. The policies and procedures stipulate that all real property acquired by SCRTD will be appraised for its fair market value and an amount of just compensation determined. An offer is made based on the appraisals. Each person or business required to relocate will be given 90 days notice and may be eligible for certain relocation services and payment. No residential occupant will be required to move until other available housing that is decent, safe, sanitary, and within the financial means of the displaced person has been offered. If it is determined that a sufficient amount of affordable, comparable housing is not available for replacement purposes, SCRTD may offer a last resort housing payment to supplement the relocation payments, on a case-by-case basis, to qualified residential occupants. Real Estate Specialists will work with businesses to assure that comparable facilities are available. In some cases a business may not be able to relocate without a substantial loss of its existing patronage. In this case the business may choose to receive a fixed payment in lieu of

actual moving and related expenses in order to mitigate the negative impact and business losses.

3.4 Social and Community Impacts

The MOS-1 alignment will traverse communities with many diverse social characteristics. This section identifies those communities which comprise the station environs and focuses on neighborhoods within one-half mile around each station. It discusses existing characteristics, community values, and trends and identifies impacts specific to the construction and operation of the MOS-1 as well as those that may result from increased development it may stimulate.

3.4.1 Existing Conditions

The downtown station environs have relatively low residential populations, consisting primarily of persons who have minority backgrounds with relatively even age distributions. Downtown residential development is occurring and probably will change the ethnic and economic composition of these station environs. Middle-to upper-income-oriented condominium projects are likely to attract new residents who will raise the median income while decreasing the percentage of the minority population. The elderly population may also increase when additional housing for the elderly is built. Dispersed throughout the area are residential hotels which provide low cost housing and artists' studios. Table 3-8 shows special user groups in station environs.

3.4.1.1 Union Station. The immediate station area borders on the industrial periphery of the CBD and is near several ethnic communities on the east side of the downtown area: Chinatown, Little Tokyo, and expanding Hispanic area is characterized by an overall resident population approximately 45 percent Asian, primarily Chinese, and 39 percent Hispanic, mostly Mexican. These residential areas are transitional, low-income areas strongly divided by ethnic background with very territorial populations. The Union Station architecture, important public places nearby, and ethnic contrasts create a strong image and draw significant tourist and pedestrian trade to the area. Olvera Street, the Pueblo, and Chinatown are regional attractions, generating activity both day and night. The primary traffic artery is Alameda Street, although pedestrian movement is concentrated in the areas around Olvera Street and on parking areas to the west and north.

3.4.1.2 Civic Center. Government buildings, Civic Center Plaza, the Mall, and the Music Center Complex to the north are the major focuses of the station area. Along Hill Street, just to the west of the proposed station entrances, lies a portion of the high-density Bunker Hill housing development primarily for the

TABLE 3-8
SPECIAL USER GROUPS

<u>Station Environs</u>	<u>Total Population</u>	<u>Percent Minority</u> ¹	<u>Percent Aged 5-19 yrs</u>	<u>Percent Aged 65+ yrs</u>	<u>Percent Transit Disabled</u>	<u>Percent Households Without Vehicle Access</u>	<u>Median Annual Family Income(\$)</u>
Union Station	6,194	92%	26%	11%	4.0%	55%	9,091*
Civic Center	6,300	71%	11%	16%	6.6%	80%	9,215*
Fifth/Hill	9,721	56%	6%	19%	6.0%	92%	8,486*
Seventh/Flower	14,065	72%	14%	16%	4.5%	75%	9,818*
Wilshire/Alvarado	39,530	76%	16%	13%	5.7%	54%	10,045*

Source: U. S. Bureau of Census, 1980

*Station environ with an asterisk have median income defined by State of California as low income (less than 80 percent of L.A. County median income).

¹Minority include Hispanic, Black, Asian and Indian and Other populations as identified by U. S. Census Percentages have been rounded off. Exact percentages can be found in the SCRTD Technical Report on Social and Community Impacts (1983).

²Transit disability refers to those residents of working age (16 to 65 years) with physical handicaps who cannot easily use normal transit.

elderly but planned for additional market-rate housing for all population groups.

3.4.1.3 Fifth/Hill. This station area lies in the heart of the CBD. The Pershing Square area offers pedestrian access to a number of important activity centers--retail commercial shopping on Broadway, the Jewelry Mart, Grand Central Market, Spring Street, the Biltmore Hotel, and the Main Library. The focus of the area for residents, employees, and tourists is Pershing Square. The Pershing Square plaza is heavily used during daylight hours, attracting thousands of persons from all walks of life. After office hours the area is generally avoided and there is little activity.

3.4.1.4 Seventh/Flower. This station area contains the important office, retail shopping, and financial buildings of the CBD. Street also has access to the Seventh Street retail stores. As a result, Seventh Street is a major auto and pedestrian artery through the Central Business District. Pedestrian volumes are heavy during the day. Housing is located on the periphery of the station environs in the South Park and the Convention Center areas.

3.4.1.5 Wilshire/Alvarado. This station area is in transition and contains a predominantly young, Hispanic population. The area serves as a port of entry for Central Americans. Shops and services are well patronized by this largely low income population. Residents value the ethnic homogeneity of the area, as well as its central location and good public transportation. The Hispanic population will probably increase in the area because rental rates are comparatively low. The lack of new housing units may increase the already high level of overcrowding.

Existing zoning in the Wilshire/Alvarado Station Area permits a FAR of 11.90. Under the proposed specific plan for Post Metro Rail construction, a FAR of 5.63 is permitted. Therefore, the specific plan for the Wilshire/Alvarado Station restricts commercial development to approximately half that permitted under existing zoning.

3.4.2 Impacts of No Project Alternative

The No Project Alternative is not expected to have any adverse social or community impacts. Existing conditions would continue.

3.4.3 Impacts of MOS-1

Impacts have been assessed in terms of community cohesion and local accessibility. Impacts affecting community cohesion include land use and displacement; traffic; aesthetics; and noise and vibration. Social change in neighborhoods can be perceived as both positive and

negative, depending on the social values and characteristics of the community. The maintenance of essential neighborhood qualities, which are important to community cohesiveness, have been an integral objective in the planning of station location and design.

3.4.3.1 Land Use and Displacement. Two types of displacement could occur as a result of the construction and operation of the rail rapid transit system which could affect community cohesion directly and indirectly. Direct displacement, which involves acquisition and removal of existing residences and facilities for MOS-1 construction, are discussed in the Land Acquisition and Displacement section of this chapter. Generally, displacement in most station areas is minimal relative to the total population, and a loss of cohesiveness for the majority of station environs has been determined to be insignificant if occurring at all.

Indirect displacement could occur as a result of the adopted land use policies calling for intensification of development in established centers. As documented in the Land Use and Development section of this chapter, increased development is a primarily positive impact in all station environs, especially those within designated centers. Economically stagnant or declining areas would be revitalized, additional commercial services and jobs would be more accessible to the surrounding community, and opportunities would be created for pedestrian-oriented activity. In most of the station environs, increased development could increase community cohesion by fostering social and economic interaction. However, development can also impact the existing community activities in other ways.

Increased development may be seen as negative when it displaces existing uses, such as housing, commercial services, and public facilities, which are perceived by residents as vital to community cohesion. This displacement may occur either as a direct result of redevelopment or indirectly if rents were to rise beyond the financial means of existing tenants. Impacts due to increased rents may especially affect social, recreational, and cultural services which generally operate on tight budgets and can quickly feel economic pressures. Generally, the degree of impact on cohesion due to these indirect as well as direct displacements can be considered proportional to a neighborhood's degree of ethnic homogeneity, its frequency of daily social interaction at local social or religious institutions, and cultural and social perceptions. Potential changes to community cohesion within each station's environs is described below.

3.4.3.2 Central Business District. Under the No Project Alternative, substantial increases in both residential and commercial development is expected to occur in the CBD. The MOS-1 will increase this development trend to some degree. Joint development may serve as a stimulus to further development, and

surrounding property values may increase leading to either redevelopment or increased rents. This may have a negative impact on existing low-income residents and businesses such as residential hotels and social, recreational, and cultural services.

The Los Angeles Community Redevelopment Agency (CRA) has expressed a concern that galleries and art-related activity such as artists' studio space may be indirectly displaced. These uses, which are currently dispersed throughout the station environs, generally occupy marginal, vacant commercial space. The CRA anticipates that the Museum of Contemporary Art, planned for Bunker Hill, will increase the demand for these types of facilities.

Residential hotels are dispersed throughout the station environs, which are zoned almost exclusively for commercial use. Residential hotels are especially vulnerable to indirect displacement as they are frequently located in buildings which are susceptible to reinvestment--either removal and replacement by new commercial buildings or renovation, probably as office space. Occupants of these hotels will be negatively impacted as they are generally low-income residents.

The demographic profile in the CBD will begin to change towards a higher median income, a higher level of auto ownership, and a greater percentage of whites, as middle and upper income professionals, seeking to live closer to work, move in. The rise in population in the downtown area will increase the demand on existing social services. While this is primarily a fiscal impact, it also affects the "quality of life" in the CBD. Displacement of commercial establishments at the Fifth/ Hill and Seventh/Flower Stations could reduce the availability of local services, thus somewhat altering local activity patterns.

3.4.3.3 Wilshire/Alvarado. Under the MOS-1, population is expected to increase substantially over what would have occurred under the No Project Alternative. The proposed action could change the demographic characteristics of the area, as median income population might increase slightly if new residential units appeal to higher income groups. If this occurs, current residents might not be able to afford higher rents in the new housing. New commercial development in the currently viable lower income Hispanic commercial center might jeopardize the area's many small marginal businesses which cater to this population.

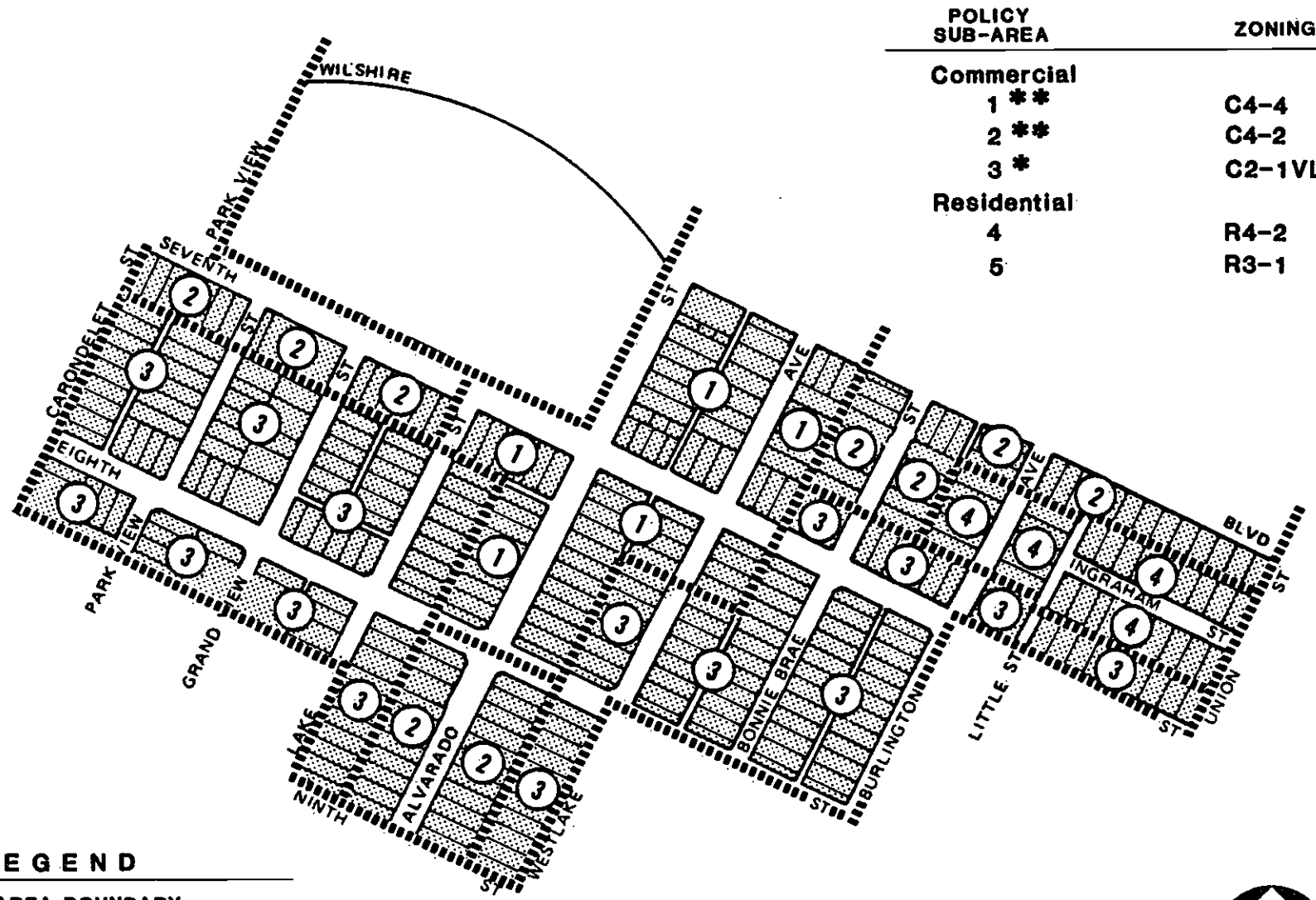
Under the MOS-1, 17 commercial establishments and 24 residential units will be directly displaced. The majority of the residents to be displaced are Hispanic. These displacements, therefore, may negatively impact this cohesive Hispanic community. Additionally, since most of the commercial establishments to be

displaced are typical of the many small marginal businesses in the area which cater to the predominantly Hispanic population, this may also negatively impact community cohesion. Mitigation measures have been identified, however, which may assist these establishments in remaining in the community. The SCRTD Relocation Analysis Report indicated that sufficient resources should be available within a one-mile radius to meet the projected needs for replacement housing.

An examination of the city's Specific Plan for the Wilshire/Alvarado area reflects that all residential zoning which exists today is proposed to continue in the future in that same classification. This should result in a continuation of the availability of housing for the Hispanic residential population in the area and should not conflict with the apparent trend of the Hispanic population increase in the Wilshire/Alvarado vicinity. The materials in Figure 3-2 and Figure 3-3 illustrate the continuation of all land use classifications designated as residential. A further examination of the Specific Plan for the Wilshire/Alvarado Station (the specific plan of the City of Los Angeles) reflects that significant bonuses are granted to developers in the immediate environment of the Wilshire/Alvarado Station for providing community use facility, senior housing, low to moderate cost housing, rental housing, and condominiums and stock cooperatives. These bonuses could create a substantial incentive for developers in the area to further the provision of low cost housing. Under current zoning at the Wilshire/Alvarado area, the area is currently utilized for residential and some commercial at an FAR of 13. Due to proposed Specific Plans for this area, commercial land currently occupied by residential property will be down-zoned from the commercial classification to multi-family residential. This creates an economic disincentive to transforming properties currently under residential utilization to an even more intense commercial utilization. As was mentioned earlier, the Transit Corridor Specific plans of the City of Los Angeles are being reviewed for final adoption. The documents were prepared by the City Planning Department, and are under intensive study by the City Planning Advisory Board for forwarding to the Director and to the Planning commission, where they will be adopted with intensive public scrutiny. The Transit Corridor Specific Plans are being prepared under proven State Enabling Legislation. The other significant protection of low income housing stock at the Wilshire/Alvarado station is the zoning roll-back mandated by the California legislature under assembly Bill 283. An additional significant provision of the Transit Corridor Specific Plans permits high FAR's only when land to which the high FAR applies is physically connected (tunnel, overpass, etc.) to a metro rail transit station.


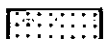


3.4.4 Mitigation

Measures to mitigate social and community impacts are shown in Table 3-9.



POLICY SUB-AREA	ZONING
Commercial	
1 **	C4-4
2 **	C4-2
3 *	C2-1VL
Residential	
4	R4-2
5	R3-1

LEGEND

-  SUB-AREA BOUNDARY
-  POLICY SUB-AREA
-  TDR DONOR AREA
-  TDR DONOR & RECEIVING AREA



Southern California Rapid Transit District
Metro Rail Project

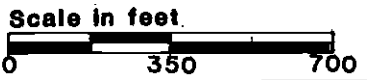
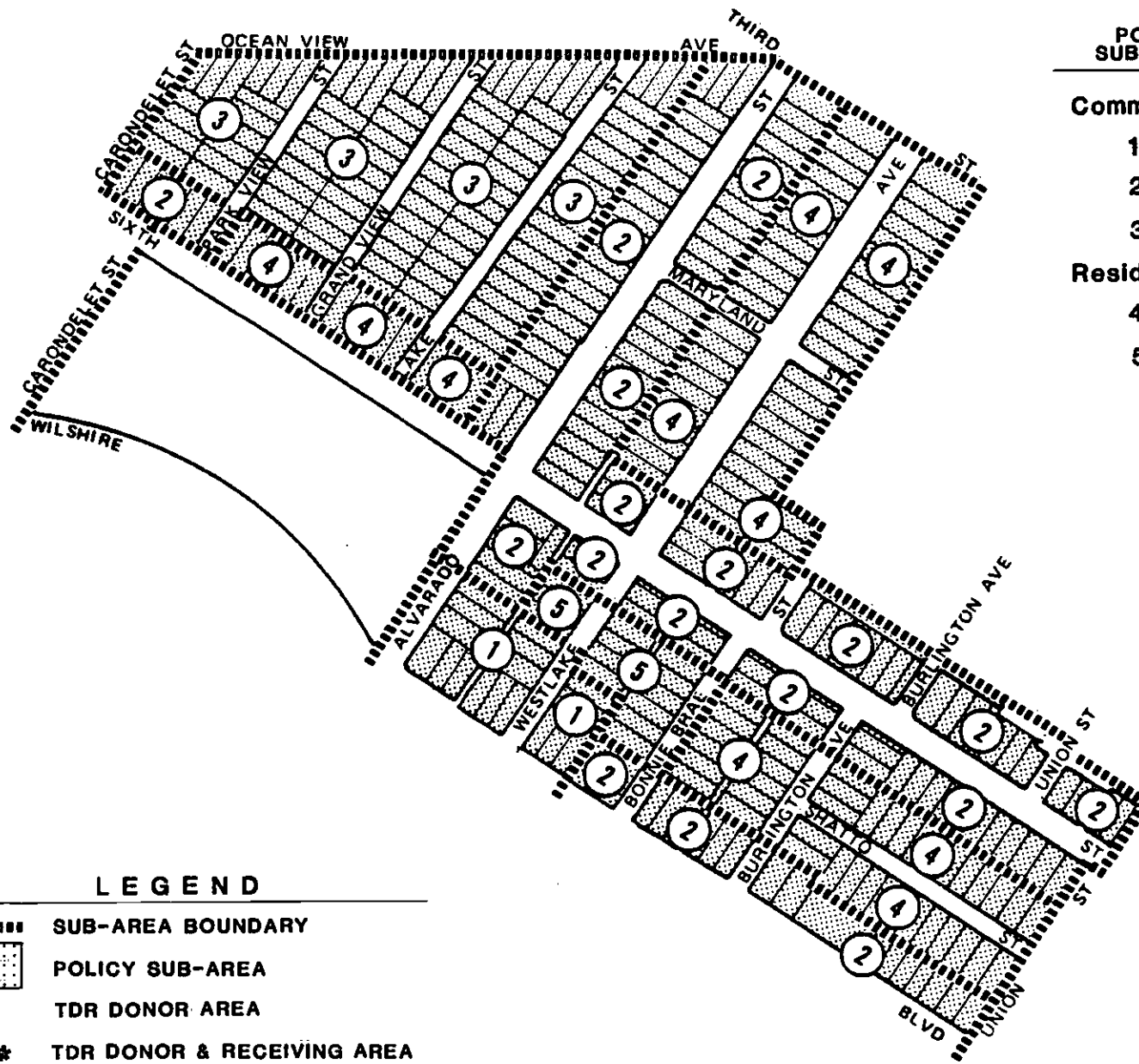


Figure 3-4 Metro Rail Transit Corridor Specific Plan - Map B Alvarado Station Area South Of Wilshire



POLICY SUB-AREA	ZONING
Commercial	
1 **	C4-4
2 **	C4-2
3 *	C2-1VL
Residential	
4	R4-2
5	R3-1

LEGEND

- SUB-AREA BOUNDARY
- ▤ POLICY SUB-AREA
- * TDR DONOR AREA
- ** TDR DONOR & RECEIVING AREA



**Southern California Rapid Transit District
Metro Rail Project**



**Figure 3-3 Metro Rail Transit Corridor
Specific Plan - Map A
Alvarado Station Area
North Of Wilshire**

TABLE 3-9

SDCIAL AND COMMUNITY IMPACT MITIGATION

<u>Mitigation Measures SCRTD Will Implement</u>	<u>Effectiveness</u>	<u>Applicable Station Areas</u>	
1. Relocation assistance to all residents and businesses directly displaced by the project.	Moderate High	All, except civic center	
2. Assist City and County of Los Angeles in the development of Specific Plans for each station.	High	All	
<u>Mitigation Options</u>	<u>Effectiveness¹</u>	<u>Agencies That Could Implement</u>	<u>Applicable Station Areas</u>
1. Provide relocation assistance to residential tenants displaced by new development in station areas.	Low	SCRTD, LA City Housing Authority LACDC, CDC, CRA	All
2. Include affordable and market rate housing at stations on commercially zone sites in lieu of increasing density in adjacent neighborhoods.	Moderate	SCRTD, LADDP, LADRP, CRA	Civic Center, Fifth/Hill, Seventh/Flower
3. Establish special rent control districts to avoid severe increases in rental rates in station areas.	Moderate-High	LA City Council LA County Board of Supervisors, CDD, CRA	All

TABLE 3-9 (continued)

SOCIAL AND COMMUNITY IMPACT MITIGATION

<u>Mitigation Options</u>	<u>Effectiveness</u> ¹	<u>Agencies That Could Implement</u>	<u>Applicable Station Areas</u>
4. As a last resort, provide housing assistance for low income residential tenants in station areas to mitigate severe increased in rental rates.	Low	LA City Housing Authority, LACDC, CRA, CDD	All
5. Implement measures to reduce traffic spillover into adjacent neighborhoods (see Transportation section)	Low-Moderate	LADOP, LADOT, LADRP, CRA	All
6. Provide relocation assistance to business tenants displaced by new development in station areas.	Low	SCRTD, CEDO, CDD, LACDC, CRA	All
7. Establish special commercial zoning or development review procedures to preserve existing small businesses that provide community services in station areas.	Moderate-High	SCRTD, LADOP, LADRP, CRA	All
8. Encourage tenancy and investment in joint development to displaced firms.	High	SCRTD, LADOP, CRA, LACDC, CDD	All
9. Provide relocation assistance to social services or facilities displaced by new development.	Low	SCRTD, CEDO, CDD, LACDC, CRA	All

TABLE 3-9 (continued)

SOCIAL AND COMMUNITY IMPACT MITIGATION

<u>Mitigation Options</u>	<u>Effectiveness</u> ¹	<u>Agencies That Could Implement</u>	<u>Applicable Station Areas</u>
10. Establish special zoning or development review procedures to preserve existing and accommodate new social services and facilities in station areas.	Moderate-High	SCRTD, LADOP, LADRP, CRA	All
11. Encourage the inclusion of displaced and new social services and facilities in joint development projects/stations.	Moderate	SCRTD, LADOP, LADRP, LACDC, CRA, CDD	All
12. Require 15% of all new housing constructed in the CBD to be low-moderate income housing.	High	CRA	Downtown stations

¹The following scale has been devised to rate the probable degree of effectiveness in mitigating a potential impact:

- Low - Options designed to offer compensatory assistance after the fact to local residents, businesses or institutions experiencing hardship.
- Moderate - Options intended to soften, but not eliminate the impact on the community.
- High - Option essentially mitigates the impact, largely by preventive action.

- Legend:
- CRA = Community Redevelopment Agency of Los Angeles
 - LACDC = Los Angeles County Community Redevelopment Commission (including the Economic Development Corporation)
 - LADOP = City of Los Angeles Department of Planning
 - LADOT = City of Los Angeles Department of Transportation
 - LADRP = Los Angeles County Department of Regional Planning
 - CEDO = City of Los Angeles Economic Development Office
 - CDD = City of Los Angeles Community Development Department
 - CDC = Los Angeles Community Development Commission

3.5 Economic Impacts

MOS-1 construction may cause local economic impacts. Potential economic impacts involve changes in the level of economic activity in each of the station areas. Potential fiscal impacts are the revenues and service costs that the proposed action would generate to local governments in the City of Los Angeles. The proposed action would generate both short term employment opportunities related to the construction of the project and long term jobs required for the day-to-day operation of the MOS-1. The size of any short-term employment impact varies directly with the total construction costs. The jobs created would be primarily in the construction, material, manufacturing, and service industries (not including employment generated in the manufacture of the system's rolling stock and electrical equipment and in industries that support construction).

In addition to economic and fiscal benefits generally occurring to the area and its residents, considerable economic benefits can accrue to properties in the vicinity of a station, especially properties that are appropriate for higher intensity commercial development. SCRTD will be pursuing a range of measures to recapture a portion of these benefits. These "value capture" revenues will be used to reduce the proposed actions' construction expenses.

The Milestone 6 Report discussed the various mechanisms being considered to generate value capture revenues. They include: Benefit Assessment Districts, Transfer of Development Rights, Tax Increment Financing, Station Cost Sharing and Connection Fees and Joint Development.

3.6 Noise and Vibration

Noise and vibration impacts of the proposed project are described in this section. Material for this section is derived from the Metro Rail FEIS published in December 1983 and a series of special studies conducted by Wilson, Ihrig and Associates, Inc. (1982), the noise and vibration engineering design consultants to SCRTD. These special studies have been summarized in the SCRTD Technical Report on Noise and Vibration referenced in the Metro Rail FEIS.

3.6.1 Ambient Noise and Vibration Environment

In this section the ambient noise and vibration conditions are described.

3.6.1.1 Noise. Seventy-eight sites were chosen from which to characterize the ambient noise levels along the full 18.6 mile Metro Rail Route. Of these sites, seven were within the 4-mile CBD to Wilshire/Alvarado (MOS-1) segment. These sites are listed in Table 3-10 of this report, and have the same reference numbers, 1, 4, 101, 102, 103, 104 and 105 as the SCRTD Technical Report. At these sites, a combination of spot checks and 24 hour noise measurements were obtained to determine the ambient noise

TABLE 3-10

AMBIENT AND PROJECT RELATED NOISE AND
VIBRATION DATA FOR MOS-1

Approximate Location ²	N-noise ³ V-Vibration ⁴	Existing Conditions (Leqs ⁵)		Estimated Ldn/CNEL ⁵	Ground-Borne Noise Standard (single event passby ⁶)	Predicted Project Noise Level
		PM	Rush Night			
1. El Pueblo State Historic Pk Plaza on Olvera Street	N V	65 49	55 43	62-64	45-50	35-41
101. Hill St. south of 1st St. State Office Bldg.	N V	71 55	60 47	65-67	40-45	29-35
102. Hill St. north on 3rd St.	N V	70 59	63 51	74*	50	31-37
103. 7th St. at Hartford Ave.	N V	69 64	58 50	67-69	45-50	38-44
4. Wilshire at Flower. Hyatt Hotel	N V	75 48	NM ⁶ NM ⁶	72-74	40-45	34-40
104. Travelodge Motel 1710 W. 7th St.	N V	66 55	60 49	67-69	40	30-36
105. Near Mid- Wilshire Con- valescent Hospital	N V	63 54	54 46	64-66	40	29-35

Source: Wilson, Ihrig and Associates, Inc., Noise and Vibration Survey for the Metro Rail project, Supplemental Noise and Vibration Survey Noise and Vibration Study for Alternative Route Alignments, 1982.

¹These measured levels are expected to also represent No Project Conditions in the Year 2000 because expected traffic volume increases, the factor most likely to affect ambient noise conditions, will not result in detectable noise increases.

²Numbers refer to measured locations, as defined during the noise monitoring survey.

³Noise levels - dB(A).

⁴Weighted vibration velocity levels - dB rel micro in/sec.

⁵Ldn and CNEL seldom vary more than 1 dB and are essentially equal measures. Noise descriptors are defined in the Technical Report.

⁶NM = Not Measured.

*Reflects actual 24-hour measurement.

conditions. Along the MOS-1, these levels were measured to be 63 to 75 dB(A) during rush periods (4:00 PM to 6:00 PM); 62 to 73 dB(A) during the day; 58 to 68 dB(A) during the evening; and 54 to 63 during nighttime hours. These are relatively high noise levels and were observed to be primarily due to existing vehicle traffic.

3.6.1.2 Vibration. Existing exterior vibration sources include automobiles, trucks, buses, underground mechanical equipment, and pedestrians. The vibration level data was taken at the same time and place as the sound level data and are also documented (along with methodology) in the SCRTD Technical Report on Noise and Vibration (1983). The vibration data was analyzed to obtain a single number velocity level weighted to approximate the human response to vibration. The weighting methodology is described in the SCRTD Technical Report on Noise and Vibration. Vibration data is also provided in Table 3-10 and shows that weighted vibration velocity levels range from 64 to 48 dB during PM rush hours, and 51 and 43 dB during nighttime hours.

3.6.2 Impacts of No Project Alternative

Under the No Project Alternative, existing noise and vibration conditions are not expected to change significantly. Traffic will increase but not enough to discernably increase noise levels.

3.6.3 MOS-1 Impacts

For commercial areas, noise from transit train operations is primarily a daytime consideration. In residential areas, noise from trains can be intrusive during evening and nighttime, when the community ambient noise level is generally lowest. In commercial areas, daytime noise measurements are therefore the most relevant for transit system design. In residential areas, the evening and nighttime operations and noise levels are of primary concern.

To assess the noise and vibration impacts from the MOS-1 the expected levels from rolling stock, maintenance and yard operations, auxiliary equipment, feeder transit systems, and ancillary facilities have been examined and compared with existing ambient levels and the Metro Rail Noise and Vibration Criteria (Wilson, Ihrig, 1982). Projections were made of the expected ground-borne noise levels from train operations in subway. Special attention was placed on identifying potential impacts on noise sensitive land uses including schools, hospitals, rest homes, and medical facilities. Along MOS-1 these include: an elderly housing complex, two motels, two hotels, a theatre, and a convalescent hospital.

3.6.3.1 Subway Operations. Underground rail rapid transit systems create ground-borne vibration and noise, which are transmitted from the subway structure to adjacent buildings. This vibration comes from wheels rolling on the rails and is generally perceived in nearby buildings as a low-pitched rumbling. The vibration occasionally may be perceptible as mechanical motion. Ground-borne vibration which might be transmitted to buildings near the subway is of such low level that there would be no possibility of structural damage.

Where ground-borne noise impacts exceed the design standards, mitigation measures will be required to reduce the ground-borne noise from transit train operations to acceptable levels.

3.6.3.2 Storage and Maintenance Yard. Noise would result from a number of major sources, including transit cars rolling on the tracks, transit car auxiliary equipment, coupling and uncoupling of cars, train horns, maintenance work, workers shouting, telephone buzzers, and public address systems. The Union Station main yard would be in a train switchyard area with already high noise levels.

3.6.3.3 Vent Shafts. With no acoustical treatment in the vent shafts, most sounds from the system would be transmitted to the surface. The levels permitted in the noise and design criteria are generally lower than typical ambient levels. Acceptable levels are keyed to land use and are measured 50 feet from the source. Since noise will be kept within ambient limits, no significant adverse impacts will occur.

3.6.3.4 Ancillary Facilities. The final location of all ancillary facilities has not been determined, so only a general discussion of the noise from them follows. As with vent shaft openings, the noise from ancillary facilities is subject to the Metro Rail design criteria for maximum permissible noise levels. The Metro Rail design criteria would ensure that the noise generated by ancillary facilities, regardless of their final location, would be compatible with the ambient noise of the surrounding area. The criteria for noise from ancillary facilities are similar to those for vent shafts (see SCRTD Technical Report on Noise and Vibration, 1983), except that equipment generating continuous noise levels shall be limited to 5 dB(A) lower because its tonal components can make it more obtrusive. Most power transformers will be below ground to mitigate noise impact. The design of each ancillary facility will incorporate noise reduction features including sound barrier walls around noise sources, complete enclosure around noise sources, and sound attenuators on fans, blowers, and cooling towers.

3.6.3.5 Traffic. A 100 percent increase in the level of traffic generally causes about a 3 dB(A) noise increase. This 3 dB(A) is the level of change at which a noise change would be noticeable. Changes in traffic around stations would be caused primarily due to feeder bus, park-and-ride and kiss-and-ride trips. This change which is not expected to exceed 20 percent, would not result in any appreciable increase in cumulative noise levels.

3.6.4 Mitigation Measures

Mitigation of transit operational noise and vibration is approached by establishing performance standards, design criteria, and vehicle specifications. SCRTD is committed to enforcement of established design criteria and assurance that such designs perform in accordance with specifications. The major tool utilized to accomplish this will be the contract documents developed between the District and designers, construction contractors, and vehicle suppliers.

3.6.4.1 Subway Operations. The detailed descriptions and explanations of specific impact mitigation measures and associated design criteria are contained in the report Noise and Vibration Design Criteria (Wilson, Ihrig and Associates, 1982) prepared for the Metro Rail Project. The key features of the mitigation measures described therein include:

- (a) Using continuous welded rail instead of jointed rail on the steel wheel/rail interface.
- (b) Utilizing rail vehicles with lightweight trucks rather than heavyweight trucks in order to provide minimum unsprung weight.
- (c) Using special grinding (truing) equipment to ensure the smoothness of wheel/rail interaction.
- (d) Using Resilient Rail Fasteners instead of Fixed Rail Fasteners (rigidly attached rails) as a track fixation method.
- (e) If necessary, utilizing Resiliently Supported Ties where Resilient Rail Fasteners are inadequate to satisfy applicable noise standards and criteria.

SCRTD is committed to the above design configurations and will include them in system design. These built-in mitigation measures are proven technology which automatically reduce noise and vibration levels by a significant degree, and satisfy noise abatement criteria in most cases without the need for additional mitigation. This is especially true of the Resilient Rail Fasteners (RRF) and Resiliently Sup-

ported Ties (RST) mentioned above. Certain locations require more effective noise mitigation measures. The complete detailed description of noise predictions and recommended track fixation methods (RRF, RST, FST) is in the SCRTD Technical Report on Noise and Vibration (1983). In this report, there are several locations identified at which Floating Slab Trackbed (FST) fixation methods may be needed. The FST along with other techniques listed below can provide greater sound reductions:

- (a) Minor shifts in horizontal and/or vertical alignment.
- (b) Crossover relocation.
- (c) Rail system structure modification.
- (d) Non-Standard Floating Slab Design.
- (e) Vibration isolation by blocking direct transmission of vibration where the subway structure is unusually close to buildings and their foundations. This can be accomplished by using elastomer pads and intervening soil as special resilient elements.
- (f) Tunnel noise abatement to improve the interior acoustical environment for employees and passengers. This can be accomplished by integrating an acoustical absorption system within the tunnel structure.

During Final Design a building by building analysis will be conducted along the alignment of MOS-1. This will examine actual usage and the sensitive receptor nature of each building. Any one or a combination of these mitigation measures will be implemented, as needed, at all locations where noise standards are being exceeded to meet the noise and vibration criteria adopted for the project.

3.6.4.2 Fan and Vent Shafts. These facilities will be designed to minimize noise intrusion by including the following specific mitigation measures:

- (a) Cellular glass and mineral fiber applied to the wall and ceiling surfaces of the shafts to maximize absorption.
- (b) Standard duct attenuators.
- (c) Contract specifications requiring certified maximum sound power levels for the fans.

3.6.4.3 Ancillary Facilities. These facilities, including power substations and emergency power generation equipment, will be modified to minimize noise and vibration using the following specific mitigation measures:

- (a) Below-ground location of power transformers.
- (b) Total enclosure of noise source.
- (c) Absorption material embedded within the facility.
- (d) Barrier walls surrounding the source.
- (e) Sound attenuators on fans and ducts.
- (f) Special mufflers.

3.7 Air Quality

The MOS-1 is located within the South Coast Air Basin (SOCAB), which includes 6,580 square miles of the Los Angeles metropolitan area. Included within this air basin are the highly urbanized portions of Los Angeles, San Bernardino, and Riverside Counties, and all of Orange County. The existing air quality condition and future projections are summarized from the SCRTD Technical Report on Air Quality (1983). This summarization, although not repeated in this Environmental Assessment, is included by reference.

3.7.1 Existing Conditions

Section 9.2 of Chapter 3 of the FEIS covers the conditions to be found in the South Coast Air Basin and discusses air pollution meteorology, air quality standards, study-area air quality, the local air quality setting and consistency with regional transportation planning. This material is summarized below in sections on air quality standards and consistency with regional transportation planning.

3.7.1.1 Air Quality Standards. The State of California and the Federal Government each have established air quality standards for various pollutants, set at or below levels with a sufficient margin to protect public health and welfare.

The South Coast Air Quality Management District (SCAQMD) monitors air quality at numerous locations in SOCAB; three of which are within the study area. A summary of air quality data collected at study area monitoring stations for the year 1980 is provided in Table 3-11. Federal standards were not met for ozone, carbon monoxide, nitrogen dioxide, and lead. Except for sulfur dioxide, SOCAB has been designated a nonattainment area for each of the primary pollutants. California failed to meet the 1982 attainment standard deadline for particulate matter but was among the states granted an extension until 1987 to meet the standards for carbon monoxide and ozone.

3.7.1.2 Consistency With Regional Transportation Planning. An assessment of a project's consistency with local, regional, state, and federal plans is required for all projects receiving federal funding. Two plans are of particular concern for the MOS-1: the Regional Transportation Plan (RTP) and the Air Quality Management Plan (AQMP). The proposed action is one part of the RTP for Southern California. The RTP provides the basis for projecting future growth and associated traffic patterns and for determining the emissions changes associated with that growth. AQMP currently has a long-range target of reducing reactive organic gases (nitrogen oxides and hydrocarbons) by 50 tons per day through transportation management and design (AQMD/SCAG, 1982). To the extent that MOS-1 reduces VMT, trip generation, or congestion by diverting automobile trips, it is consistent with the long-range strategies of the AQMP.

TABLE 3-11

AIR QUALITY SUMMARY FOR STUDY AREA MONITORING STATIONS, YEAR 1980

<u>Contaminant/Station</u>	<u>Days Exceeding State Standards</u>	<u>Days Exceeding Federal Standards</u>	<u>Annual Average of Monthly 1-Hr Max. Air Contaminant Concentrations</u>	<u>State Standard</u>	<u>Federal Standard</u>
OZONE					
Los Angeles CBD	109	50	0.29 ppm		
CARBON MONOXIDE					
Los Angeles CBD	7 ^{a,b}	14 ^b	19 ppm		
NITROGEN DIOXIDE					
Los Angeles CBD	16	annual standard exceeded	0.44 ppm		
SULFUR DIOXIDE					
Los Angeles CBD	0	0	.037 ppm	.05 ppm/24 hr	0.14 pp,/24 hr
PARTICULATE MATTER					
Los Angeles CBD	55	0	108 ^c ug/m ³	100 ug/m ³ /24 hr	260 ug/m ³ /24 hr
LEAD					
Los Angeles CBD	5 months	1 quarter	2.68 ^d ug/m ³	30/day avg.	quarterly avg.

Source: SCAQMD, May 1981. SCAQMD 1981.

NM₃ = Not Monitored.

ug/m³ = Micrograms per cubic meter.

^a Data shown are for the old ppm 10 hr standard which was revised in December 1982. The State eliminated the 12 hr CO standard and adopted the Federal 8 hr standard. The 40 ppm/hr CO standard was changed at the same time to 20 ppm/hr.

^b Data is for 8 hr standard; 1 hr standard was not exceeded.

^c Annual average of total samples.

^d Annual average of monthly concentrations.

3.7.2 Air Quality Impacts

The air quality impacts are described in this section.

3.7.2.1 No Project Alternative Impact. The No Project Alternative is predicted to have a VMT level within the 5 county study area of 240,841,000 in the Year 2000. This includes both work and non-work trips. The five counties which make up the study area are Los Angeles, Ventura, Orange, San Bernardino and Riverside. The regional air pollutant levels associated with the No Project Alternative are shown in Table 3-12.

3.7.2.2 MOS-1 IMPACTS

The MOS-1 is expected to reduce regional VMT by approximately 225,000 per day. According to traffic modeling results, the average trip length does not change as a result of implementing the MOS-1. Table 3-12 shows the resulting reduction in vehicular emissions. The rail project will have a negligible effect on reducing mobil source emissions in the Wilshire Corridor. Even when taking into account the pollutants resulting from project-related power generation, net impacts are still slightly favorable in all cases except sulfur dioxide, for which the small net increase would not result in any air quality standards being exceeded.

The MOS-1 will conform with the State Implementation Plan. In the Southern California region, the AQMP is the regional component of the State Implementation Plan, prepared pursuant to the Clean Air Act. The MOS-1 is in conformance with the AQMP, since it fulfills the three basic requirements (identified in Section IX.7 of the AQMP) to be addressed in any review for conformity:

- (a) The AQMP/SIP is being implemented in the area where the project is proposed.
- (b) SCAG has found that the project is consistent with the SCAG 82 growth forecast (the adopted growth forecast policy).
- (c) The MOS-1 has been part of the SCAG Regional Transportation Plan (the applicable transportation project list) for seven years.

3.7.3 Cumulative Impacts

The MOS-1 will produce a very slight improvement in regional air quality while causing a slight worsening of air quality near the parking facility at Union Station. The cumulative impacts of MOS-1 with other projects are expected to be overshadowed by improvements in air quality which will result from improvements in the regional fleet emission controls.

Table 3-12

DIRECT REGIONAL AIR QUALITY BENEFITS
YEAR 2000

<u>Pollutant</u>	<u>No Project Alternative</u>	<u>MOS-1</u>	
	<u>Regional Vehicular Emissions (tons/day)</u>	<u>Regional Vehicular Emissions (tons/day)</u>	<u>Regional Emissions Benefit (tons/day)</u>
Carbon Monoxide	461.3	459.7	1.6
Reactive Hydrocarbons	37.7	37.6	.1
Oxides of Nitrogen	57.9	57.7	.2
Sulfur Dioxide	8.9	8.88	.02
Suspended Particulates	12.4	12.14	.06

Source: WESTEC Services, Inc.; SCRTD; Schimpeler-Corradino Associates

3.B Energy

3.B.1 Existing Conditions

The description of the sources of electrical power for the Los Angeles Region and the regional useage of electrical and petroleum energy is contained in Section 10.2 of Chapter 3 of the FEIS. Electrical power is obtained from plants throughout the Western States although nearly half is produced within the Los Angeles Basin by steam generating plants. Gasoline consumption in the region is declining and annual sales for Year 2000 are projected at 4,140 million gallons.

3.8.2 Impacts

3.B.2.1 No Project Alternative Impacts. The No Project conditions in the Year 2000 are shown in Table 3-13. The total energy use for the Los Angeles region transportation function is 552,371 billion BTU's of which buses consume 1% and automobiles 99%. The total annualized energy demand of the No Project Alternative is 642,888 billion BTUs. Of this total, the bus sector would account for less than one percent and the automobile the remaining 99 percent. Propulsion energy totals 424,805 billion BTUs which translates to 3.36 billion gallons of gasoline for automobiles and 34.4 million gallons of diesel fuel for buses consumed annually.

3.8.2.2 MOS-1 Impacts. The energy necessary to construct and operate the MOS-1 is expended in guideway construction, vehicle manufacturing, vehicle maintenance, vehicle propulsion and station operations. The energy budget for construction of the system is composed of two elements, guideway construction based on a process analysis method, and vehicle manufacturing as follows:

(a) Guideway Construction	2,301 Billion BTU
(b) Vehicle Manufacturing	
4.1 Billion BTU 30 vehicles	<u>123 Billion BTU</u>
(c) Total Construction Energy	2,424 Billion BTU

Each year additional energy must be used to operate the MOS-1. The three elements of this annual energy requirement are vehicle maintenance, vehicle propulsion, and station operations:

(a) Vehicle Maintenance	35 Billion BTU
(b) Vehicle Propulsion	58 Billion BTU
(c) Station Operation	<u>142 Billion BTU</u>
(d) Total Annual Energy	235 Billion BTU

In order to provide a basis for comparing the total energy costs of the alternatives, the construction and manufacturing energy costs have been annualized assuming a conservative 50 year project life for guideway components and a 30 year life for rail cars. Fleet annual vehicle

TABLE 3-13

LOS ANGELES BASIN TRANSPORTATION ENERGY DEMAND IN THE
YEAR 2000 UNDER NO PROJECT CONDITIONS

COMPONENT	ENERGY USE FACTOR (BTUS PER MILE)	ANNUAL VMT (MILLIONS)	TOTAL ENERGY (BILLIONS OF BTUS)
VEHICLE PROPULSION			
AUTO	5208	80682	420219
BUS	41688	110	4586
VEHICLE MAINTENANCE			
AUTO	1600	80682	129091
BUS	1000	110	110
VEHICLE MANUFACTURE			
AUTO	1100	80682	88750
BUS	1200	110	132
TOTAL			642888

SOURCE: SCRTD

NOTE: ENERGY FACTORS DERIVED FROM TRANSPORTATION RESEARCH BOARD,
KULASH AND MUDGE, AND SCRTD (BUS PROPULSION).

mileage was assumed at 692,640. The energy requirements for vehicle maintenance and station operation are based on the size and type of stations and yards designed for the MOS-1.

The total annualized energy requirement for the 4 mile MOS-1 are compared with the annualized energy requirements for the No Project Alternative. This table shows the five separate constituent sources of annual energy demand, each alternative's total annual energy demand, and the total annual operating energy use for each alternative. The total annual operating energy is overwhelmingly electricity, but includes provision for use of some natural gas by shop equipment and to supplement the solar collectors which will fill hot water needs.

Conversion of electricity is based on 10,000 BTU per kilowatt hour which includes provisions for losses associated with generation and transmission.

The annualized construction and operating energy is combined with the bus and automobile requirements under the MOS-1 to yield a total of 642,397 billion BTU's in the Year 2000. (Table 3-14) Buses would use 7%, rail less than one tenth of one percent and automobiles the remaining 99.2%.

The operation of the MOS-1 and the associated bus network is expected to reduce the Year 2000 annual automobile VMT by 75.6 million VMT (nine one hundredths of one percent) and bus VMT by approximately 3.8 million VMT (3.48%).

A reduction of 75.6 million automobile VMT annually would conserve 3.15 million gallons of gasoline and a reduction of 3.8 million bus VMT annually would conserve 1.18 million gallons of diesel fuel. The net energy savings due to operation of the MOS-1 is projected to be 491 billion BTU when the annualized operating and construction energy for the MOS-1 are subtracted from the diesel and gasoline savings it generates. (Subtract total of Table 3-14 from total of Table 3-13).

3.9 Construction Impacts

There are few changes in the type of construction impacts for the 4 mile MOS-1 from Union Station to the Wilshire/Alvarado Station versus the Locally Preferred Alternative or base MOS described in the Final EIS. The extent of the construction impacts will change because there are fewer stations and less length of tunnel for the MOS-1.

TABLE 3-14

ENERGY REQUIREMENTS FOR THE MINIMUM OPERABLE SEGMENT 1 ALTERNATIVE

IN BILLIONS OF BTUS

COMPONENT	ANNUALIZED AUTO	ANNUALIZED BUS	ANNUALIZED RAIL	ANNUALIZED TOTAL
GUIDEWAY CONSTRUCTION	NOT CALCULATED	NOT CALCULATED	4	46
VEHICLE MANUFACTURING	88,667	127	4	88,798
VEHICLE MAINTENANCE	128,970	106	35	129,111
VEHICLE PROPULSION	419,825	4,417	58	424,300
STATION OPERATION	NOT APPLICABLE	NOT CALCULATED	<u>142</u>	<u>142</u>
TOTAL	637,462	4,650	285	642,397

SOURCE: SCRTD

3.9.1 Construction Methods

3.9.1.1 Techniques for Line Construction. Cut-and-cover line construction: This method, as discussed in Sections 13.1.1, and 13.1.3, Chapter 3 of the FEIS, will be used for the five stations in the MOS-1 and for the crossovers at the Union Station and Wilshire/Alvarado Station. Both locations are off-street and their construction will be generally less disruptive than on-street stations. The tunnels for the MOS-1 will be driven through soft ground, and will be side-by-side circular tunnels.

3.9.1.2 Line Construction Details. Excavation and disposal of tunnel material: Total volume of material excavated from the tunnels of the MOS-1 will be approximately 420,000 cubic yards. This would require 30,000 loads in trucks with double trailers hauling a total of 14 cubic yards per load.

Stations will be excavated by cut-and-cover methods. About 710,000 cubic yards of material will be excavated from the five stations comprising the MOS-1. This would require almost 51,000 truckloads to remove at 14 cubic yards per load. Station construction is expected to take from 3-4 years to complete each station.

Individual station area impacts would be unchanged from the conditions in the FEIS. The material from cut-and-cover station excavation will be disposed of at the rate of about 6 truckloads per hour. Each station will require backfilling with transported material. Approximately 11-14 trucks per day will bring the 11,500 cubic yards of backfill needed at each station.

3.9.2 Circulation Impacts

Traffic disruption during the construction of the MOS-1 will be similar to the conditions spelled out in Section 13.2.1 of Chapter 3 of the FEIS for the five stations involved. Traffic congestion from construction will be felt most in the Central Business District where stations are in areas with high auto, bus, and pedestrian volumes. Traffic capacity may be temporarily reduced by as much as 50 percent on streets parallel to the long axis of the station and intermittently on intersecting streets during decking installation and removal. Factors such as the presence of a large number of heavy-duty construction vehicles on these streets, narrow lane widths and unusual detour configurations, uneven or poor roadway surfaces, and signal timing which is inefficient for construction conditions will also contribute to the reduction in capacity. Crossover tracks proposed at Union Station and Wilshire/Alvarado would be built off-street and little additional congestion would occur. While no streets would be permanently closed entirely to vehicular or pedestrian traffic, the congestion would likely spill over to other parallel streets. In addition, heavy duty vehicles delivering and hauling construction

materials at each station site would reduce street capacity. These factors will have the effect of broadening the impacts of construction activity to area streets and neighborhoods. With a reduced width on streets near station construction sites and the temporary shifting of lanes, traffic control devices may have to be relocated and temporary supplemental devices installed. Circulation impacts for each station area are discussed in a Technical Report, Traffic Control Policies During Construction (LADOT, 1983).

In addition to the disruption in auto movement, construction activities would affect parking, pedestrian activities, and bus service. On-street parking would be temporarily eliminated to accommodate construction operations and vehicular flow on streets where stations are to be located. Pedestrian movement would be inconvenienced due to the temporary loss or narrowing of sidewalks. This impact would be greatest in the CBD, where pedestrian traffic is heavy and the sidewalks are relatively narrow. Some bus stops, bus schedules, and routes would need to be changed for as much as four years.

Mitigation measures for traffic circulation impacts are shown in FEIS Chapter 3, Section 13.2.2. They include: using panel decking instead of wooden plank decking, requiring contractors to comply with City of Los Angeles standards for traffic control, preparing coordinated traffic control plans, phasing construction to avoid excessive capacity reduction and keeping major and secondary streets at least partly open.

3.9.3. Community Impacts

The diminished access to local facilities and disruption of community activities caused by the MOS-1 in the five neighborhoods surrounding the MOS-1 is discussed in detail in Section 3.13, chapter 3 of the FEIS. These effects are temporary and may last 3 or 4 years with varying degrees of impact as construction progresses.

3.9.3.1 Loss of Access to Local Facilities. Diminished access would result primarily from street closures, which would worsen parking problems, perhaps causing drivers to seek areas with fewer parking difficulties and thereby affecting use of stores and services in the station environs. Pedestrian activity may also decline when sidewalks are blocked. The resulting detours and closures would be especially difficult for special user groups, who are less able to leave the area for shopping and services. The handicapped and elderly may perceive construction as both a psychological and physical barrier to local accessibility and thus be forced to take different and longer routes to their destinations.

3.9.3.2 Disruption of Community Life. Noise from construction equipment can bother residents and employees near construction sites. The most significant noise impacts would occur during

installation of piles to support stations and other excavations, which may last three months at any one station. Bus stops and bus routes at construction sites may also be changed for up to four years.

3.9.3.3 Mitigation. Times of day for soldier pile drilling, driving by vibrating hammers and other construction activities that exceed noise standards will be controlled by the terms of the construction contracts. This procedure will be used only in locations where noise is a problem, such as residential areas at night. Other areas, such as the commercial zones near the Union Station, would not be disturbed by round-the-clock operations. The SCRTD Technical Report on Noise and Vibration contains noise standards by type of use and noise levels of typical equipment.

Specific traffic control measures for the construction period have been formulated by the Los Angeles City Department of Transportation and were described earlier. Although little can be done to mitigate the temporary impacts from psychological barriers, access to all businesses as well as the safety of all walkways will be maintained by the contractors.

Relocation assistance will include announcements of construction procedures, traffic control, schedules, and what to expect. While not eliminating the disruption of daily activities, these efforts will relieve many of the uncertainties and frustrations of the residents and business operators and minimize inconveniences.

3.9.4 Business Disruption

3.9.4.1. Physical Impacts. The physical impacts caused by the MOS-1 will be confined to those businesses within approximately one block of the five stations and include modified pedestrian and vehicular access; reduced visibility for store fronts and signs; reduced on-street parking and, in some cases, less convenient access to off-street parking; and temporary disturbances from noise and dust. Stores most affected by the physical impacts of construction are marginal businesses and those that rely upon impulse buying and foot traffic. Less affected are establishments that primarily serve other businesses, provide unusual services, or sell unique or expensive merchandise. Other types of specialized businesses that might suffer some disruption are theaters, motels and hotels, and retail businesses sensitive to noise (for example, stores selling stereo equipment). There is a potential that some small and marginal business may not survive the long construction period.

3.9.4.2 Economic Impacts. For the MOS-1 the significance of the potential economic impacts on businesses can be measured by the length of cut-and-cover construction.

The MOS-1 would have 5,150 feet of cut-and-cover construction. Two of the stations of the MOS-1 will be severely impacted by the construction: 5th/Hill and 7th/Flower. Less severe impacts on business activity are anticipated at the Civic Center and Union Station. The 5th/Hill and 7th/Flower Stations will be affected more severely than other stations because of the heavy traffic congestion, high commercial densities and pedestrian orientation of business.

3.9.4.3 Mitigation. As noted earlier under "Circulation Impacts," SCRTD with the city and county will develop a traffic maintenance plan to minimize traffic disruption. Because some cut-and-cover operations will overlap the sidewalk, a logical program of pedestrian traffic movement and sidewalk restoration also will be established. Options include restricting construction during peak commute hours, allowing some construction at night in the CBD where there would be little impact on residents, and maintaining access to commercial establishments. Construction contracts will specify the traffic maintenance plan for the construction and the means for implementation.

3.9.5 Utility Impacts

The discussion on utility relocations and mitigations in Section 13.5 of Chapter 3 of the FEIS remains valid.

3.9.6 Noise and Vibration Impacts

The material in Section 13.6.2 and 13.6.3 of Chapter 3 of the FEIS describes the impacts and mitigations of the MOS-1 on noise and vibrations except that no blasting is anticipated in the soft ground characterizing the MOS-1.

3.9.6.1 Disturbance from Equipment Noise. Measurements at other transit system construction projects provide the best indication of expected noise levels from Metro Rail construction. Considerable progress has been made recently in the reduction and control of construction noise through modifications in equipment and modification and selection of construction procedures. Noise limits or standards will be included in construction contracts.

3.9.6.2 Disturbance from Ground-Borne Vibration. Drilling and excavation procedures for cut-and-cover and tunneled subways can cause ground-borne vibration levels perceptible in adjacent community areas. Impact pile drivers, which create considerable noise and vibration, produce vibrations too low to damage adjacent buildings and other facilities. Tunnel boring machines (TBMs) create ground-borne vibration and noise but considerably less than pile driving. The noise levels from TBMs would depend on the type of building structure, distance, and intervening materials. Because the ground-borne noise and vibration from TBMs is of very short duration since the machine passes by an

area in a few days at most, there will be only limited impact. Vibration levels would be imperceptible more than 75 to 100 feet away; even at 50 feet, the TBM would create only barely perceptible vibration. For building occupants, noise impact from TBMs would be the same as from operations of subway transit trains. If the tunnel is about 35 feet below ground, then ground-borne noise may be noticed by building occupants approximately 100 feet in horizontal distance from the alignment. During Final Design, SCRTD will conduct a survey to pinpoint sensitive structures adjacent to tunneling and surface excavation activities that require special construction stability techniques. While primarily developed in response to possible geology and hydrology construction impacts, this survey will include consideration of ground-borne noise and vibration impacts upon adjacent structures.

3.9.6.3 Mitigation. Construction noise and vibration impacts are mitigated by the performance standards and design criteria established for the project. Section 8.2.3 of the FEIS describes in detail these performance standards as they relate to construction activities as well as Metro Rail operations. Further detail and analyses are contained in various technical reports listed in the Noise and Vibration section of Chapter 3 of the FEIS.

Conformance to these standards (including all applicable local regulations and codes) will be monitored by SCRTD. SCRTD will make these performance standards a part of the contract requirements for all applicable contractors.

Among the measures identified for mitigating construction noise and impacts are the following:

- (a) Use of alternative procedures of construction and selection of the proper combination of techniques that would generate the least overall noise and vibration. Such alternative procedures include, but are not limited to: using a Tunnel Boring Machine in place of conventional blasting techniques as a method of excavation; using welding instead of riveting; mixing concrete offsite instead of onsite; and/or employing prefabricated structures instead of assembling them onsite.
- (b) Use of construction equipment modified to dampen noise and/or vibration emissions, such as using electric instead of diesel-powered equipment; using hydraulic tools instead of pneumatic impact tools, and using drilled piles or vibratory pile drivers instead of impact pile drivers.
- (c) Maximize the physical separation, to the extent feasible, between noise generators and noise receptors. Such separation includes, but is not limited to, the following measures: Selection of truck routes for muck disposal so

that the noise from heavy duty trucks will have minimal impact on sensitive land uses (e.g., residential). Specific routes and measures for accomplishing this objective have been developed and specified in Disposal of Tunnel and Station Excavation Material (Sedway/Cooke, 1983) and providing enclosures for stationary items of equipment and barriers around particularly noisy areas on the site or around the entire site.

- (d) Minimize noise-intrusive impacts during the most noise sensitive hours. Some of the key techniques used for this purpose could be to: plan noisier operations during times of highest ambient levels; keep noise levels at relatively uniform levels; avoid peaks and impulse noises; and turn off idling equipment.

3.9.7 Air Quality Impacts

Section 13.7.3 of Chapter 3 of the FEIS lists the mitigation measures the District has committed to, in order to offset the air polluting aspects of construction at the MOS-1 stations.

3.9.7.1 Fugitive Dust. Dust from construction projects, commonly termed fugitive dust and caused by wind and construction machinery, is the primary air quality impact during construction. Activities generating fugitive dust include: cut-and-cover and open-cut excavations; spoil loading, hauling, and disposal; construction of surface facilities such as stations and aerial guideways; and building demolitions. Dust impacts will be most severe at station sites and at tunnel shafts which also serve as locations for muck removal. While reliable emissions factors for particulate generation have not been established by air pollution control agencies, dust generation varies dramatically from building to building as a function of size, materials of construction, and the choice of demolition methods.

3.9.7.2 Other Air Pollutant Emissions. Air quality in the Regional Core would be affected by increases in emission of CO, HC, NO_x, SO₂, and particulate material from direct and indirect sources during project construction. Direct sources include emissions from the operation of gasoline and diesel powered construction machinery, including earth-hauling equipment, and emissions generated by the construction work force traveling to and from job sites. Indirectly, construction activities may cause local traffic delays, detours, and congestion which increase the rate at which motor vehicles emit pollutants. In addition, some of the energy construction demand may be met by using locally available power for which there would be indirect air pollutant emissions due to power generation. Overall, the air pollutant emissions are expected to be insignificant on a regional basis and potentially significant on a local basis where substantial traffic congestion occurs.

3.9.7.3 Mitigation. South Coast Air Quality Management District Rules and Regulations apply to the proposed project and will govern construction operations. SCRTD has responsibility for the enforcement of these criteria. Standards for both amount and duration of fugitive dust emissions will be written into all construction contracts. SCRTD will monitor all construction sites for compliance. The detailed descriptions and explanations of specific impact mitigation measures are contained in the South Coast Air Quality Management District (SCAQMD) Rules and Regulations (Rule #403, "Limitation on Fugitive Dust Emissions") and in Section 13.7.3 of Chapter 3 of the FEIS. To implement these regulations, SCRTD will require contractors to take the steps regarding trucks used to transport materials and debris to and from construction sites such as to: establish regular cycles and locations for washing the trucks; tarp loads of debris leaving sites; and water down and sweep the streets at least daily which have heavy volumes of construction vehicles. Site watering is most commonly used to suppress dust, because it is effective if done frequently. Water is generally available at construction sites. Site watering can reduce construction site dust emissions up to 50 percent. Watering will receive particular attention during materials handling associated with waste removal and disposal. SCRTD will require all contractors to establish and maintain records of a routine maintenance program for all internal combustion engine powered vehicles and equipment. The mitigation measures described in the Transportation section of this chapter for reducing traffic congestion will also have a positive impact on air quality.

3.9.8 Energy Requirements

Construction of the 4 mile MOS-1 including guideway, stations, yards, shops, control facilities and incidental structures would use 2,301 billion BTU based on a process analysis method. Mitigation measures for use of energy during construction as stated in Section 13.8.2 of Chapter 3 of the FEIS are valid for the MOS-1.

3.9.9 Geology and Hydrology Impacts

3.9.9.1 Excavation. Section 13.9.1 of Chapter 3 of the FEIS presents the impacts that tunneling and surface excavations for the MOS-1 will have on the geology, hydrology and water quality of the region.

3.9.9.2 Muck Handling. During construction of the MOS-1, tunneling will produce 420,000 cubic yards of spoil while station excavation will produce around 710,000 additional cubic yards. Of this total of 1,130,000 cubic yards, the District does not expect to find any contaminated with tar or oil. This inert material can be disposed of in a class III landfill or used as fill dirt for other regional projects such as the Century Freeway

or the filling and reclaiming of a canyon by the Los Angeles City Department of Recreation and Parks. Although the status of some of the landfills has changed since the publishing of the Technical Report on Disposal of Tunnel (and) Station Excavation Material (1983), there is adequate capacity to accept the residual material from the MOS-1.

3.9.9.3 Hydrocarbon Accumulation. The FEIS indicates that hydrocarbon accumulations are of concern in the western Wilshire corridor. The project may encounter gassy ground near the Wilshire/Alvarado Station but isn't expected to find oily or tar saturated ground.

3.9.9.4 Water Resources. There is no change in the impacts from those depicted for the LPA in Section 13.9.4 of Chapter 3 of the FEIS.

3.9.9.5 Mitigation. The mitigation measures listed in Section 13.9.5 of Chapter 3 of the FEIS are still applicable to the impacts of the MOS-1 on geology, hydrology and water quality except that these measures will only be applied as needed for the five MOS-1 stations. For example, mitigations for gassy ground may be needed but measures for oil and tar probably need not be used.

3.9.10 Construction Impacts Which Cannot Be Mitigated

Mitigation techniques have been identified for all the construction impacts. However, no combination of mitigation techniques completely offsets all of these impacts. Therefore, for each of the construction impacts discussed in this chapter, some residual, unmitigated impacts would occur.

3.9.10.1 Community Impacts. Daily routines will be disrupted since mobility of residents, visitors, and employees around construction sites will be hampered. The increased traffic and noise from construction and dump trucks will be an inconvenience that cannot be avoided.

3.9.10.2 Business Disruption. Even with the application of the identified mitigation measures, some disruption of commercial activity will occur along the 2000 feet of commercial frontage that is adjacent to cut-and-cover station or crossover sites.

3.9.10.3 Dust and Noise. Some temporary increase in dust and noise will occur at construction sites and along the muck disposal routes, even after mitigation techniques are applied.

3.9.10.4 Vehicular Traffic Congestion. Some increase in traffic congestion in the vicinity of station construction sites will probably occur, despite the application of mitigation techniques, because of construction areas and the addition of construction traffic.

3.9.10.5 Parking. Parking availability will be reduced in station environs where off-street yards for construction employee parking and equipment are not established.

3.10 Other Effects

The MOS-1 will have impacts in other categories. However these impacts essentially are identical to the impacts described in greater detail in the Final Environmental Impact Statement for the Metro Rail Project (SCRTD/UMTA, December 1983) for the rail line between Union Station and the Wilshire/Alvarado Station. Those impact categories and impacts are summarized below. The Final EIS should be consulted for more detail.

- (a) Economic and Fiscal Impacts: Employment and gross regional product will increase as a result of implementing the MOS-1. There is the potential for value capture revenue through the use of such mechanisms as benefit assessment districts and joint development. The MOS-1 will lead to an increase in both sales and property tax income.
- (b) Safety and Security: System design will ensure that the MOS-1 is both safe and secure.
- (c) Aesthetics: MOS-1 will have a relatively insignificant impact on the overall character, scale and form of the existing visual setting.
- (d) Geology and Hydrology: Design and construction mitigation measures will be needed to address potential seismic, soil liquefaction densification, tunnel and excavation stability, and hydrocarbon accumulation problems. The project will not cause flooding and will not result in a significant encroachment of a flood plain.
- (e) Biological Resources: There will be no significant impacts on this area.
- (f) Cultural Resources: Three properties are eligible for the National Register of Historic Places and will be adversely affected: Union Station, Title Guarantee Building, and Pershing Square Building. Archaeological resources may be encountered near Union Station. Some paleontological resources may be encountered. Some land will be taken from the Pershing Square. Mitigation measures have been specified in a Memorandum of Agreement.

3.11 Short-Term Impacts Versus Long-Term Productivity

Construction of the MOS-1 will require the use and commitment of resources such as acquisition of land, displacement of residents and businesses, and the potential disruption of historic and archaeological resources. The use

of these resources is a recognized expenditure worth the investment when weighed against benefits of the construction of the system: increased accessibility and decreased total number of vehicle miles traveled in the CBD area.

3.12 Irreversible and Irretrievable Commitment of Resources

The construction of the MOS-1 would require the irreversible and irretrievable commitment of various resources including land, manpower, energy, construction materials, and money. The commitment of resources, while recognized is justifiable when weighted against the benefits associated with the project.

4. ORGANIZATIONS AND PERSONS CONSULTED

4.1 Consultation With Other Agencies And Organizatins

In accordance with Section 15086 of the CEQA guidelines, the District has consulted with responsible agencies that are concerned with the MOS-1. Conversations were held with the Los Angeles City Department of Planning (LADOP). Issues of concern included parking needs and supply at Wilshire/Alvarado Station and LADOP suggested the Environmental Assessment cover the opportunities for development at the Wilshire/Alvarado Station. These have been addressed in appropriate sections of the EA. The Los Angeles County Transportation Commission pointed to the need for bus service to feed passengers into the Wilshire/Alvarado Station. The Los Angeles Community Redevelopment Agency (CRA) believes that the FEIR for the Metro Rail Project adequately covers the impacts of the Project including the MOS-1 on the Central Business District. SCAG requested the District to discuss how the MOS-1 growth will fit into the Regional growth plans. Under air quality, they asked whether the project will involve a net emissions increase. They want to have mode split information for the region with the MOS-1 to help them determine air quality impacts.

4.2 DISTRIBUTION

A number of governmental agencies, businesses, professional groups, and community organizations have been sent copies of the EA. Others interested in obtaining copies should contact the Community Relations Department of the Southern California Rapid Transit District, 425 South Main Street, Los Angeles, California 90013, (213) 972-6456.

4.2.1 Federal Agencies

1. U.S. Department of Transportation
Office of the Secretary of Transportation
Federal Highway Administration
2. U.S. Department of Agriculture
3. U.S. Department of Energy
4. U.S. Department of the Interior
5. U.S. Department of Commerce

6. U.S. Department of HOusing and Urban Development (HUD)
7. U.S. Department of Health and Human Services
8. U.S. environmental Protection Agency (EPA)
9. U.S. Army, Corps of Engineers
10. Interstate Commerce Commission

11. General Services Administration
12. Office of Management and Budget
13. Advisory Council on Historic Preservation

4.2.2. State Agencies

1. Office of the Governor
2. California Transportation Commission
3. State Department of Transportation
4. State Air Resources Board
5. State Resources Agency

6. State Department of Water Resources
7. State Office of Planning and Research
8. State Energy Resources Conservation and Development Commission
9. State Department of Rehabilitation
10. State Legislative Audit Committee

11. State Office of Historic Preservation
12. Public Utilities Commission
13. State Lands Commission
14. State Department of Housing and Community Development
15. State Department of Parks and Recreation

16. State Department of Conservation
17. Regional Water Quality Control Board
18. State Department of Education
19. State Department of Public Health

20. State Department of General Services
21. Division of Mines and Geology
22. Santa Monica Mountains Conservancy
23. California State Publications Librarian
24. El Pueblo de Los Angeles State Park

4.2.3 Regional and Local Agencies

1. Southern California Association of Governments
2. South Coast Air Quality Management District
3. Los Angeles County Transportation Commission
4. Los Angeles County (Board of Supervisors and Chief Administrative Officer)
5. Los Angeles County Regional Planning Commission
6. Los Angeles County Community Development Commission
7. Los Angeles County Road Department
8. Los Angeles County Regional Planning Department
9. Los Angeles County Health Services Department
10. Los Angeles County Hospital and Clinics Services
11. Los Angeles County Public Social Services Department
12. Los Angeles County Parks and Recreation Department
13. Natural History Museum of Los Angeles County
(George S. Page Museum)
14. Los Angeles County Museum of Art
15. Los Angeles County Assessor
16. Los Angeles County Engineer
17. Los Angeles Fire Department
18. Los Angeles Sheriff's Department
19. Los Angeles Senior Citizen Affairs Department
20. Los Angeles County Commission on Human Relations
21. Los Angeles Commission on Women
22. Los Angeles Commission on Disabilities
23. Los Angeles Superintendent of Schools
24. Los Angeles County Flood Control District
25. Los Angeles County Sanitation District
26. Los Angeles County Library Department (see Libraries, below)
27. Los Angeles County Clerk
28. Los Angeles City (Mayor and Council and Chief Administrative Officer)
29. Los Angeles City Transportation Department
30. Los Angeles City Planning Commission
31. Los Angeles City Planning Department
32. Los Angeles City Public Works Department
33. Los Angeles City Bureau of Engineering
34. Los Angeles City Bureau of Street Maintenance
35. Los Angeles City Recreation and Parks Department

36. Los Angeles City Police Department.
37. Los Angeles City Fire Department
38. Los Angeles Library Department (see Libraries, below)
39. Los Angeles City Cultural Affairs Department
40. Los Angeles City Cultural Heritage Board

41. Los Angeles City Social Service Department
42. Los Angeles City Community Redevelopment Agency Board
43. Los Angeles City Community Redevelopment Agency
44. Los Angeles City Housing Authority
45. Los Angeles City Community Development Department

46. Los Angeles City Building and Safety Department
47. Los Angeles City Department of Water and Power
48. Los Angeles Community College District
49. Los Angeles City Board of Education
50. Los Angeles City Legislative Analyst

51. City of Beverly Hills
52. City of Santa Monica
53. City of Burbank
54. City of Glendale
55. Southern California Edison Company
56. Southern California Gas Company

4.2.4 Business, Community, and Professional Organizations

1. Citizens Advisory Committee, Los Angeles County
Transportation Commission
2. Sierra Club/City Care
3. National Association for the Advancement of Colored People
4. League of Women Voters
5. Urban League

6. National Organization for Women
7. Countywide Citizens Planning Council
8. Los Angeles County Federation of Labor
9. Los Angeles Conservancy
10. Van Nuys Chamber of Commerce

11. North Hollywood Chamber of Commerce
12. North Hollywood Project Area Committee
13. Universal City Specific Plan Citizens Advisory Committee
14. Hollywood Heritage
15. Hollywood Chamber of Commerce

16. Hollywood Specific Plan Citizens Advisory Committee
17. Hollywood Coordinating Council
18. West Hollywood Planning Advisory Committee
19. West Hollywood Chamber of Commerce
20. West Hollywood Community Alliance

21. Beverly Fairfax Chamber of Commerce
22. Vitalize Fairfax Project
23. Beverly Fairfax Specific Plan Citizens Advisory Committee
24. Miracle Mile Specific Plan Citizens Advisory Committee
25. Park Mile Specific Plan Design Review Committee

26. Crenshaw Station Specific Plan Citizens Advisory Committee
27. Wilshire Chamber of Commerce
28. Korean Chamber of Commerce for Southern California
29. Southwestern University
30. West Coast University

31. Central City Association
32. Central Business District Redevelopment Project
Area Committee
33. Los Angeles Area Chamber of Commerce
34. Little Tokyo Businessmen's Association
35. Little Tokyo Project Area Committee

36. Chinatown Project Area Committee
37. Chinese Chamber of Commerce of Los Angeles
38. Los Angeles Convention and Visitors Bureau
39. Institute of Electrical and Electronic Engineers
40. American Institute of Architects

41. American Planning Association
42. American Society of Civil Engineers
43. American Society of Mechanical Engineers

Additional copies of the report will be made available to other interested agencies, groups, or individuals as appropriate.

5. LIST OF PREPARERS

5.1 URBAN MASS TRANSPORTATION ADMINISTRATION, Washington, D.C.
Lead Federal Agency responsible for EA. Key personnel include:

Abbe Marner: Environmental Protection Specialist
Sue Kaminsky: Environmental Consultant

5.2 SOUTHERN CALIFORNIA RAPID TRANSIT DISTRICT, Los Angeles, California.

Project proponent and responsible for managing environmental documentation and analysis. Key personnel include:

5.2.1 EXECUTIVE OFFICE

John Dyer: General Manager
Albert Perdon: Assistant to the General Manager

5.2.2 METRO RAIL PROJECT STAFF

Robert Murray: Assistant General Manager, Transit Systems Development
James Crawley: Director, Transit Facilities Department
Nadeem Tahir: Manager of Environmental Analysis (EIS Project Manager)
Jim Sowell: Supervising Planner, EIS Staff
James Callaway, Paulette Cunningham: EIS Staff
William Rhine: Director, Systems Design and Analysis

5.2.3 PLANNING DEPARTMENT

Gary Spivack: Director of Planning
Keith Killough: Planning Manager, Systems
Ashok Kumar, Steve Tung, Steve Brye: Planning Staff

5.2.4 SCHIMPELER-CORRADINO ASSOCIATES, SCRTRD GENERAL PLANNING CONSULTANT

Responsibility for Environmental Assessment on MOS-1. Key personnel include: Charles Schimpeler, Peter Stopher, Cheryl King and Stephen Beard

6. SUPPORT DOCUMENTS

Reports by the SCRTD and its consultants have been the source of much of the material in the Environmental Assessment.

All documents incorporated by reference in the EA are available for public inspection at the following locations:

6.1 Availability

SCRTD Administrative Offices (Monday-Friday)

425 South Main Street
Los Angeles, California 90013
Metro Rail Department
Phone: (213) 972-6439
Library/Information Center
Phone: (213) 972-6467

City of Los Angeles Central Library
(Monday-Saturday)

630 West Fifth Street
Los Angeles, California 90071
Phone: (213) 626-7461

Southern California Association of Governments
(Monday-Friday)

600 South Commonwealth Avenue
Los Angeles, California 90005
Phone: (213) 385-1000

University of California, Los Angeles

University Research Library
Public Affairs Service (Monday-Saturday)
405 Hilgard Avenue
Los Angeles, California 90024
Phone: (213) 825-3135

State Clearinghouse, Room 121 (Monday-Friday)

State of California
1400 Tenth Street
Sacramento, California 95814
Phone: (916) 485-0613

Following is a list and brief summary of each document which is incorporated by reference or used in putting together the environmental assessment:

6.2 TECHNICAL REPORTS

Southern California Rapid Transit District and the U.S. Department of Transportation Urban Mass Transportation Administration. 1983. Final Environmental Impact Statement/Environmental Impact Report. Los Angeles Rapid Transit Project-Metro Rail. 605 pages.

Describes the Environmental conditions in the Regional Core and assesses the environmental impacts of alternative transit improvements.

Southern California Rapid Transit District. 1982. Task Report--Existing Conditions-Regional and Community Setting. Prepared by Sedway/Cooke. 193 pages plus appendix.

Describes the existing environmental conditions in the Regional Core, encompassing the physical, natural attributes as well as the socio-economic, cultural, aesthetic, and man-made attributes.

_____. 1982. Technical Report--Growth Scenarios. Prepared by Sedway/Cook. 42 pages.

Formulates high-growth and low-growth scenarios to describe future patterns in the Regional Core. The scenarios help to show what may result from different assumptions about the growth rates and distribution of population and employment.

_____. 1983. Technical Report--Land Use and Development Impacts. Prepared by Sedway/Cooke. 162 pages plus appendix.

Documents existing conditions in station areas, provides detailed quantitative documentation of impacts of the Metro Rail Project on projected growth, and prescribes measures to minimize negative impacts.

_____. 1983. Technical Report--Aesthetics. Prepared by Sedway/Cooke. 56 pages.

Presents documentation on the analysis and results of the visual impact assessment in the EIS/EIR. Also documents visual analysis performed in conjunction with the Hollywood and North Hollywood Special Alternatives Analyses.

_____. 1983. Technical Report--Noise and Vibration. Prepared by WESTEC Services, Inc. 174 pages plus appendices.

Compiles information from other sources, notably reports by Wilson-Ihrig & Associates, Inc., on existing noise and vibration conditions, assessment of potential impacts. Also discusses appropriate noise regulations and design criteria.

_____. 1983. Technical Report--Air Quality. Prepared by WESTEC Services, Inc. 68 pages.

Discusses existing air quality levels, analyzes expected impact of Metro Rail system, and proposes mitigation measures. Includes analysis of regional air quality burden, localized hot spots, and construction impacts.

_____. 1982. Report on Construction Methods. Prepared by Daniel, Mann, Johnson & Mendenhall/Parson, Brinckerhoff, Quade and Douglas.

Describes various construction methods available for both the line and station structures of the Metro Rail Project. Recommends methods for the various segments of the system and establishes foundation upon which preliminary cost estimate is based.

_____. 1983. Technical Report--Historical/Architectural Resources. Prepared by WESTEC Services, Inc. 225 pages.

Inventories historical/architectural properties eligible or potentially eligible for the National Register of Historic Places. Also discusses potential impacts and effects of the Metro Rail Project on these properties as well as parklands.

Los Angeles City Department of Transportation. 1983. Draft Traffic Analysis Report.

Summarizes data collection and analyses which are presented in more detail in eight separate task reports prepared for SCRTD. Subjects include traffic volumes, intersection evaluation, parking conditions, and traffic during construction.

6.3 MILESTONE REPORTS

_____. 1982. Milestone I: Preliminary System and Operating Plan. 39 pages plus appendices.

Presents the Preliminary System Definition and Operating Plan for the Metro Rail system as defined at the start of Preliminary Engineering. Public comments and responses are also included.

_____. 1982. Milestone 2: System Design Criteria. 29 pages plus appendices.

Outlines the basic rules, requirements, and guidelines used during the design process to ensure that the system design conforms to project objectives and requirements and all applicable laws. Public comments and responses are also incorporated.

_____. 1982. Milestone 3: Route Alignment. 140 pages plus appendices.

Outlines route alignment alternatives and explains the analysis procedure used to evaluate such alternatives. Discusses alignment alternatives considered, evaluation methodology and criteria, analysis and evaluation, community-suggested options, board actions and final alignment.

. 1982. Milestone 4: Station Locations. 77 pages.

Outlines the development of the selection of station locations for the Metro Rail system. Topics covered include design philosophy, station entrances, station components, patron movement and other station considerations.

. 1982. Milestone 5: Right-of-Way Acquisition and Relocation Policies and Procedures. 83 pages.

Outlines comprehensive policies and procedures developed to assure the timely availability of real estate for construction of the Metro Rail system, while assuring compliance with legal requirements for land acquisition and relocation of displaced individuals. Public comments and responses are also included.

. 1982. Milestone 6: Development and Land Use Policies. 103 pages plus appendices.

Develops an effective and coherent set of SCRTD land use and development objectives and policies that will effectively govern the implementation of the Metro Rail Project. Also discusses joint development and value capture. Public comments and responses are also incorporated.

. 1982. Milestone 7: Safety, Fire/Life Safety, Security, and Systems Assurance. 101 pages plus appendices.

Covers all aspects to satisfy transit safety, fire/life safety, security and systems assurance requirements. Public comments and responses are also included.

. 1982. Milestone 8: Systems and Subsystems. 75 pages plus appendices.

Provides an overview of the system and subsystem analyses which were performed to evaluate system operating requirements and select preferred subsystem (e.g., vehicles, train control, traction power, technology) alternatives. Public comments and responses are also included.

Provides an overview of the system and subsystem analyses which were performed to evaluate system operating requirements and select preferred subsystem (e.g., vehicles, train control, traction power, technology) alternatives. Public comments and responses are also included.

_____. 1983. Milestone 9: Draft Report for Supporting Services Plan. 136 pages plus appendices.

Describes methods and designs to ensure that the supporting services (feeder bus routes, etc.) connected with the Metro Rail system will be integrated effectively and efficiently into the overall transit project. Public comments and responses are also included.

_____. 1983. Draft Report for Milestone 10: Fixed Facilities. 191 pages.

Documents the design of fixed facilities (physical plant, stations, tunnels, etc.) developed during Preliminary Engineering. Describes station design, ways and structures design and construction methods.

_____. 1983. Draft Report for Milestone 11: Cost Estimate. 66 pages plus appendices.

Presents the Preliminary Engineering estimates of System Capital Cost, together with estimated Maintenance and Operating Costs. Outlines cost estimating basis and methodology, and discusses program schedule and cash flow.

_____. 1983. Milestone 12: Preliminary Draft Report for System Plan. 169 pages plus appendices.

Summarizes results of the entire Milestone process with sections on Metro Rail system policies, requirements, ways and structures, station design and descriptions, yard and shops, subsystems (vehicles, communication, etc.), and costs. Also includes glossary and bibliography.

6.4 REFERENCE DOCUMENTS

California Air Resources Board. 1980. California Air Quality Data, Summary of 1980 Air Quality Data, Vol XII.

_____. 1982. California Ambient Air Quality Standards for Particulate Matter PM₁₀.

Community Redevelopment Agency of Los Angeles. 1973. FEIR on Bunker Hill Urban.

_____. 1975. FEIR on Central Business District Redevelopment Project.

Los Angeles City Department of Planning. 1982. Existing Land Use Reports.

Los Angeles City Department of Transportation. March 1982. Working Paper--1980 Traffic Volumes.

- _____. October 1982. Working Papers--1980 Parking Inventory.
- _____. October 1982. Working Paper--Year 2000 Base Traffic Volumes.
- _____. 1983. Draft Traffic Analysis Report.
- _____. 1983. Draft Traffic Analysis Report.
- _____. March 1983. Working Paper--2000 with Project Traffic Volumes.
- _____. March 1983. Technical Report--Traffic Control Policies During Construction.
- _____. March 1983. Technical Report--Traffic Mitigation Measures.
- _____. April 1983. Technical Report--2000 with Project Condition VC Ratios and Impacts.
- _____. May 1983. Technical Report--2000 Parking Conditions.
- Los Angeles County. 1980. County of Los Angeles General Plan.
- _____. 1982. County of Los Angeles General Plan (second printing).
- Los Angeles County, Department of Regional Planning. 1979. Final Environmental Impact Report for the Los Angeles County Proposed General Plan.
- _____. 1981. Air Quality Handbook for Environmental Impact Reports.
- _____. 1981. Air Quality Reasonable Further Progress.
- _____. 1981. Annual Report for 1980 on the South Coast Air Quality Management Plan.
- _____. 1982. Air Quality Trends in the South Coast Air Basin, 1965-1981.
- _____. Rules and Regulations (including various amendments) Regulation IV Prohibitions.
- Southern California Association of Governments. 1975. Draft 1976 Transportation Plan: Towards a Balanced Transportation System.
- _____. 1978. SCAG-78 Growth Forecast Policy.
- _____. 1980. 1980 Regional Transportation Plan.
- _____. 1981. Issue Paper on Alternative Urban Forms.
- _____. 1982. 1980 Population and Housing Report.

- _____. January 1982. Draft SCAG-82 Growth Forecast Policy.
- _____. September 1982. Final SCAG-82 Forecasts.
- Southern California Association of Governments/South Coast Air Quality Management District. 1979. Air Quality Management Plan.
- _____. 1982. Air Quality Management Plan, 1982 Revision, Carbon Monoxide Analysis for the South Coast Air Basin.
- U.S. Department of Transportation, Urban Mass Transportation Administration. 1976. Federal Policy of Assistance for Major Urban Mass Transportation.
- Wilbur Smith & Associates. October 1981. Central City Parking Study. Prepared for City of Los Angeles Department of Transportation.
- Wilson, Ihrig and Associates, Inc. April 1982. Noise and Vibration Survey for the Metro Rail Project, Draft Report.
- _____. April 1982. Noise and Vibration Design Criteria for the Metro Rail Project.
- _____. May 1982. Review of Regulations and Industry Practice Affecting Control of Noise and Vibration.
- _____. July 1982. Noise and Vibration Survey for the Metro Rail Project, Final Report.
- _____. October 1982. Supplemental Noise and Vibration Survey for the Metro Rail Project, Preliminary Draft Report.
- _____. November 1982. Noise and Vibration Study, Alternative Route Alignments for the Metro Rail Project, Draft Report.