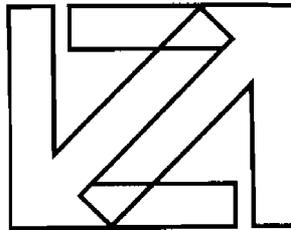


Downtown
People Mover
Element
of the

**CIRCULATION
DISTRIBUTION
SYSTEM**



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City
of
Los Angeles

July 30, 1976



CITY HALL
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OFFICE OF THE MAYOR

TOM BRADLEY
MAYOR

August 5, 1976

Mr. Robert E. Patricelli
Administrator
Urban Mass Transportation Administration
400 7th Street, S.W.
Washington, D.C. 20590

Dear Mr. Patricelli:

The City of Los Angeles is pleased to submit this proposal for a fully automated Downtown People Mover System. We feel confident that implementation of this system in our city will achieve the goals set forth for the Downtown People Mover (DPM) Project. It will also make a significant contribution to the overall plans for revitalization of the Los Angeles Central Business District.

This proposal has been prepared in accordance with the Urban Mass Transportation Administration program plan for the Downtown People Mover Project, dated May 21, 1976, and the implementation schedule contained therein. The City of Los Angeles believes, however, that extensive analysis and preparation already completed enables us to offer an alternative schedule that is beneficial to the Urban Mass Transportation Administration and the City of Los Angeles. This schedule (attached) provides for announcement of the Urban Mass Transportation Administration Grant in September or October, 1976 rather than on January 31, 1977 as shown in the program plan. This would allow earlier selection of the system manufacturer, earlier operation of the system and would save approximately \$800,000 in total system cost for every month the schedule is moved up. The cost for the preparation phase would not change and would remain at \$1.238 million. We believe this alternative should be given serious consideration.

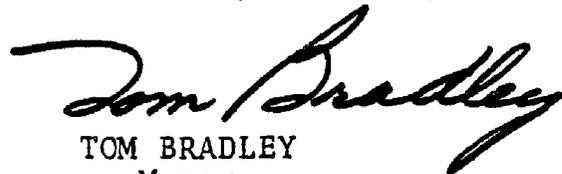
A major factor in pursuing the accelerated schedule is participation of the private sector in the planning, financing and implementation of the people mover project. Under the schedule we propose, there is considerable opportunity for exploration and development of value capture financing techniques that will help to offset the capital cost and possibly permit fare-free operation. Pursuit of these value capture opportunities will be hampered by any schedule delay.

As you know, the Los Angeles region is completing an analysis of Regional Transportation Improvement Alternatives. The Downtown People Mover proposal submitted herewith has been closely coordinated with that analysis and integrates in with the proposals for improving transportation throughout the Los Angeles region. At the request of UMTA Regional Office, further refinement of integration with the regional alternatives is being conducted. In serving downtown Los Angeles, the People Mover serves as a focal point of a sixty-mile circle whose per capita gross product is higher than that of any major nation in the world. Lastly, it is fully integrated with the area's vast freeway network, and complements bus on freeway transit improvements that are now being planned and implemented.

In all respects the Los Angeles Downtown People Mover will become a model for the Southern California region and for the rest of the nation. I trust you will agree with me that the City of Los Angeles' proposal is sound and has the merits for national demonstration of the benefits of a fully Automated Shuttle Loop Transit System.

Please feel free to contact me if I can be of further assistance in your evaluation of this proposal.

Sincerely,

A handwritten signature in black ink that reads "Tom Bradley". The signature is written in a cursive, flowing style.

TOM BRADLEY
Mayor

TB:lm

Attachment



CITY HALL
LOS ANGELES, CALIFORNIA 90012
(213) 485-3311

OFFICE OF THE MAYOR

TOM BRADLEY
MAYOR

Mr. Steven A. Barsony, Director
Automated Guideway Transit
Applications Division
Urban Mass Transportation Administration
Department of Transportation
2100 2nd Street, S.W.
Room 6104H
Washington, D.C. 20590

Dear Mr. Barsony:

This proposal is submitted in accordance with the Program Plan for the Downtown People Mover Project issued on January 26, 1976 and revised on May 21, 1976. The information contained herein results from extensive analysis of alternative transportation solutions for downtown Los Angeles in conformance to Urban Mass Transportation Administration guidelines for alternatives analyses.

The project schedule contained under Section VI of the proposal was established with consideration to the project milestones included in the Program Plan. However, the extensive preparation work already completed leads us to offer an alternative schedule that can lead to significant benefits for the City of Los Angeles and the Urban Mass Transportation Administration. This schedule (attached separate to the proposal) provides for announcement of commitment in principal for Capital Grant funds and granting of conditional planning funds in September or October, 1976, rather than on January 31, 1977. This will allow earlier selection of the system manufacturer, earlier operation of the system and a savings of approximately \$800,000 in total system cost for every month the schedule is moved up. We believe this alternative should be given serious consideration.

A major factor in pursuing the accelerated schedule is participation of the private sector in the planning, financing and implementation of the people mover project. Under the schedule we propose, there is considerable opportunity for exploration and development of value capture financing techniques that will help to offset the capital cost and possibly permit fare-free operation. Pursuit of these value capture opportunities will be hampered by any schedule delay.

Supporting letters for the Los Angeles Downtown People Mover Project are now being completed and should be filed shortly. I am confident that Los Angeles merits selection as one of the sites for national demonstration of the benefits of a fully Automated Shuttle Loop Transit System.

Please feel free to contact me or Mr. Norman Emerson of my staff if either of us can be of assistance in your evaluation of this proposal.

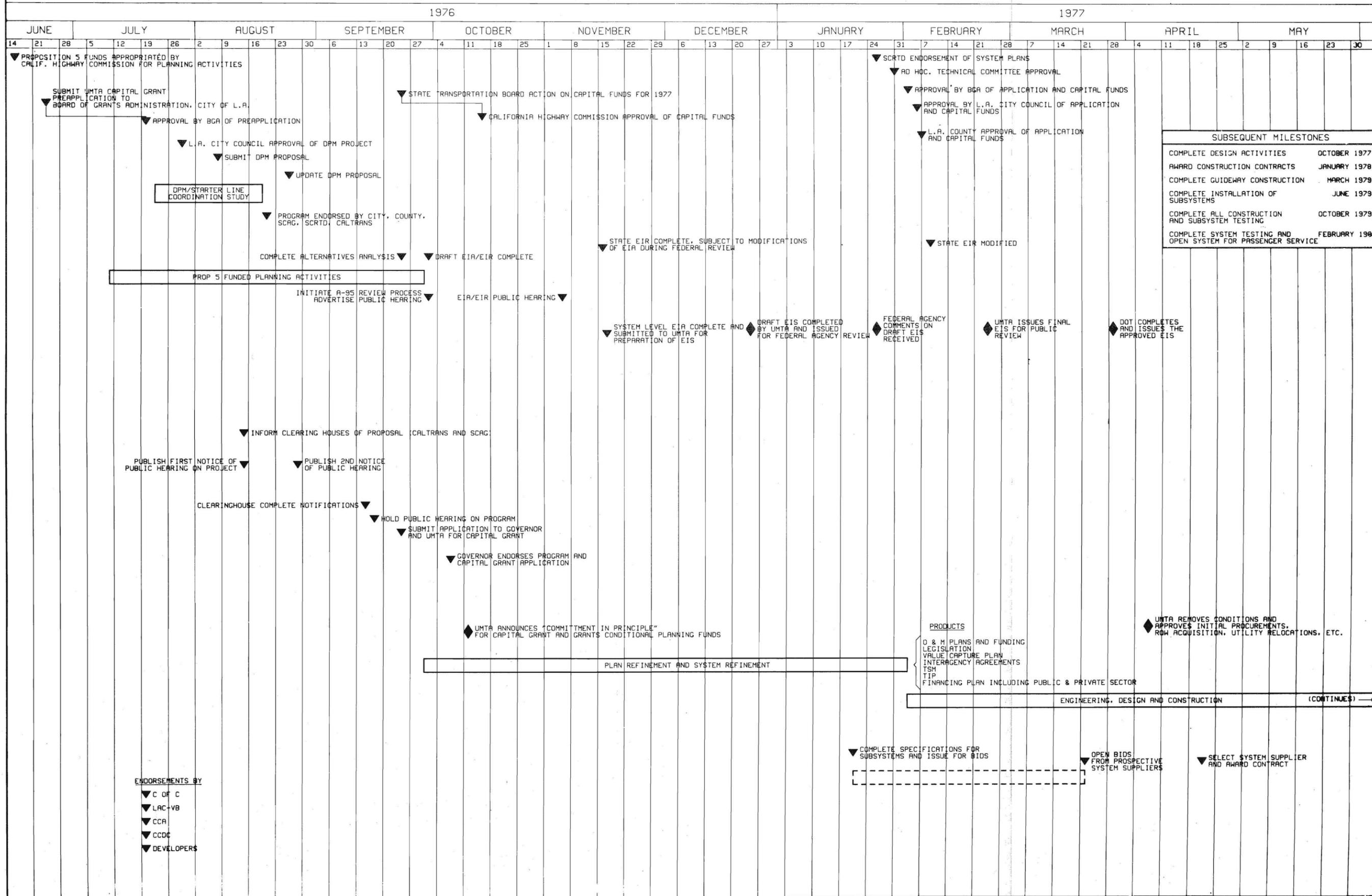
Sincerely,



TOM BRADLEY
Mayor

TB:lm

IMPLEMENTATION SCHEDULE
PEOPLE-MOVER ELEMENT OF LOS ANGELES COLLECTION/DISTRIBUTION SYSTEM



City of Los Angeles

TOM BRADLEY, Mayor

City Council

JOHN S. GIBSON, JR., 15th District, President

GILBERT W. LINDSAY, 9th District
Councilman for the Central City

JOHN FERRARO, 4th District
Chairman, Ad Hoc Committee on
Rapid Transit

LOUIS R. NOWELL, 1st District

ROBERT FARRELL, 8th District

JOEL WACHS, 2nd District

DAVID CUNNINGHAM, 10th District

DONALD D. LORENZEN, 3rd District

MARVIN BRAUDE, 11th District

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ARTHUR K. SNYDER, 14th District

CALVIN S. HAMILTON

Director of Planning
Chairman, Ad Hoc Technical Committee
on Rapid Transit

COMMUNITY REDEVELOPMENT AGENCY

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Members

DR. EVERETT T. WELMERS
Chairman, Transportation Committee

ALAN GOLDSTEIN

MARILYN W. HUDSON

LUIS G. NOGALES

TSUTOMU UCHIDA

ANDY W. WALL

EDWARD HELFELD
Administrator

PARTICIPANTS IN THE CIRCULATION/DISTRIBUTION SYSTEM PROGRAM

PUBLIC AGENCIES

Office of the Mayor of Los Angeles
Community Redevelopment Agency, City of Los Angeles
 Special Projects Department
 Real Estate Department
 Bunker Hill Project Office
 Planning Department
 Engineering Department
City Council of Los Angeles
City of Los Angeles Staff
 Administrative Office
 Department of Airports
 Bureau of Engineering
 Department of Environmental Quality
 Department of City Planning
 Department of Public Utilities and Transportation
 Department of Traffic
 Department of Water and Power
County of Los Angeles
 Offices of the Supervisors
 Administrative Office
 Road Department
 Regional Planning Department
Southern California Rapid Transit District
Southern California Association of Governments
California State Department of Transportation

PRIVATE SECTOR

Building Trades Council
Central City Association
Central City Development Corporation
Chamber of Commerce
Citizens Advisory Panel
Los Angeles Convention and Visitors Bureau

PRIMARY CONSULTANTS

Kahn Kappe Lotery Boccato - Lead Consultant, Urban Planners
Barton-Aschman Associates, Inc. - Transportation Planning
Centers for Study - Bus Planning
Kaiser Engineers - Engineering
Keyser Marston Associates - Socio-economics

SUPPORTING CONSULTANTS

Barrio Planners Incorporated - Community Relations
Cambridge Systematics, Inc. - Transportation Planning
Cityscope and Mobility Company - Private Sector Financing
COMSIS - Transportation Planning
General Analysis, Incorporated - Environmental Planning
Eugene Jacobs - Legal Counsel
Los Angeles Community Design Center - Community Relations
Metrex Management Corporation - Aerial Photogrammetry
Peat, Marwick, Mitchell & Co. - Management Planning
Wilbur Smith and Associates - Parking Analysis
Stanford Research Institute - Transportation Technology
Wallen Associates - Traffic Engineering

SUMMARY

The City of Los Angeles is pleased to have this opportunity to submit its proposal for the Urban Mass Transportation Administration's Downtown People Mover Project.

BACKGROUND

By any measure - area, population, gross regional product - the Los Angeles area is one of the largest urban areas in the world. Over 10 million residents live within 60 miles of downtown Los Angeles; the population increase alone in the area during the most recent census exceeded the total population of Philadelphia, Detroit, or Houston. Los Angeles accounts for over 50 percent of California's annual wholesale trade, and 48 percent of annual retail sales. As with other major urban centers, the Los Angeles Central Business District, or Central City, suffers from deterioration, greatly aggravated by urban flight. Considered by many to be the classic example of urban sprawl, rejuvenation of downtown Los Angeles was begun by public and private sectors. This major redevelopment effort took formal shape in 1948 with the establishment of the Community Redevelopment Agency of Los Angeles. Transportation improvements have been an important element of the Agency's plan since the early 1960's. The Bunker Hill People Mover program was initially defined as a specific transit element in 1969.

This transportation, and transit, planning, design and implementation has continued with full support and participation by all interested agencies over the years; e.g., improved freeway network by Caltrans, improved arterial traffic control by the City, improved bus service by the Southern California Rapid Transit District.

THE CIRCULATION/DISTRIBUTION SYSTEM

The Central City continues to face increasing congestion in this auto-dominated environment. Numerous transit alternatives have been evaluated and are described in this proposal. A plan has been adopted using unique intermodal concepts. A Circulation/Distribution System using buses and People Movers which serve bus/auto intercept points fed by the freeway system is the essence of this plan. UMTA's DPM project provides an opportunity to implement the People Mover element of this adopted plan.

THE DPM PROJECT PROPOSAL

This proposal is structured to describe the Central City environment in focusing on the transportation system. Alternative plans to improve that transportation system are described, as is the evaluation methodology that resulted in the bus-people mover selection. The People Mover portion of the selected plan - the DPM System - is then described in detail, delineating its physical, operational, financial and environmental characteristics.

The City's proposed technical approach is described in detail and is shown graphically on the DPM schedule on the following page. The lower half of the DPM schedule shows the major tasks to be accomplished during the Preparation Phase. While this proposal is only for the preparation phase of the project, the schedule shows the overall DPM project. Analysis of operating plans, functional responsibilities, implementation schedules, construction staging and similar project functions had to be accomplished to properly prepare this proposal. For example, the "Service/Impacts/Results" function shown on the schedule was reviewed

and defined to determine whether a DPM installation in Los Angeles would meet UMTA's needs for post-implementation evaluation. Appendix D, Evaluation of System Impacts, outlines the methodology and supporting data base that could be used for such evaluation.

To ensure successful completion of this project - a DPM system in passenger service, on time and within budget - requires effective management of the project throughout its life. We have developed a Management Approach which centralizes the City's control of the project in a Board of Control functioning through a Circulation/Distribution System Program Director and a DPM Program Manager. Adequate staffing has been provided and will be supported by consultants where necessary. System implementation will be accomplished through a turnkey system contractor. Details of the management philosophy and project control techniques are given in Section VI.

The Financing Section of the proposal defines the alternative funding sources for this project, identifying known opportunities for value capture financing and known sources of local and state funds.

THE DPM SYSTEM

The initial segment of the People Mover portion of the Circulation/Distribution System is described below:

DPM CHARACTERISTICS - INITIAL SEGMENT

Length of guideway

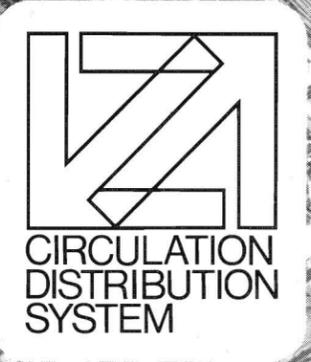
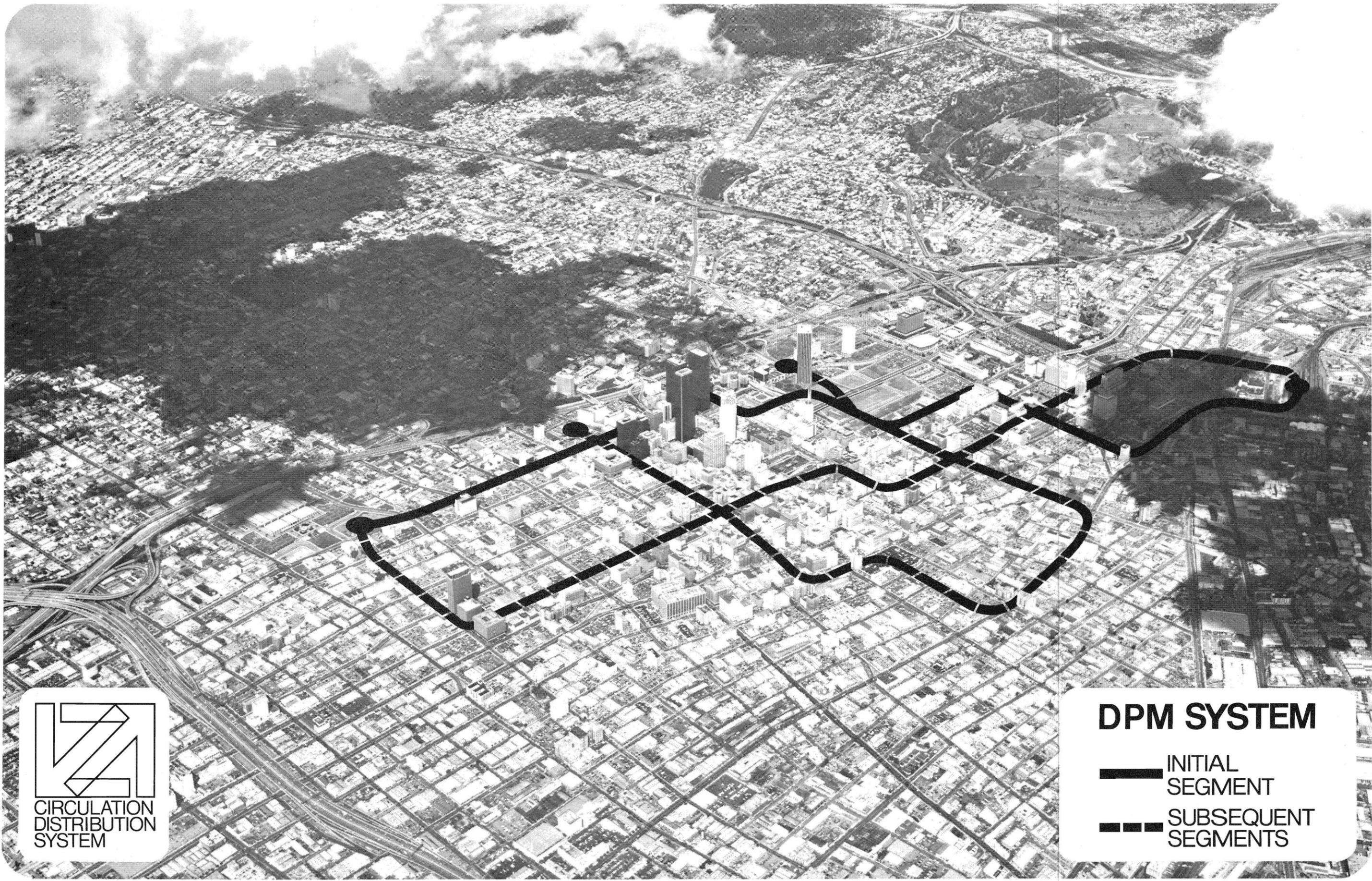
- | | |
|--------------------|-------------|
| o Elevated portion | 14,000 feet |
| o Subway portion | 1,800 feet |

Number of Stations	11
o Elevated	10
o Subway	1
Average station spacing	1,395 feet
Number of vehicles (initial)	46
Number of vehicles per train	1-3
Round trip time	23 minutes
Annual passengers (1990)	25 million
Daily passengers (1990)	81 thousand
Peak hour passengers (1990)	11 thousand
Capital Cost (including escalation and contingency)	\$167 million
Operating cost/yr. (initial)	\$2.6 million
	(in 1976 dollars)

The route alignment of the total DPM system - initial segment and subsequent segments - is shown on the following page. Additional requirements planned in the design in the conceptual stage include system capability for goods movement and a system operating strategy of fare free service based on value capture financing for system operating costs.

THE SUCCESSFUL DPM PROJECT - LOS ANGELES

The Congress, the Department of Transportation, the Urban Mass Transportation Administration, all have recognized the need for proving automated guideway transit (AGT) in an urban setting. UMTA has planned and embarked on a needed and ambitious program. The magnitude of the challenge was expressed in UMTA's April 6, 1976 press release, "we now want to test their (AGT systems) feasibility and public acceptance in the harsher and more demanding environment of a real city. We feel this project is important.... because it responds to one of the broader program goals of the UMTA



DPM SYSTEM

— INITIAL SEGMENT

- - - SUBSEQUENT SEGMENTS

program,..... to support the effective economic functioning of our central cities." UMTA will want to assure itself that it selects cities for the DPM project that will deliver successful results. Los Angeles is one of those cities.

This proposal documents that:

- o the need for relief of congestion in the Central City is real;
- o the opportunity for demonstrating the use of value capture concept is real;
- o the system as defined is feasible and meets UMTA's guidelines; and,
- o the system as defined is compatible with, and supportive of, the existing regional transit system and any future alternative regional transit system.

Clearly, the City of Los Angeles has the desire and the commitment as well as the institutional framework to successfully implement the UMTA Downtown People Mover Project.

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I. INTRODUCTION

A. The Urban Setting

Los Angeles is a dynamic and complex metropolis that some urbanologists view as the prototype of tomorrow's cities. The scale of investment and development in the metropolis is enormous and its cultural diversity is rich. The extensive involvement of both private and public forces in shaping development makes Los Angeles an exciting site for demonstrating new opportunities such as a people mover system. The following facts give those unfamiliar with the City a different perspective on the urban setting of this proposal. Figure I-1 shows an overview of where the City of Los Angeles fits into the region.

Economy: Half of California's economy and almost half of its population are concentrated in a circle within sixty miles of downtown Los Angeles on less than five percent of the state's land. The per capita gross product in this circle is higher than that of any major nation in the world.

People: The Los Angeles sixty-mile circle has more than 47 percent of the population of California, the nation's most populous state. This circle with 10 million residents, is the second largest center of population and business in the United States (next to the New York area). The Los Angeles circle led all other areas in the United States in attracting population in the period covered by the most recent national census; the increase was equivalent to adding a population larger than that of Philadelphia, Detroit or Houston.

Business: The Los Angeles sixty-mile circle accounts for approximately 55 percent of California's annual wholesale trade and 48 percent of the state's annual retail sales. Over 48 percent of California's personal income is earned in the Los Angeles sixty-mile circle, where the per capita personal income is approximately 12 percent higher than the national per capita personal income. The annual per capita gross economic product

in the Los Angeles circle is more than \$7,600 and is greater than that of any major nation in the world (as reported by the U. S. Agency for International Development).

Housing: The Los Angeles sixty-mile circle accounted for 40 percent of all the dwelling units built in California in the last three years. In this period 42 percent of the value of all residential construction in California was produced in the Los Angeles circle. These housing production totals mean that for more than a decade the Los Angeles sixty-mile circle has accounted for over 40 percent of all the dwelling units built in California.

Industrial Development and Foreign Trade: Sixty-six of the top 100 industrial firms in California have their headquarters in the Los Angeles sixty-mile circle. These firms, with more than 975,000 employees, transact annual sales valued at 60 percent of the total for the state's top 100 industrial companies. The Los Angeles area, with a higher per capita gross product than the Greater Tokyo area, is the leading economic center in the Pacific Basin, which has two-thirds of the world's population. Shipments through the Los Angeles-Long Beach Port District account for 59 percent of the value of California's annual multi-billion-dollar international trade.

This proposal concentrates on the heart of this region: The Central City (Figure I-2). Downtown Los Angeles -- the Central City -- is truly a modern paradox since it encompasses both the best elements of planned development and many of the bitter problems besetting our nation's metropolitan cities.

Over the past several decades, rarely have the planning of transportation and redevelopment been combined. Often the functions were completely divorced. This lack of combined planning is of necessity coming to an end. The present and future of related urban functions must be molded into a combined effort. This proposal reflects one step toward achieving this coordination since the Community Redevelopment Agency of the City of Los Angeles is responsible for coordinating the Downtown People Mover Program. The proposal, as detailed, illustrates how efficient transit service has been incorporated

CIRCULATION/ DISTRIBUTION STUDY AREA



FIGURE 1.2



The Los Angeles Bunker Hill and Central Business District

Circulation Distribution Program

Prepared For The Community Redevelopment Agency Of The City Of Los Angeles, California

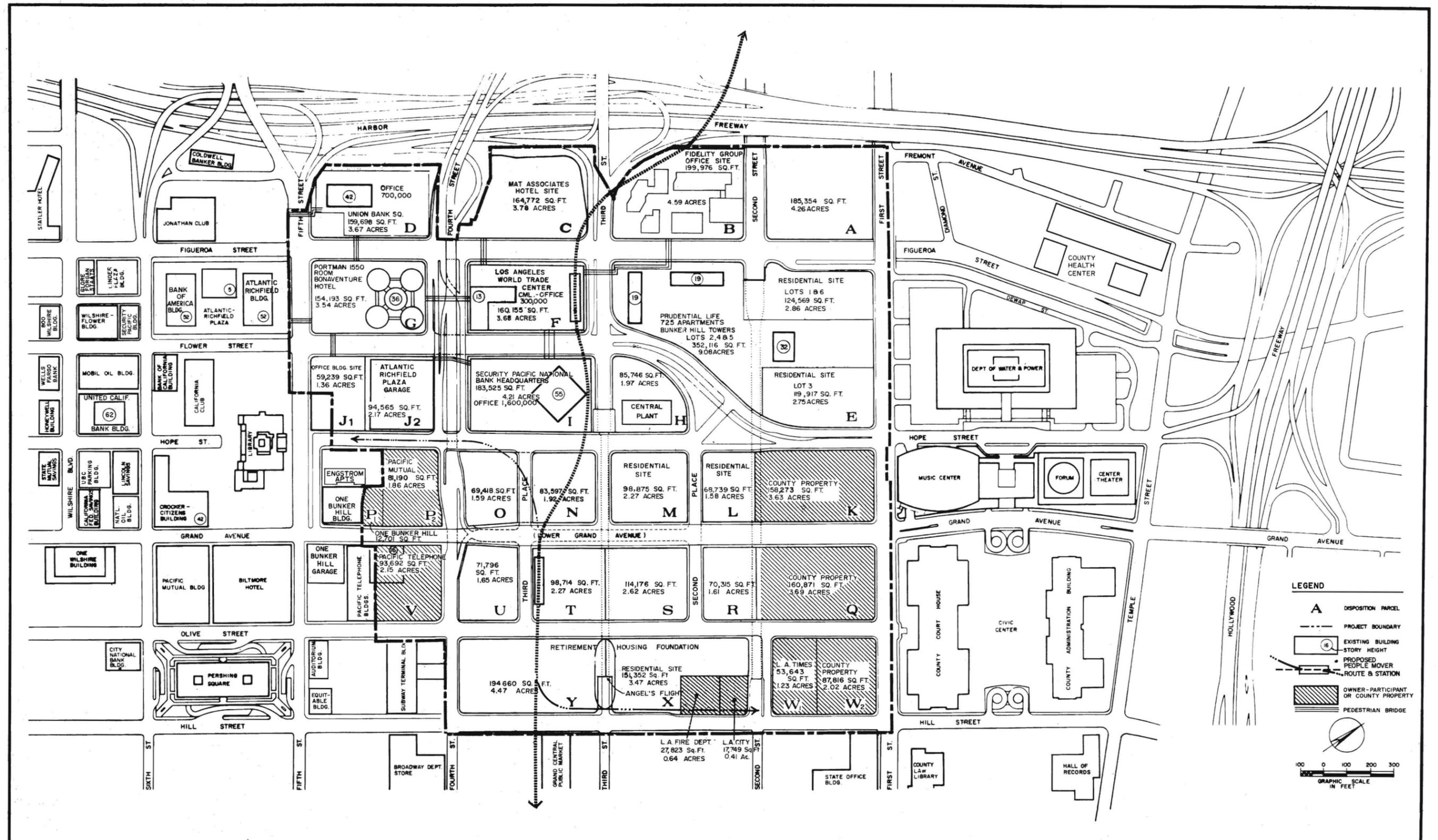
Kahn Kappe Lotery Boccato	Planning - Urban Design
Barton Aschman Associates	Transportation Planning
Keyser Marston Associates	Socio-Economic
Kaiser Engineers	Civil Engineering
Wallen Associates	Traffic Engineering

into the Bunker Hill Urban Renewal Project.

The Bunker Hill Urban Renewal Project (Figure I-3) was conceived and planned to reverse urban deterioration in a key area of downtown Los Angeles and to spark revitalization of the greater downtown area. The 133 acre Bunker Hill Project is strategically located between the central business district and the civic-cultural center. Its location and topography provide a unique opportunity for combining land uses to accommodate the full range of activities associated with a vital downtown core, including commercial offices with supporting retail, entertainment, dining, transient housing, and convention and exhibition facilities, and in-town residential units.

Planned development in Bunker Hill includes about 3,200 dwellings, 3,000 hotel rooms, and some 12.5 million square feet (gross area) in commercial and retail uses. A major 1,500 room hotel is nearing completion, 726 dwellings have been constructed, and 56 percent of the land has been sold or committed for sale to new developers. Additional growth through completion of the Project in 1985 is largely dependent upon the ability of the circulatory system to move the people, goods and services required to sustain the planned levels of achievement.

Traffic studies indicated that on-site parking must be constrained because of high peak-hour congestion on surface streets serving the Project. In fact, of the parking spaces intended for Bunker Hill, 10,000 must be located in sites outside the Project area. It is necessary to provide alternative access from remote parking locations which will be safe, economical, convenient and quick. The People Mover element of this redevelopment program was designed to address the transit requirements of the Bunker Hill Project.



LAND DISPOSITION MAP

BUNKER HILL URBAN RENEWAL PROJECT

THE COMMUNITY REDEVELOPMENT AGENCY OF THE CITY OF LOS ANGELES, CALIFORNIA

4-17-75	2-1-74
8-19-75	1-2-74
7-20-76	11-9-73
	4-26-73
	1-2-73
	2-15-72
	1-4-72
	12-8-70
REVISED	8-12-70
DATE	2-18-69
	10-26-72

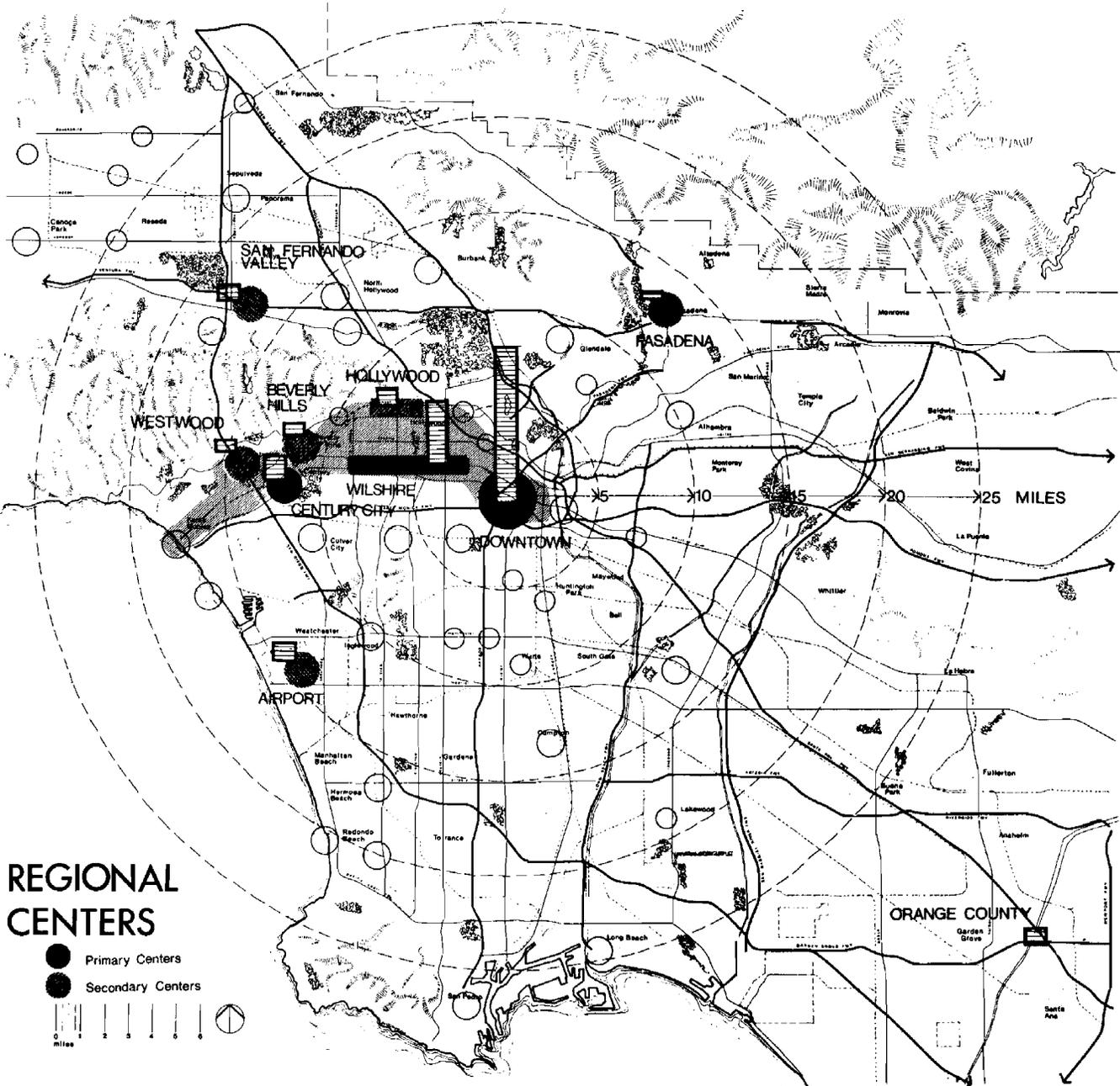


FIGURE I-3

Transportation planning generally has gone hand-in-hand with land use planning. It is the belief of this City that the People Mover form of transit must work as a horizontal elevator, tying together commercial and developmental functions. This People Mover will create customer excitement, thereby generating new customer demand. It is critical that the DPM be viewed as an integral element of the urban planning process required for revitalization of our urban centers. It cannot be planned, built and operated simply as an unmanned railroad.

The DPM project provides substantial opportunities to relate transit service with real estate development and redevelopment. Close coordination of transit service with real estate development will result in greater program participation by the private sector. Coordination with redevelopment activities are of equal importance since recycling land within this urban area is a major priority. The DPM will be a catalyst for downtown revitalization and promotion of urban renewal.

From a national perspective the DPM project is a transit solution appropriate for accommodating the growth patterns exhibited by many Western cities. The DPM is well designed for cities where activity centers exist but regional density levels do not justify extensive rail systems. Most Western cities, and particularly Los Angeles, are characterized by activity centers connected by good freeway access. Transit service is provided largely by bus. The downtown centers of these cities are growing and they exhibit a more congested peaking of travel activity than other secondary activity centers. The following map shows the distribution of Los Angeles' activity centers - a pattern being followed by many Western cities.



REGIONAL CENTERS

- Primary Centers
 - Secondary Centers
- 0 1 2 3 4 5 6 7 8 9 10
miles

PEOPLE MOVER CIRCULATION SYSTEMS SUPPORT PLANNED LAND USE.

Urban sprawl growth patterns of such cities cannot be revised unless ways are found to increase the people moving capacity within the major activity centers and make these centers focal points of future development. Improving downtown transit services is important because while the areawide transportation service remains relatively good, the downtown streets are becoming increasingly more congested. If the people moving capacity is not improved to accommodate future growth, then the downtown centers will continue to decline.

The Los Angeles DPM project, detailed in this proposal, is designed specifically to address improving the people moving capacity in downtown Los Angeles. The system is designed to intercept both buses and autos by means of strategically located intercepts. The people mover is one transit solution which can provide for increased person travel in downtown without incurring the very high costs of extensive regional guideway transit systems.

Los Angeles is at a stage where many recent local efforts to implement extensive rail systems have failed. Coupled with this problem is the fact that other agencies such as the State Air Resources Board and the State Energy Commission are looking to the transportation sector for alternatives to the automobile and policies for managing the automobile. Such coordinated planning is needed so that energy resources are conserved and emittants from mobile sources are reduced.

Transit improvements will be implemented in Los Angeles. The area does have monies to initiate rapid transit service, and currently efforts are underway to stage the bus and guideway projects into a local "blue print for action." A commitment of federal monies to an innovative transit system that is coordinated with both the Transportation System Management bus program and the regional rail starter line program would have a positive effect on promoting further development of

transit in the region.

From a policy standpoint the DPM program offers major opportunities for both the Federal and local governments to integrate transportation system management projects with state-of-the-art advancement in urban areas where they are most critically needed.

B. OVERVIEW

The DPM System proposed by Los Angeles has evolved directly from adopted regional plans. The system is designed to integrate with three key components of the Southern California Association of Governments (SCAG) Short Range Plan and Transportation System Management Plan:

- preferential treatment for high occupancy vehicles;
- carpools; and
- transit service improvements.

As discussed in this proposal, the DPM program has evolved from a cooperative planning process involving the City of Los Angeles, Caltrans, SCAG, SCRTD, and Commuter Computer. These agencies were responsible for the regional TSM plan. They will be involved in the implementation of the people mover.

Project documentation included in this proposal supports the objective of facilitating downtown movement of people, urban goods, and vehicles in Los Angeles consistent with the ongoing Bunker Hill and other downtown developments. The project is consistent with current Federal efforts and objectives, particularly that of determining applicability of automatic guideway transit (AGT) people movers to congested, downtown areas. The long range view is to establish a basis for replication in city centers as demand develops. A preview is provided in this document as to how the City of Los Angeles perceives the technical solution to its desires and how funding for such a project might be arranged/derived. The need exists. Implementation of a practical solution as presented is long overdue. The anticipated benefits consistent with local planning are numerous.

The Federal government is currently promoting demonstration of the Downtown People Mover transit approach as one solution element to inner city movement problems. The Community Redevelopment Agency views the Downtown People Mover as a major tool for center city revitalization. Because of the timely opportunities offered by this program, the Downtown People Mover Project takes on new significance. Recognizing that public funds would be required and that, ultimately, a large amount thereof might be provided by means of a Federal Capital Grant, the City decided to file this proposal.

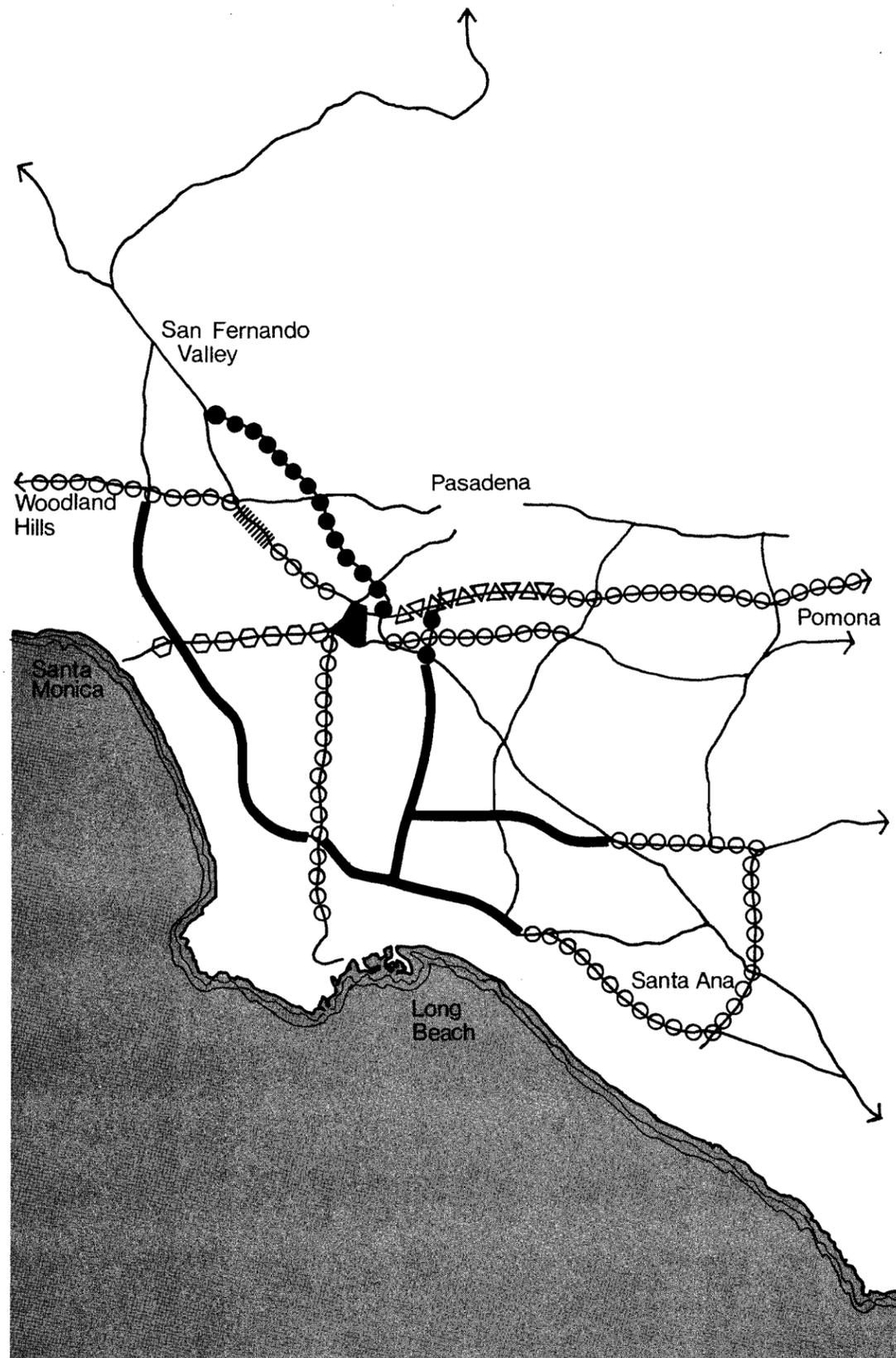
NEED FOR A C/DS

II. THE NEED FOR A CIRCULATION/DISTRIBUTION SYSTEM

A. Transportation Setting

The downtown circulation/distribution system program is an outgrowth of regional and local plans. The very existence of the Los Angeles Bunker Hill and Central Business District recent Circulation/Distribution System Study was a recognition that no improvements were being planned for downtown to supplement the adopted regional bus on freeway program. In 1974 local, regional and state agencies united efforts to produce a bus on freeway plan for greater Los Angeles. Lanes on ten major freeways were designated for buses and carpools, and increased bus service to downtown Los Angeles was scheduled. (Freeways scheduled for this type of transit service are shown in Figure II-1). There was, however, no transportation plan for downtown to accommodate the planned increase in bus service. Buses coming into downtown on the freeways spend about one-third their total trip time on congested downtown streets. Many agencies saw the need for a downtown Circulation/Distribution System (C/DS) to make the regional bus on freeway concept a successful endeavor.

A series of meetings was held with representatives of cognizant agencies at the state, regional, county, and local levels to determine if there was a need for a Central Business District plan to accommodate adopted regional improvements.



- ▽▽▽ BUSWAY ON SEPERATE ROADWAY
- ||||| CONTRAFLOW (BUSES ONLY)
- ○ ○ CONCURRENT FLOW ON EXISTING LANE
- CONCURRENT FLOW ON IMPROVED MEDIAN SHOULDER
- ● ● PREFERENTIAL RAMPS BYPASS TREATMENT
- ○ ○ ○ UNDEFINED (MEDIAN SHOULDER BEING PREPARED FOR POSSIBLE USE)

THE DOWNTOWN PEOPLE MOVER IS DESIGNED TO SUPPORT THE REGIONAL BUS-ON-FREEWAY PROGRAM.

FREEWAY SCHEDULE FOR BUS PRIORITY IMPROVEMENTS



FIGURE II-1

After a nine month study, the interagency committee recommended:

- a circulation/distribution system be implemented for the Bunker Hill and CBD (the mode and service level to be established by further study); and
- the interface between the C/DS and the regional transportation system receive a high priority; and,
- the concept of peripheral parking be considered in design of the system.

The People Mover element outlined in this proposal is part of a package of phased improvements designed to be responsive to these recommendations. The adopted Regional Transportation System Management Plan was used as a basis for design of the Circulation/Distribution System. The People Mover evolved as an approach not only to improve travel within downtown but also to improve the efficiency of the regional TSM Program.

From a local perspective the Circulation/Distribution System is needed to promote a healthy economy in downtown Los Angeles and to provide an efficient way of moving people to, within and through the Central City. Economic analysis conducted as part of the study indicate that the Circulation/Distribution System is needed to maintain the economic vitality of downtown Los Angeles. Over the past two decades the economic growth rate of downtown Los Angeles has been declining. Many office buildings stand vacant, unemployment is high, and extensive deterioration of many buildings is evident. Extensive urban renewal efforts, particularly the Bunker Hill Program, have slowed down this trend of economic decline and in some sections of downtown a favorable growth trend has been established. The DPM is needed to reinforce this economic growth trend.

From a transportation perspective the Circulation/Distribution System is needed to satisfy transit, parking and pedestrian facilities deficiencies that exist today and would otherwise increase over time. The following paragraphs describe those transportation conditions that make circulation/distribution improvements a necessity for Los Angeles.

B. TRANSPORTATION CONDITIONS

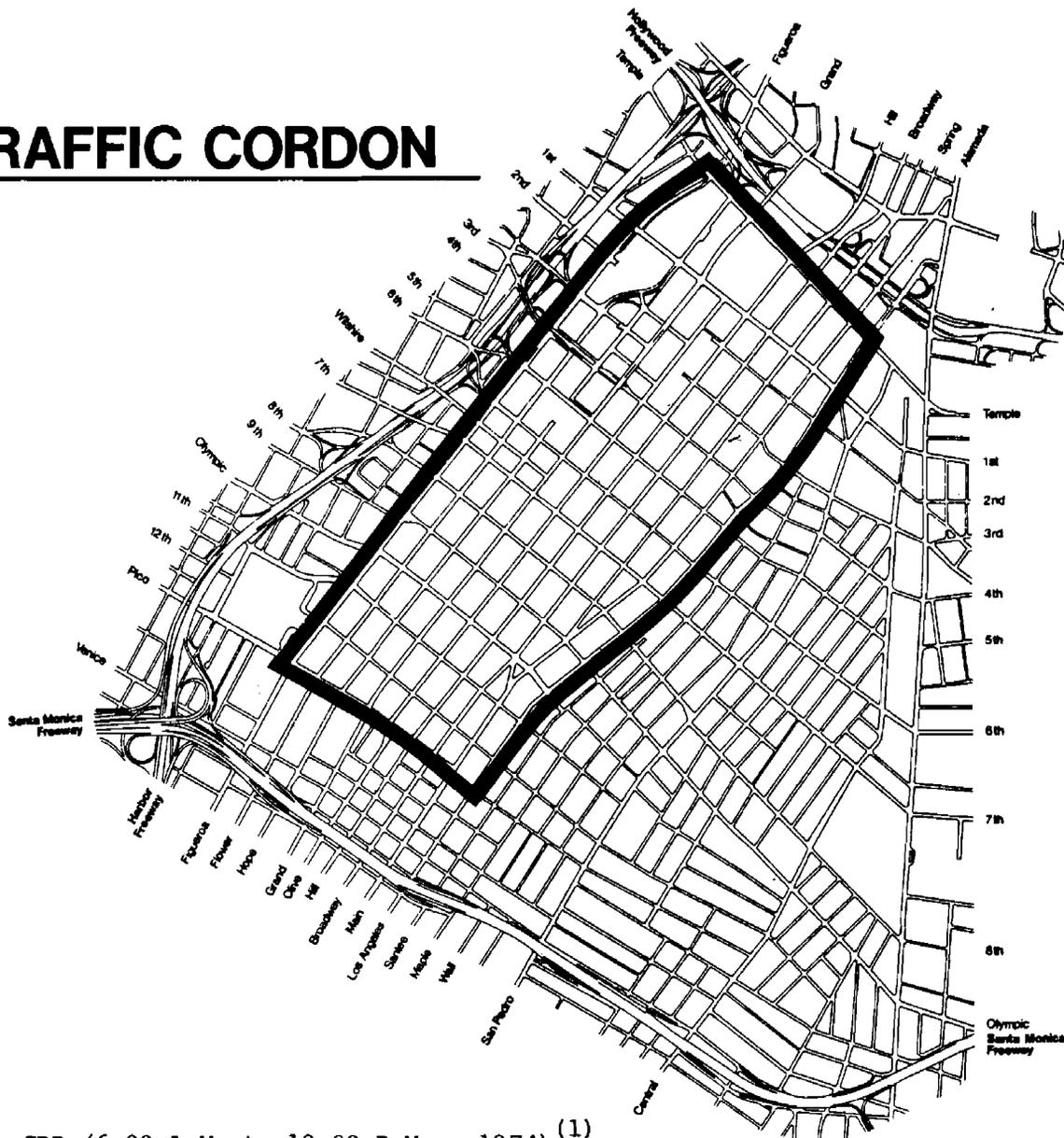
1. Traffic

The private automobile has remained the most prominent mode of travel to and within the Los Angeles CBD. Table II-1 shows that, in 1974--the most recent year for which traffic counts have been published--over 370,000 persons per day entered the CBD by auto or truck, while the transit system carried over 150,000 passengers per day to the CBD. The total number of persons entering the CBD has changed little in the past ten years, but decreased vehicle occupancy has resulted in a net increase in total vehicles and has produced increased travel congestion in the downtown area, particularly during commuter peak hours.

As shown in Figure II-2, downtown Los Angeles is bounded on three sides by freeways--the Hollywood Freeway on the north, the Harbor Freeway on the west, and the Santa Monica Freeway on the south. These freeways, and their direct connection to the San Bernardino, Pomona, Santa Ana, Long Beach, Golden State, Pasadena, and Glendale Freeways provide high speed travel to most parts of the region. The freeways, with exits to major arterials traversing the CBD, make downtown highly accessible to the region; the freeways have been a major influence in the extent and locale of development in the CBD.

Downtown surface streets form a basic grid pattern, with blocks measuring approximately 660 feet in the north-south direction and 300 feet east-west. There are several one-way pairs to increase traffic capacity and improve operating conditions. The basic grid is interrupted in several locations by structures

TRAFFIC CORDON



TRAFFIC - CBD (6:00 A.M. to 10:00 P.M. - 1974) (1)

	<u>IN</u>	<u>OUT</u>
TOTAL VEHICLE TRIPS ACROSS CORDON	306,700	296,200
TOTAL PERSON TRIPS ACROSS CORDON	605,000	578,000

BUS TRAVEL:

TOTAL DAILY RIDERSHIP ACROSS CORDON - 300,000
 TOTAL DAILY BUS MILES WITHIN CORDON - 115,000

TABLE II-1

PARKING SPACES IN CBD - TOTAL 103,700 SPACES

	<u>IN</u>	<u>OUT</u>
PASSENGER CARS	271,900	263,700
TRUCKS AND OTHER VEHICLES	29,600	27,300
BUSES	5,200	5,200
PEDESTRIANS	50,600	46,700

(1) Cordon count, Downtown Los Angeles
 Department of Traffic

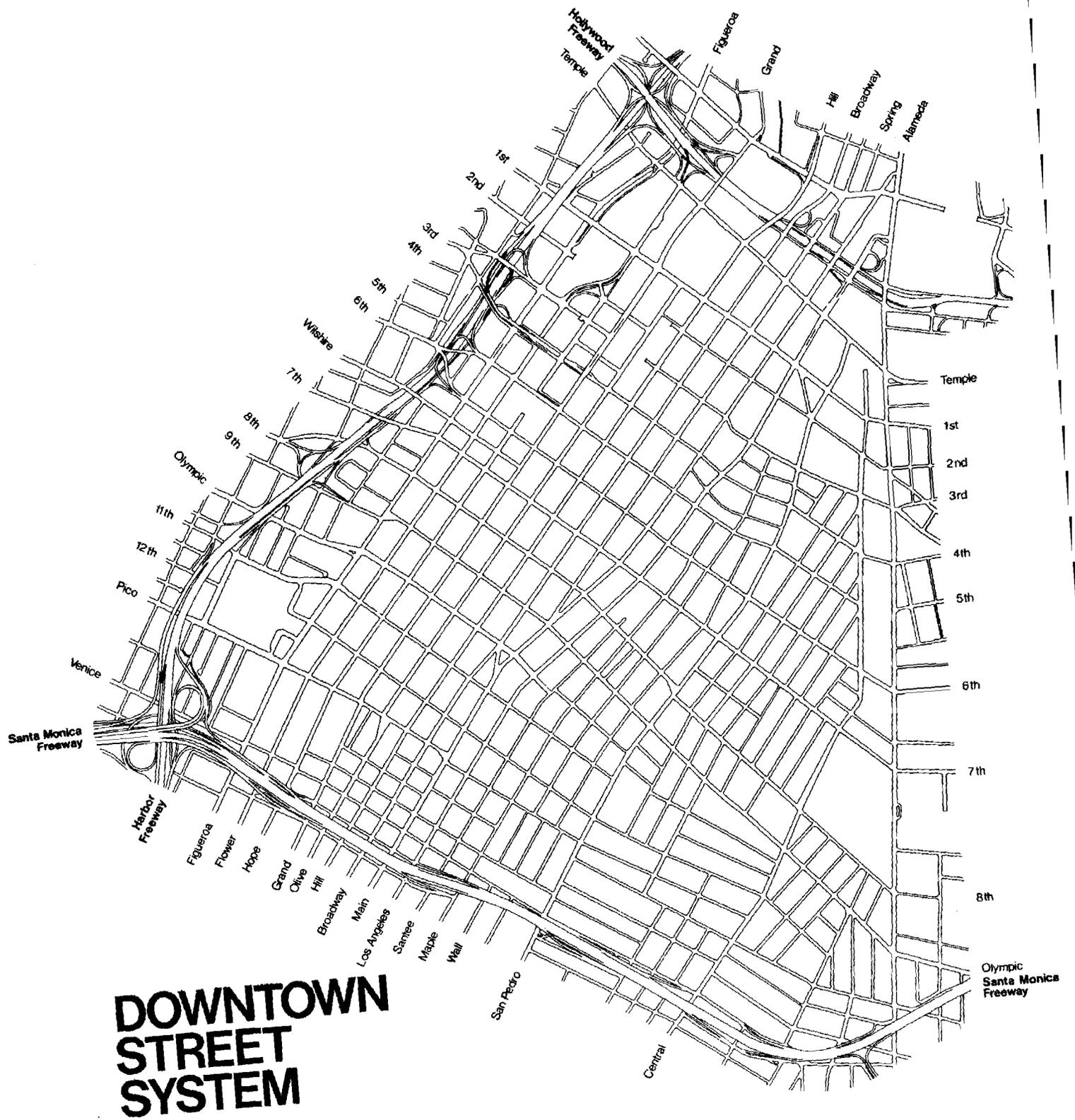


FIGURE II-2

and major land use developments, particularly the Bunker Hill Redevelopment Project, where terrain limitations have resulted in major east-west through streets being located in tunnels, providing limited access to major commercial and residential facilities on the top of the Hill.

Downtown streets experience congestion, particularly in the afternoon peak hours. The major north-south route is Main Street, which carries over 2,500 north-bound vehicles/hour in the Civic Center area. Other major north-south streets are Los Angeles, Spring, Broadway, Hill, Grand, and Figueroa.

The west side of the Central City, where development has shifted, is particularly poor for substantial service by transit. The main north-south street, Figueroa, narrows down to four lanes under Temple. Flower narrows in Bunker Hill to two lanes in each direction, on a steep grade and with tight radii. Hope Street dead ends. Grand Avenue has a steep grade in the vicinity of Fourth Street. Olive Street dead ends.

Major east-west routes are the one-way couples of Ninth-Eighth, Sixth-Fifth, and Fourth-Third. Fifth-Sixth has a peak hour volume of 2,700 vehicles west-bound and 2,100 eastbound. Maximum traffic volume (and congestion) points occur near the Harbor and Hollywood Freeway ramps to the north and northwest of the CBD, and at nearby intersections. Traffic demand on most of the streets approaching the Hollywood Freeway presently exceed or approach street design capacities.

Baseline traffic projections have been prepared and projected for a moderate range downtown employment

increase to 230,000. The projections were first developed for a "Null" bus system, consisting of only those bus improvements programmed for 1976. Under these conditions, peak hour traffic volumes were estimated to exceed greatly design capacity on virtually all north-south streets and on most east-west streets, both along the north and west cordons and at many intersections within downtown. (Table II-2 presents current and projected traffic congestion points in the CBD.) Traffic projections made for an alternative, incorporating substantial increases and improvements in downtown bus service, for the 230,000 employment projections, also indicated volume/capacity ratios exceeding 1.0 along the north and west cordons and along several north-south streets at intersections with Fifth Street and with Olympic Boulevard; volume/capacity ratios for this alternative were generally in the range 0.90 to 1.20, in contrast to ratios exceeding 1.50 for the null alternative. Incorporation of a downtown people-mover, intercepting regional freeway buses at the periphery of the CBD, would reduce projected traffic congestion, particularly along First Street and the Figueroa/Flower corridor.

TABLE II-2

DOWNTOWN INTERSECTIONS
WITH HIGH P.M. PEAK HOUR
TRAFFIC VOLUME/CAPACITY RATIOS
(Design Capacity Assumed at Level of Service E)

		Existing (1974-6 Counts)	Null (1990 with 230K Empl.)
Figueroa	- Northbound at Temple	1.56	1.66
	- Northbound at Fifth	1.09	1.55
	- Northbound at Olympic	0.76	0.92
	- Southbound at Fifth	1.07	1.29
	- Southbound at Olympic	1.15	1.70
Flower	- Northbound at Fifth	0.88	1.13
	- Southbound at Olympic	0.92	1.35
Hope	- Northbound at Temple	0.91	1.00
Grand	- Northbound at Temple	1.00	1.09
	- Northbound at Fifth	0.80	1.02
Olive	- Northbound at Fifth	0.88	1.16
Hill	- Northbound at Temple	2.06	2.59
	- Northbound at Fifth	1.58	4.58
	- Northbound at Olympic	0.77	1.04
Broadway	- Northbound at Fifth	0.85	1.14
	- Southbound at Fifth	0.79	0.98
	- Southbound at Olympic	0.94	1.04
Spring	- Southbound at Fifth	1.90	2.58

TABLE II-2

(Continued)

		Existing (1974-6 Counts)	Null (1990 with 230K Empl.)
Main	- Northbound at Olympic	1.07	1.23
Temple	- Westbound at Grand	1.65	1.69
First	- Westbound at Figueroa	1.13	1.32
	- Eastbound at Spring	1.03	1.14
Second	- Westbound at Figueroa	1.01	1.17
	- Westbound at Grand	0.83	0.97
	- Westbound at Spring	0.83	0.98
Third	- Westbound at Figueroa	1.11	1.22
Fifth	- Westbound at Figueroa	1.02	1.24
	- Westbound at Grand	0.92	1.01
Seventh	- Westbound at Grand	0.93	1.07
	- Westbound at Spring	0.87	1.08
Olympic	- Westbound at Figueroa	1.30	1.63
	- Westbound at Grand	1.13	1.28

2. Parking

Because the automobile is such a dominant mode of travel in Los Angeles, assessment of present parking conditions and future needs under alternative policies is critical to a balanced downtown transportation program. Recent parking inventory surveys have indicated that while the entire CBD currently has a surplus of parking supply, the Bunker Hill area has a deficiency. Projections of parking supply and demand indicate a substantial shortage of downtown parking in Bunker Hill, the Financial District, and Civic Center. (See Figures II-3, II-4, and II-5.)

A major cause of the projected parking shortage within the Bunker Hill Redevelopment Project is the traffic capacity limitations of adjoining surface streets and freeway ramps. Bunker Hill could physically accommodate sufficient parking spaces but the traffic capacity restrictions make this option undesirable.

The Circulation/Distribution System, particularly the people-mover element, can alleviate access problems to major development. The concept put forth in this proposal is one of intercepting both automobiles and buses so that they do not enter the City core. Needed parking facilities should be located at strategic intercept points and Transportation System Management policies would be implemented to encourage greater use of ride-sharing.

PARKING ANALYSIS ZONES

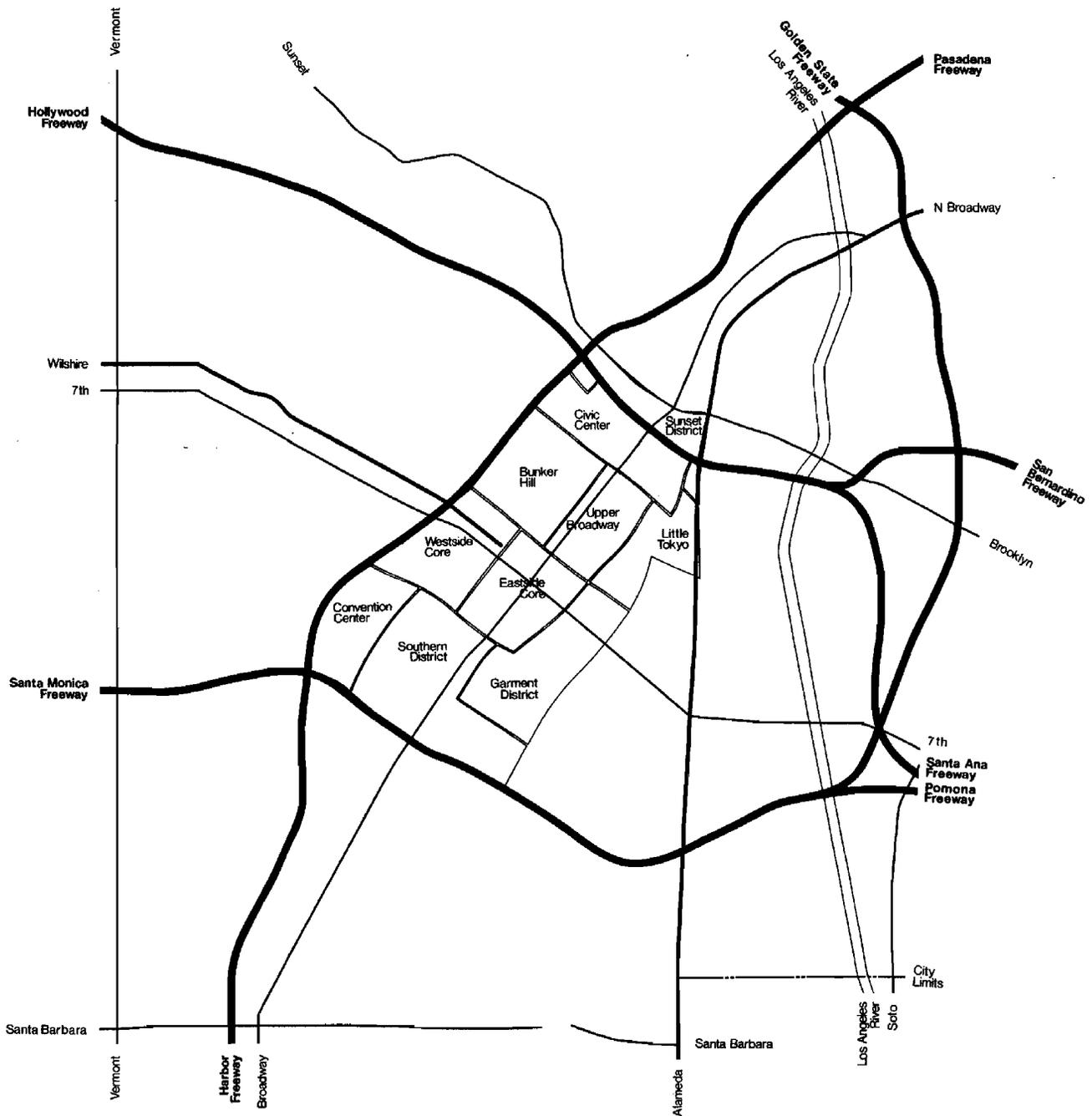


FIGURE II-3

PARKING SURPLUS & DEFICIENCY 1975



FIGURE II-4

PARKING SURPLUS & DEFICIENCY 1990

Mid Projection

 Surplus

 Deficiency

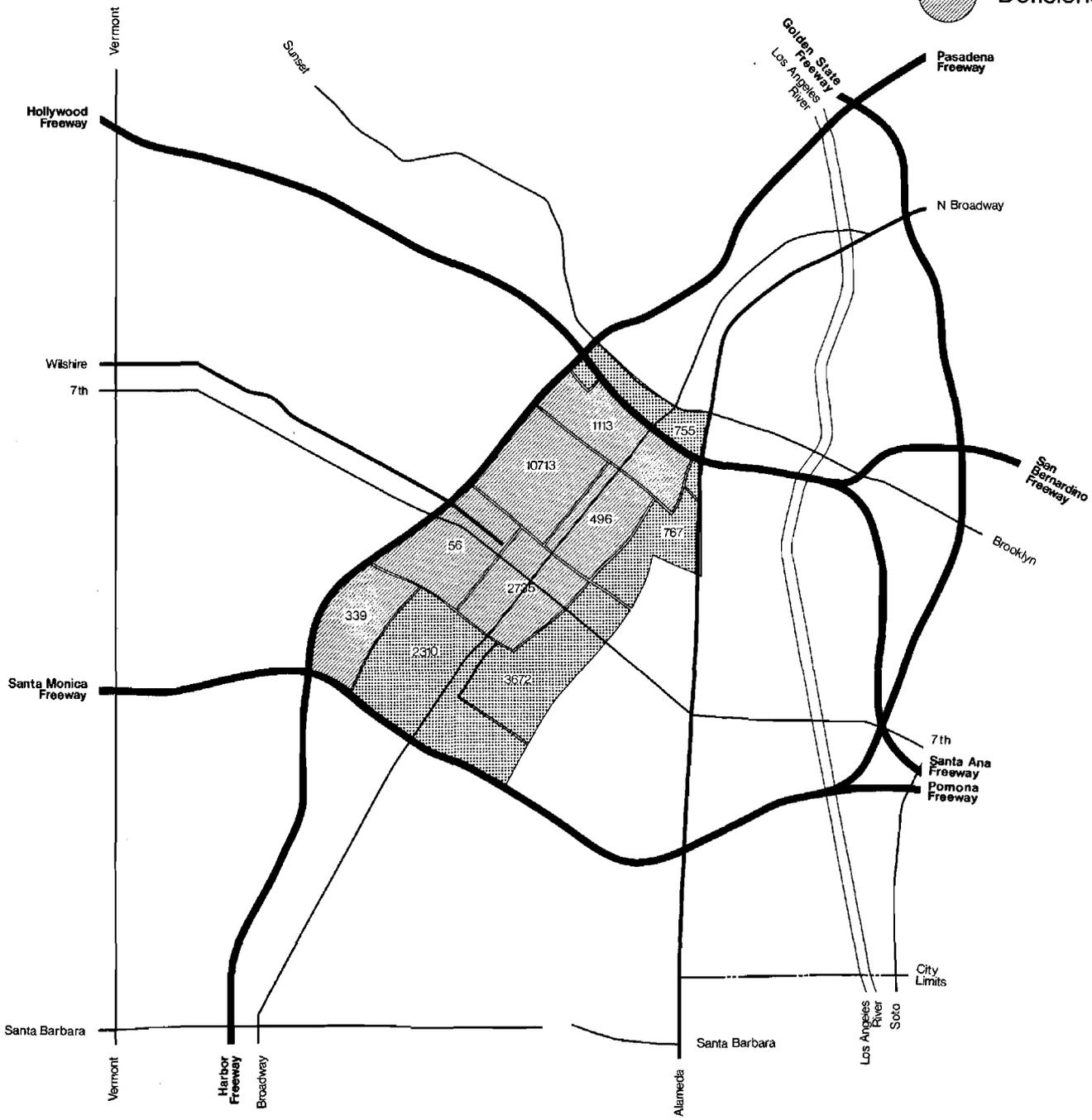
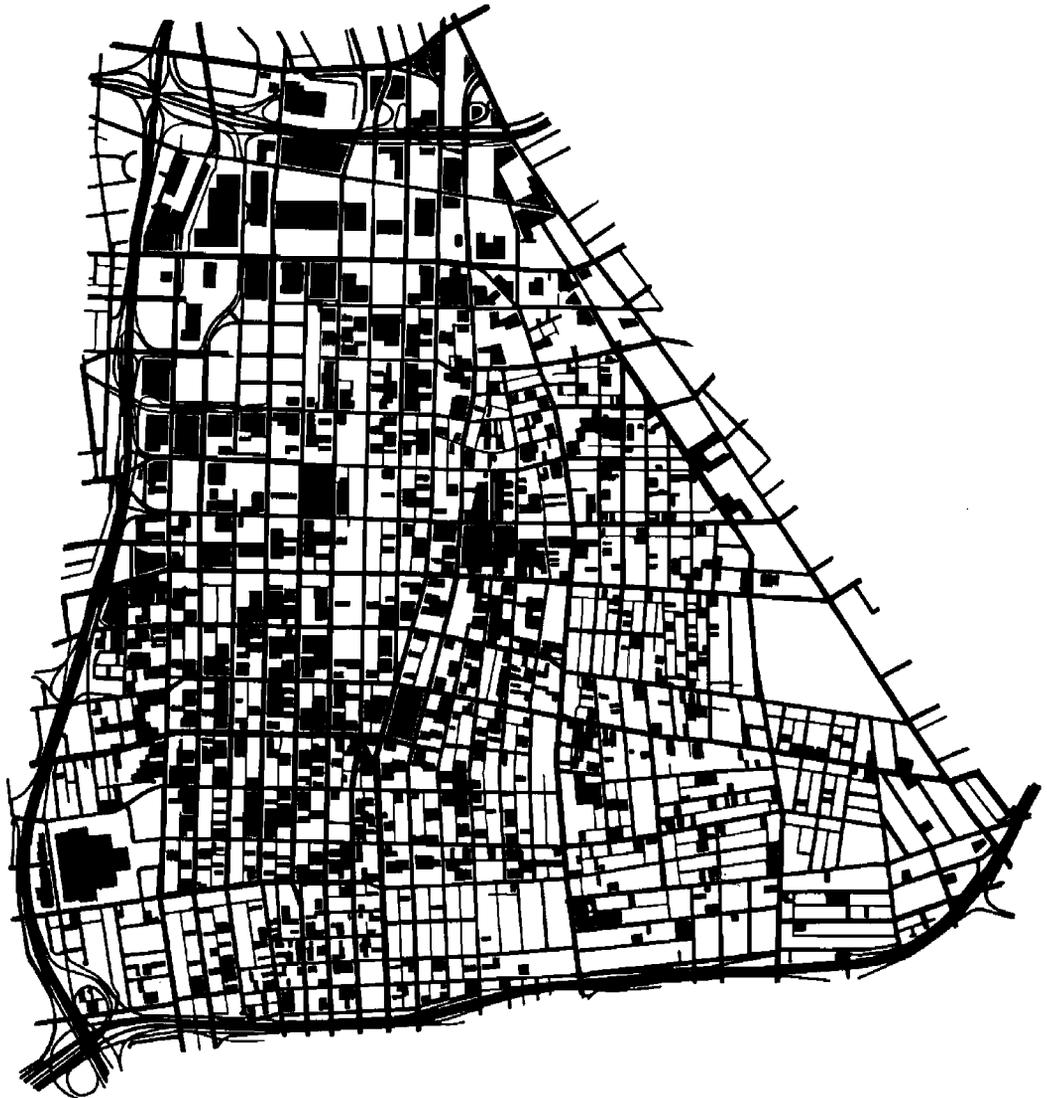


FIGURE II-5

If a balanced circulation/distribution system is not developed for downtown, the existing trend of automobile dominance will continue.

The figure below is revealing because it shows the amount of land in downtown dedicated primarily to the automobile. Included in the automobile-related category are streets, freeways, and parking facilities. If Transportation System Management projects, including strategic location of parking and supporting transit services, are not implemented, then this trend of traffic dominance in downtown will continue.



**MOST OF THE LAND IN DOWNTOWN
LOS ANGELES IS AUTO RELATED.**

3. Transit

Over 80 bus transit routes currently operate within the Los Angeles CBD, forming an extensive network that provides comprehensive coverage of the downtown area. Bus service includes a circulation Minibus system, freeway flyers, park-ride service, and regional surface routes including express, limited, and local service. Freeway buses enter the CBD from exclusive bus lanes on the El Monte Busway and from preferential bus/carpool lanes on the Santa Monica Freeway; buses also receive preferential treatment at freeway on-ramps throughout the area. A contra-flow exclusive bus lane is also in operation along Spring Street. Several other streets, although not designated for bus preferential treatment, carry over 120 buses per hour in the peak direction, resulting in near-exclusive bus use of curb lanes.

Buses carry over 25 per cent of total daily travelers to downtown, and nearly 50 per cent of peak hour travellers. Predominant transit usage occurs from the East/Northeast area and from the Wilshire-Hollywood area on the west side.

The Southern California Rapid Transit District (SCRTD) has been conducting extensive studies of bus transportation improvements needed in downtown. There is general agreement that added bus service is needed immediately to address the existing imbalance of transit service within downtown. Bus service to the west side of downtown is limited by street capacity restrictions, resulting in large part from the topography of Bunker Hill. Figueroa

and Grand Avenue are the only through north-south streets west of Hill Street. This can be seen on Figure II-2. Figueroa is constricted to four lanes through underpasses near Temple and the Hollywood Freeway, and bus service on Grand Avenue is limited by a large grade and by interference from several major parking facilities. East-west streets through Bunker Hill are grade-separated by tunnels and bridges. Consequently, many people who work along the westside corridor tend to rely upon their automobiles because of the poor pedestrian access to bus stops.

Planned bus improvements for downtown include designation of a grid system, increased freeway service, and increased service to the heavy employment concentrations on the west side of the CBD. SCRTD has proposed additional bus preferential treatments on downtown streets; these recommendations are still being evaluated by City traffic engineers and transportation planners.

The downtown Circulation/Distribution Study has used SCRTD's existing and proposed downtown bus system as a basis for the expanded systems designed for future employment projections. Future bus system alternatives (incorporating decreased headways, decreased turn movements, service levels reflecting expected activity concentrations, and preferential bus treatments) were designed as part of the C/DS study. The impact of proposed bus improvements on traffic congestion, travel times, and attractiveness to potential passengers, were evaluated as part of the study's alternatives analysis.

Figures II-6 and II-7 illustrate peak hour high volume bus streets and the resulting traffic congestion problems projected for an optional expanded bus system. The volume of buses projected and the need to minimize interference between bus and auto traffic, have led to designation of some eight streets for bus preferential treatments, e.g., exclusive bus lanes, preferential signals, restricted turn movements, and in some cases, conversion of street segments to exclusive bus/pedestrian use.

Most of the buses along the Figueroa/Flower corridor, and along First Street, use surface streets to collect and distribute freeway bus commuters. The Downtown People Mover provides an opportunity to intercept many of these commuters at Union Station and Convention Center, providing them more convenient transit service within the CBD, and also allowing the freeway buses to be used more efficiently for regional trips, rather than having to make the slow, stop-and-go trip through downtown.

Finally, Circulation/Distribution services of an innovative nature are needed to release Los Angeles from the financial stranglehold imposed by the existing transit conditions. The Los Angeles area is faced with a major shortage of operating funds in the next few years regardless how minimally service is expanded. Adopted plans will expand service by increasing the bus fleet to about 3100 buses by 1980. This increase in fleet will be accompanied by a \$75 million operating deficit, bringing the total five-year operating deficit to \$216 million.^{1/}

^{1/} Source: Southern California Association of Governments

An improved Circulation/Distribution System will not eradicate that regional deficit. However, because of automation, the system can be designed to establish trends in reduction of per-passenger operating costs. Then the overall per-passenger costs of moving people within downtown can be reduced.

P.M. PEAK HOUR Bus Volumes

230 K All Bus
Self-Distribute

→ 90 and above

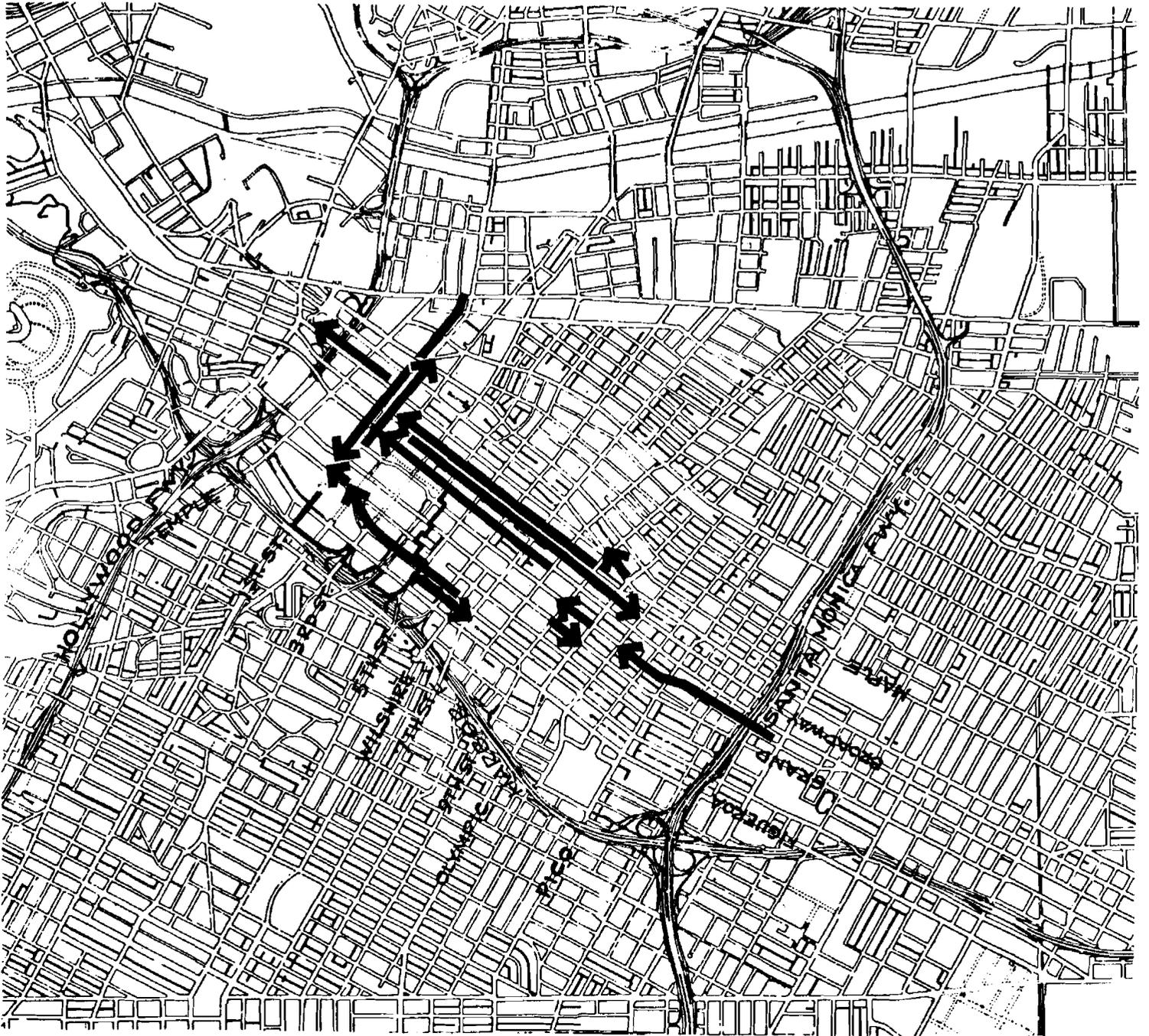
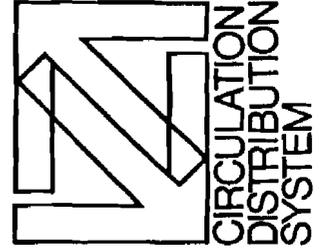


FIGURE II-6

P.M. PEAK HOUR Traffic Volume/ Capacity

230 K All Bus
Self-Distribute

➔ 1.00 and above

— screen line

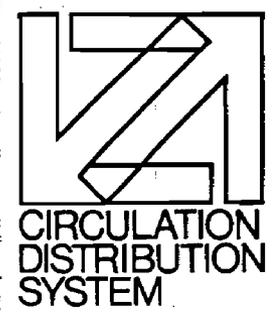
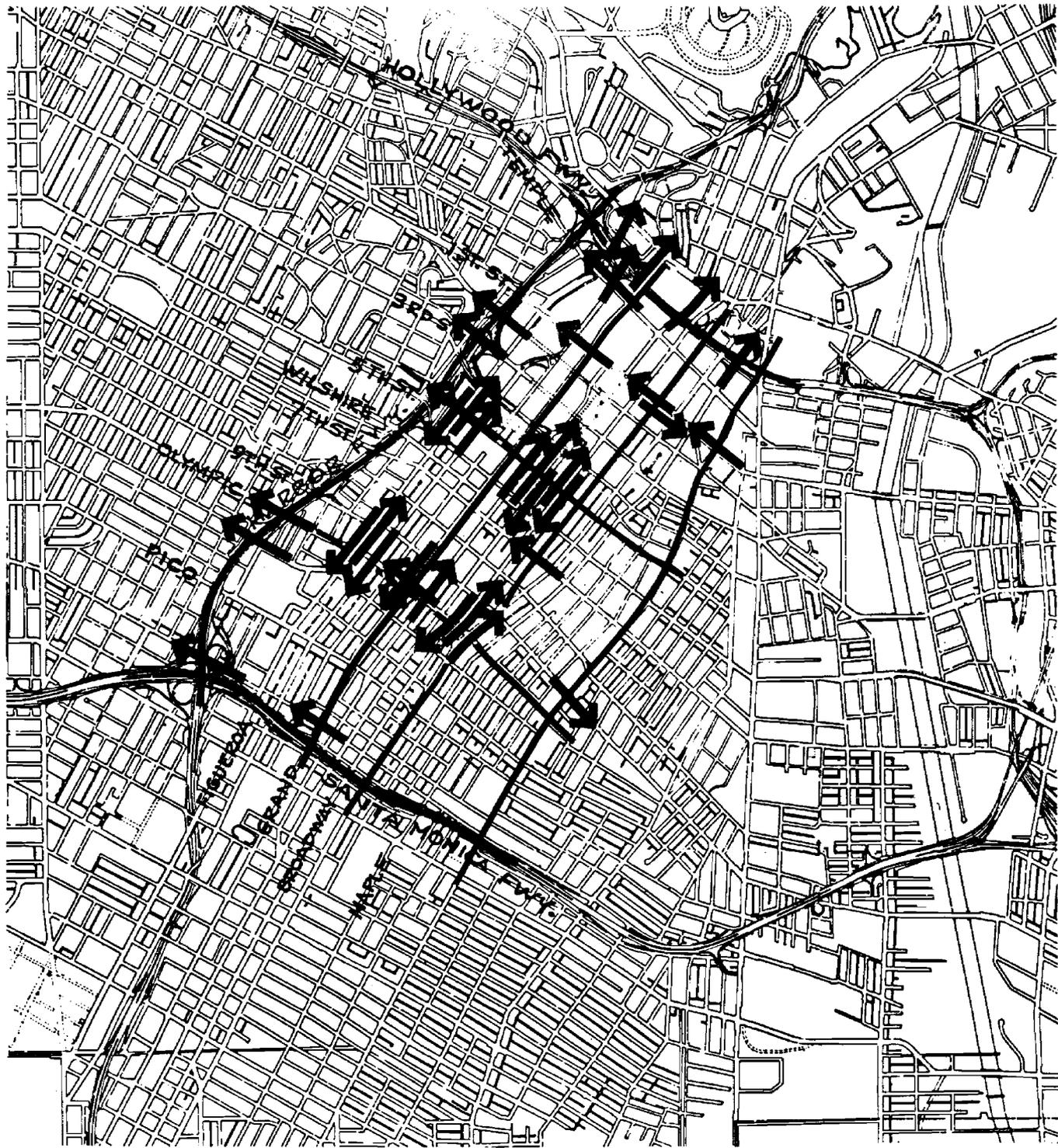


FIGURE II-7

 **PLANNING STATUS**

III. PLANNING STATUS

A. Alternatives Analysis

Various policy options are available for future transportation development in downtown Los Angeles. The three options that have been intensely analyzed include:

- do-nothing, the Null alternative;
- an improved and expanded all-bus system;
- an improved and expanded bus system augmented by an automated guideway transit system.

1. Evaluation Process

The evaluation process, to sort out the implications of these various options, was a two-cycle evaluation process. As shown in Figure III-1 the first cycle evaluation began by developing both alternative bus and DPM systems. Two bus alternatives were designed, each of which corresponds to a different level of service. Three DPM alternatives were also designed, but with a different purpose in mind. Because DPM systems offer different opportunities, the alternatives were designed to exemplify three different ways of using this service, depending upon the location of an initial segment.

Initially, an extensive number of DPM scenarios (18) was developed. From these were derived the total system and alternative initial segments, each of which emphasizes somewhat different goals and objectives. One places emphasis on coordinating ongoing metropolitan transportation plans. A second places emphasis on the need to use advanced transportation service as a level to promote private sector development in otherwise deteriorating sections of downtown.

Evaluation Process for the Circulation/Distribution System Study

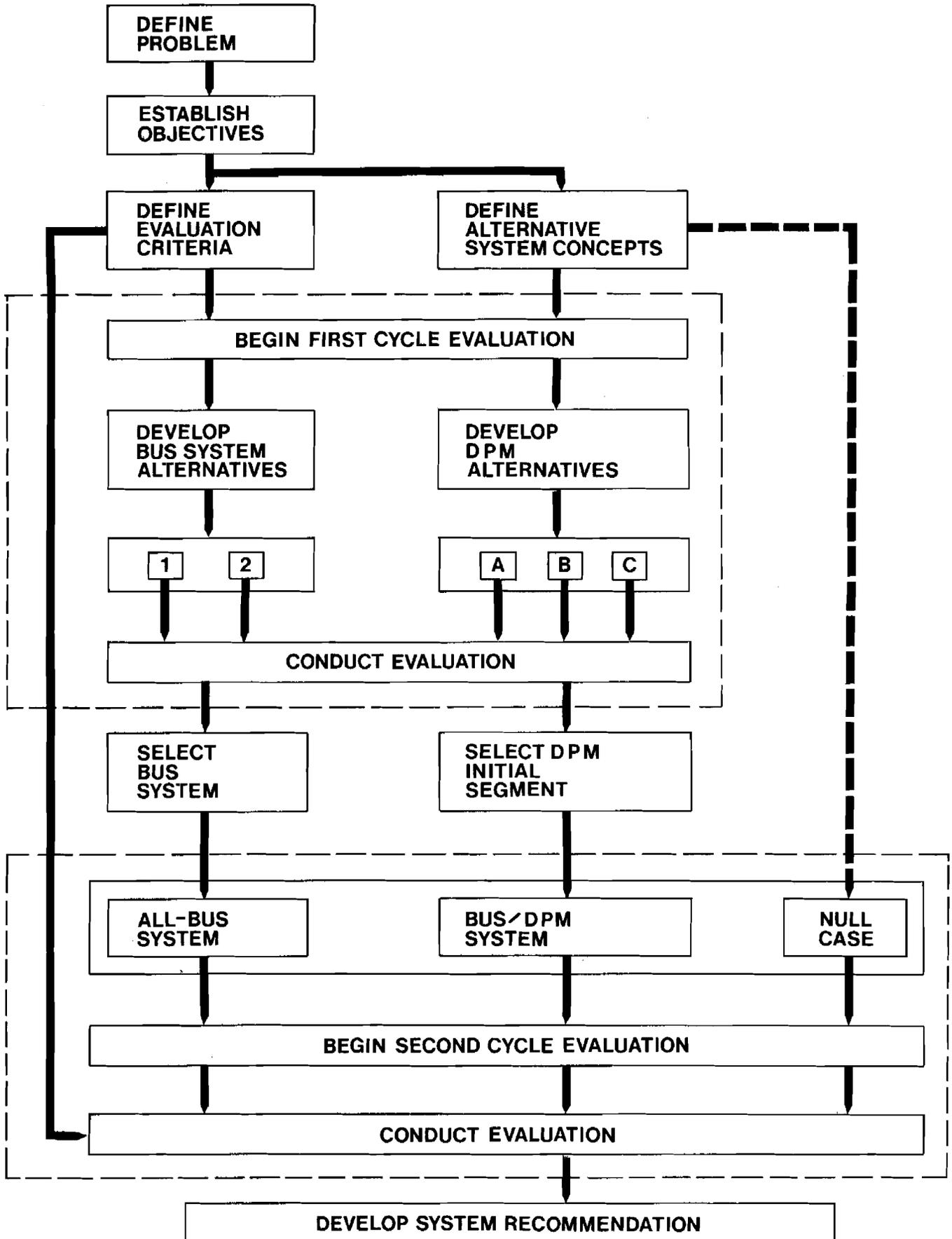


FIGURE III-1

The third places emphasis on developing the central core of the shopping and financial districts.

The first cycle evaluation imposed a set of criteria on these alternatives. Performance criteria included patronage, service area, travel time, capital and operation costs, and connectivity. Impact criteria included social and economic factors, disruption and displacement, and land use and activity changes.

The outputs of the first cycle evaluation were the selected DPM and bus alternatives which were then used for the design of three system alternatives. These consisted of a null, all-bus, and bus/DPM alternative.

Each of these three system alternatives was evaluated in a comparative fashion, the result of which was a recommended program.

2. System Alternatives

Three system alternatives emerged from the analysis conducted during the first cycle evaluation. The three system alternatives which were examined are described below.

a. The Null System

This alternative represents the "do-nothing" policy which assumes that the downtown area will be able to adjust incrementally to accommodate transportation needs, without significant additional public transportation improvements.

For purposes of this study, the Null System assumed those public transit improvements having an effect on downtown, and that have been approved for implementation in fiscal year 1975-76. On a regional basis, this included additional service in the San Gabriel Valley (50 buses), Mid-Cities Area

(45 buses), East Los Angeles (25 buses), South Bay (65 buses), and implementation of the Santa Monica Freeway "Diamond Lane" (50 buses). No change in the downtown Mini-Bus service was assumed. (Mini-Bus service has subsequently been significantly reduced.)

The following is a summary of the Null Alternative:

Buses Entering Downtown (peak hour)	75
Mini-Buses Operating Only in Downtown (peak hour)	40
Bus Intercept Facilities	SCRTD Terminal
Pedestrian Facilities	Bunker Hill Pedestrian Bridges
Parking Policies	No Major Change in City Code
Downtown Freeway Ramps	No Improvements
Street Traffic Accommodations	No Additional Restrictions

b. Improved-Bus Alternative

This alternative represents the policy option of accommodating future public transportation needs in downtown through improvement of the existing bus system. This is a relatively moderate capital-intensive approach to improved transportation and, therefore, is useful for comparison with an approach that requires substantial capital investment.

During the early stages of system design, two alternative bus system concepts were evaluated. The first consisted of self-distributing buses operating similarly to today's system. The second was a plan wherein line haul buses coming into downtown would be routed to intercepts. At these intercepts passengers would transfer to a downtown bus system operating throughout downtown using preferential bus lanes. Preliminary analysis of

these two alternatives indicated that the bus-to-bus intercept alternative would not be practical for Los Angeles since the user would incur increased travel time without any perceived improvement in the service offered, and the operator would require additional bus equipment to make the system function.

The improved bus alternative assumes that public transit service in downtown is expanded to include:

Buses Entering Downtown (peak hour)	973 bus trips
Mini-Buses Operating Only in Downtown (peak hour)	55 bus trips
Bus Intercept Facilities	SCRTD Terminal
Pedestrian Facilities	Bunker Hill and Civic Center Pedways; Improve- ments on 7th & Broadway
Parking Policies	No Major Change
Downtown Freeway Ramps	No Improvements
Street Traffic Accommodations	Signalization, turn re- strictions, preferential bus lanes on Broadway, Spring, 1st, Hill, Flower, Figueroa, 6th, 7th

c. Bus/DPM Alternative

The third alternative system introduces the use of a Downtown People Mover System (DPM) in the downtown area. The purpose of developing a Bus/DPM alternative was to determine whether implementation of such a system would significantly improve transportation services and to assess potential opportunities for downtown. Analysis of these and other issues was needed to determine the appropriateness of such a transportation service in downtown Los Angeles.

Several issues became immediately apparent during the early stages of DPM analysis. These include:

- Choice of technology;
- Relationship to plans for regional transit improvement;
- Location of an initial segment of guideway.(1)

These three issues became key to the development of a Bus/DPM alternative to be used in the final comparative evaluation.

Three alternative DPM alignments were defined for purposes of comparative evaluation. Two of these connect Union Station with the Convention Center (via alternatively East and West routings), while the third is an East-West half loop configuration.

(1) Description of DPM Alternatives

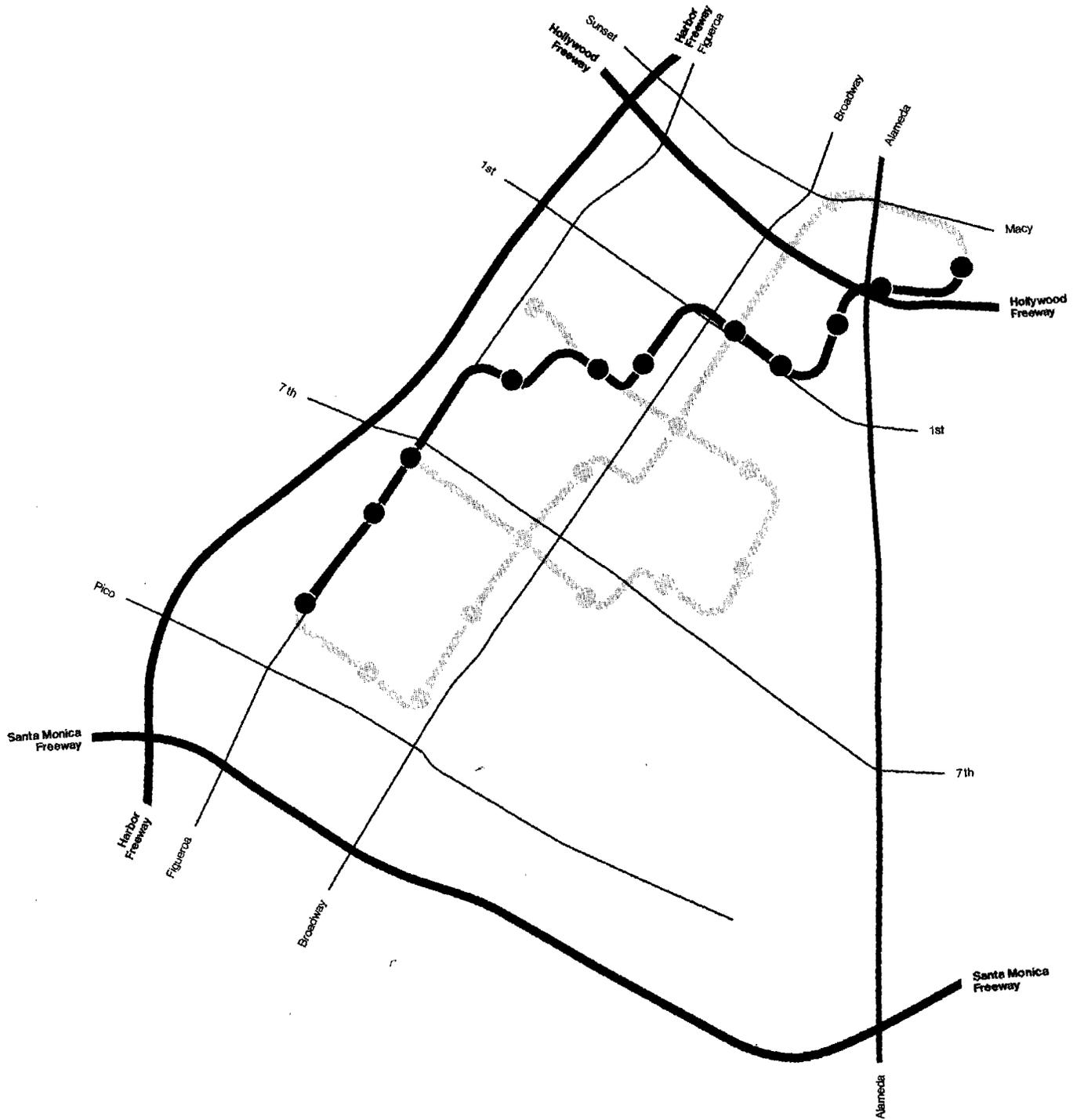
DPM Alternative A: Union Station to Convention Center via West Corridor

This route, shown in Figure III-2, terminates at either end in aerial stations which are integrated into auto and freeway bus intercept facilities, located at Union Station and the Convention Center. The route is in aerial configuration for all but 1800 feet of its 14,000 feet length, which is subway configuration as the route passes through Bunker Hill. The complete route alignment and station locations for Alternative A are described in detail in Section IV.

DPM Alternative B: Union Station to Convention Center via East Corridor

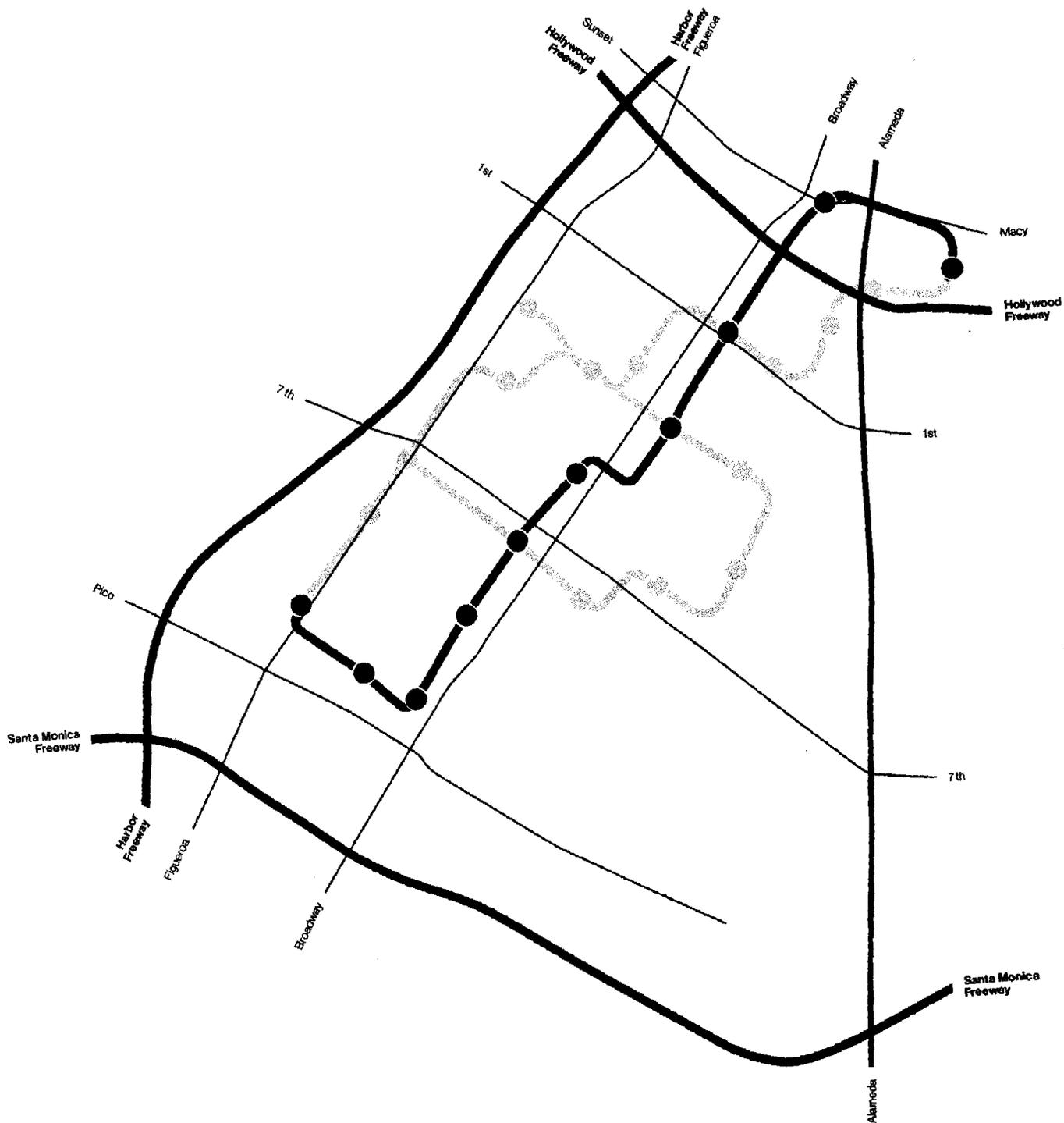
This route, shown in Figure III-3, also terminates at both Union Station and the Convention Center. The route is aerial for all

(1) The DPM system was phased so that feasible segments for near term operation would be compared against the bus alternative. Then, only the initial segment of DPM was included in the alternative for comparative evaluation.



**DPM
INITIAL INCREMENT
Alignment A**

FIGURE III-2



DPM Alignment B

FIGURE III-3

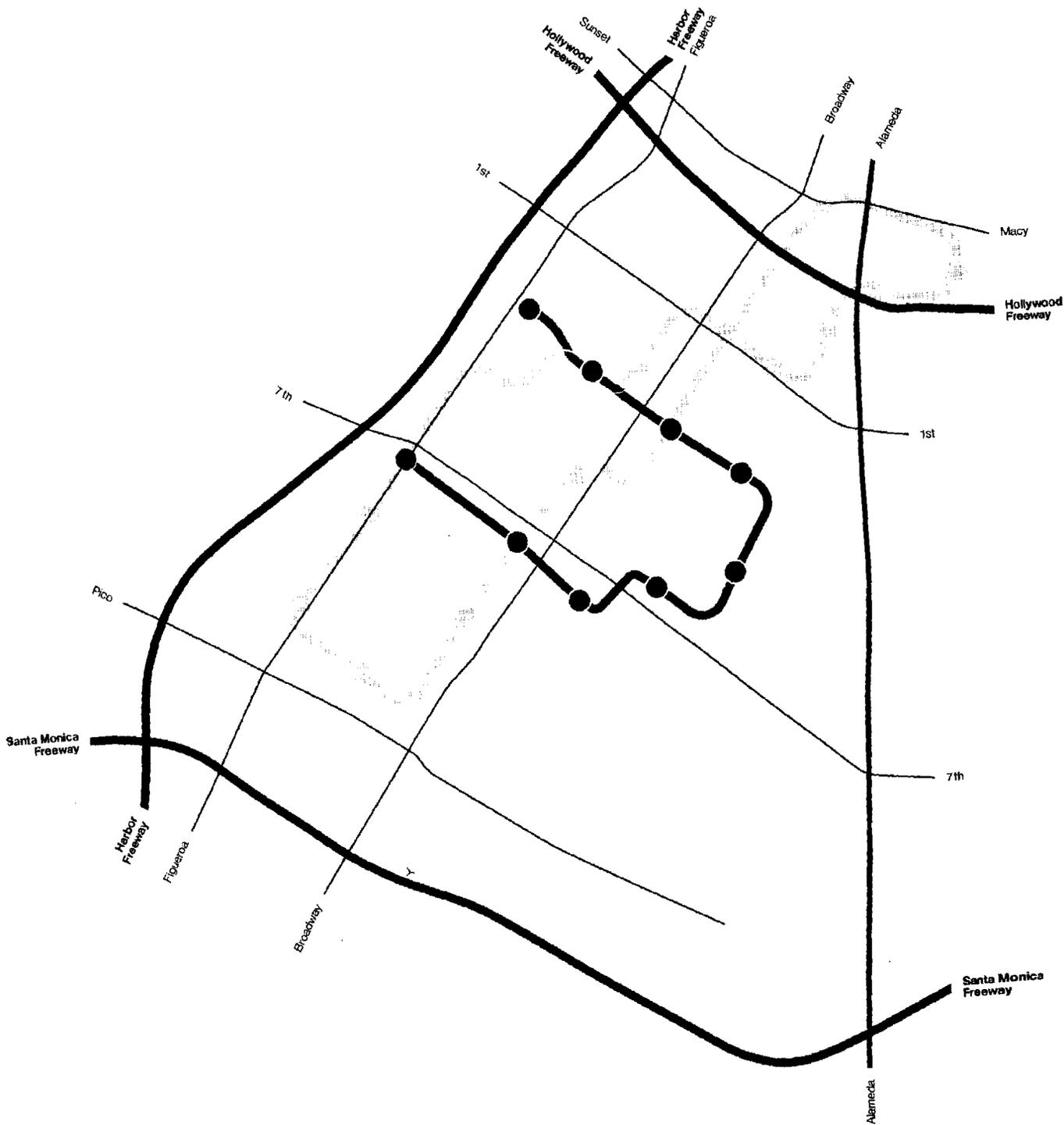
of its 15,300 feet of length. In addition to the Union Station and Convention Center stations, eight additional stations are required at an average spacing of 1,697 feet. Twelve vehicles are required, operating at two minute headways, with an average speed of 13.5 miles per hour.

Proceeding north from Union Station the route extends to Macy Street and then turns west. Passing to the north of Olvera Street, the route turns south and parallels Spring Street. Proceeding south the route passes by the Hall of Justice, City Hall, the Times-Mirror Building, and Caltrans. At Fifth Street the route turns to the west and then again to the south at Hill Street. The route proceeds south along Hill Street until it reached Twelfth Street. After passing between the Occidental Center Buildings, the route turns to the west and continues along Twelfth Street until it reaches the Convention Center.

DPM Alternative C: East-West Loop

This route, shown in Figure III-4, begins in a station integrated into the World Trade Center. From here the route proceeds east, passing through Bunker Hill, to the north of the Grand Central Market and past the Broadway Building, along Third Street. At San Pedro Street the route turns to the south and continues along San Pedro to Sixth Street, at which point it curves to the west. The route enters a station located within the SCRTD-Greyhound Terminal, and then turns to the south along Los Angeles Street. Before reaching Eighth Street, the route turns west to occupy a mid-block position between Seventh and Eighth Streets. The route continues along this path, passing just south of the Broadway Plaza-Hyatt Regency Hotel, and terminating in a station located at Figueroa Street.

Nine stations in all are required, at an average spacing of 1,436 feet. The route is 12,600 feet in length, with 1,000 feet in subway configuration through Bunker Hill. Nine vehicles are required, operating at 2.5 minute headways, with an average speed of 14.2 miles per hour.



DPM Alignment C

FIGURE III-4

(2) Evaluation of DPM Alternatives

The three DPM alternatives have areas of commonality and areas of division. There is a commonality of purpose which ties the three alternatives together, namely to provide effective circulation and distribution services within the Los Angeles downtown area. However, each of the three alternatives addresses this purpose through a different approach.

All of the alternatives are fairly comparable in terms of their physical characteristics. They are all of approximately the same length, and are primarily elevated structures. The number of stations and the spacing between them are nearly the same.

A comparative evaluation of all of the AGT alternatives was conducted under categories generated from the study's goals and objectives. These categories are:

- System Usage
- System Costs
- System Connectivity
- CBD Opportunities
- Social Impacts
- Economic Impacts
- Environmental Impacts

The following summarizes the results of that comparative evaluation.

System Usage. When the alternatives are compared on the basis of service to existing conditions, alternatives B and C appear more favorable than A. Alternative B provides the best service to existing population in the CBD, while Alternative C best serves existing employment. However, when future population and employment concentrations are analyzed, Alternative A becomes the most favorable.

In terms of patronage generated by the newly-achieved accessibility, Alternative A generates the highest figures on a peak hour, daily and annual passenger basis. This is caused by this alternative's superior connections to the regional transportation system. Alternative B generates the greatest number of passenger-miles of service, and Alternative C generates the greatest number of noon-hour patrons.

System Costs Alternative A has the greatest capital and operating costs, because of its vehicle and station requirements. However, this alternative exhibits economics of scale, producing lower operating costs on the basis of vehicle-miles travelled.

Annualized capital costs are fairly equivalent for all of the alternatives, although when compared on the basis of passengers carried, A and C appear more favorable than B. When total costs are considered, Alternative A emerges as the most favorable, in terms of passengers carried, and Alternative B, in terms of passenger-miles travelled.

System Connectivity Alternative A provides the best overall linkage of functions within the CBD, with two of the prime linkages being between the major hotels and the Convention Center, and between the Civic Center and the professional offices near Bunker Hill. It provides the strongest link to the government office complex. Alternative C has the lowest rating from an overall linkage standpoint, although its strongest link is to the retail services along Broadway. Alternative B has no effective linkage to the redevelopment areas. Alternatives A and B provide connectivity to the regional bus and auto systems.

CBD Opportunities Alternative A offers the greatest potential for economic growth to the CBD. It serves the most regionally significant office buildings, it exhibits the greatest potential increase in real estate value, sales, and tax revenues, and it provides a superior linkage to the government complex. This alternative would have a significant positive economic impact on the west side of the CBD, and it would not lead to the further deterioration of the east side of the CBD.

Alternative B has less potential for the growth of the CBD. This alternative would cause a positive impact on the east side by potentially attracting governmental and quasi-government office users to that area. It would have but a small impact on the private office and residential markets, and would cause only a small increase in retail sales.

Alternative C has the least potential for economic growth enhancement. It will produce some positive impact, however, on retail sales.

Social Impacts Alternative C causes the greatest amount of housing relocation, through the demolition of residential hotels. Alternative A and B have no relocation associated with their alignments.

Alternative A produces a minimum localized impact on the loss of jobs in the short term, whereas Alternative C produces the most general negative impact on this factor. Both Alternatives A and B can be considered to have the least detrimental impact on employment in the long term. In the near term, however, Alternative B produces the greatest losses due to construction, causing Alternative A to be the most favorable.

Economic Impacts In terms of business relocation in the near term, Alternative B results in the greatest loss of sales, and Alternative A results in the least loss. In the long term, business relocations resulting from Alternative C produce the greatest loss of sales, whereas again Alternative A is the least disruptive.

Environmental Impacts From the environmental perspective, none of the alternatives produce either positive or negative impacts of a marked degree. Impacts on the general environment are minor. Impacts occurring during construction can be mitigated through appropriate precautions and procedures.

Noise impacts are expected to be minor for all of the alignments.

In terms of visual impact, Alternative C emerges as the most favorable, because it impacts no special buildings or historical sites, and because it affects the least number of nodes and plazas. Alternative A and B, on the other hand, have greater impact on these areas.

Air quality and energy impacts are small for each of the alternatives. None of the alternatives will produce a significant change in emissions of primary pollutants. Similarly, all of the alternatives have been a minor impact on energy.

Alternative A scored highest in most of the evaluative categories assessed and therefore was chosen to input to the Bus/DPM system alternative for use in the system level evaluation.

The DPM/Bus Alternative assumes that the transit service is expanded to include:

Buses Entering Downtown (peak hour)	834 bus trips
Minibuses Operating Only in Downtown (peak hour)	20 bus trips
Bus Intercept Facilities	Convention Center, Union Station, SCRTD Terminal
Pedestrian Facilities	Bunker Hill and Civic Center Pedways; Improvements on 7th and Broadway
Parking Policies	Parking provided at Convention Center and Union Station; alternative could support controlled growth of parking policy
Downtown Freeway Ramps	Extend San Bernardino Freeway Ramp into Union Station; provide preferential treatment on ramps coming into Convention Center area
Street Traffic	Signalization and turn restrictions; preferential bus lanes on Spring, Hill, Broadway, and 11th
Automated Guideway Transit	Alternative A (West Side Corridor)

3. Summary of Comparative System Evaluation Findings

Results of the system level comparative evaluation are presented on the following pages. This evaluating cycle used the same criteria as the first cycle evaluation:

a. System Usage:

Under the Bus/DPM alternative, the total downtown transportation system is projected to carry 130,000 passengers per day in 1990. This compares with 57,800 for the All-Bus Alternative and 47,600 for the Null alternative. 81,400 total daily passengers will be carried by the DPM alone. The source of downtown travel under the Bus/DPM alternative is divided approximately equally between distribution (72,300) and circulation (57,000). For the DPM alone, daily travel is distributed approximately two-thirds/one-third between distribution (56,400) and circulation (25,000). The DPM captures over 30,000 of daily regional transit users, and 17,000 of daily regional auto users.

Beyond these projections, there are a number of sources of additional patronage. For example, as the availability of parking at each of the two initial auto intercepts or at additional locations expands, patronage on the people mover will increase. An additional 5,000 parking spaces could generate as much as 20,000 additional trips on the people mover.

Recent SCRTD analysis has indicated that a bus or rail guideway between Union Station and the Convention Center could attract from 25,000 to 40,000 passengers destined to points beyond the CBD. If a people mover system were implemented, it is reasonable to expect that the system could attract a significant portion of these trips. Furthermore, if a Wilshire corridor rail transit system were to be implemented, at least an additional 10,000 people can be expected to use the people mover to complete their trip.

b. System Costs:

The capital costs of the Bus/DPM alternative are quite substantial (\$167 million in 1980 dollars)

when compared with both the Null and All-Bus alternatives. On the basis of capital costs alone, the Bus/DPM alternative would not be the most attractive alternative.

However, operating costs offer a more useful comparison between alternatives because of recent escalation experienced by transit operations throughout the country. Today's operating cost of the Minibus system is approximately \$0.79 per passenger. (It is difficult to project the 1980 cost of operating the Minibus.) This service is of a similar, but not comparable, nature to that which the DPM would offer. In 1980, however, the operating cost of the people mover would be about \$0.14 per passenger.

Because of reduced bus fleet requirements, implementation of a DPM could result in annual cost savings to SCRTD in 1990 of \$4.2 million (in 1975 dollars). In 1990 dollars, the savings would be about \$6.9 million. Between 1980 and 1990, this yields a cumulative savings of approximately \$70 million (in 1990 dollars). This savings results from two factors. First, there is a reduction in the expanded fleet requirements which would occur in the All-Bus plan. Second, value capture revenues generated by a DPM are not available from a commitment to an All-Bus system.

c. System Connectivity

Each of the system alternatives examined offers a level of connectivity between activities in the downtown. The Null alternative results in a gradual deterioration in level of service, producing a decreasing level of connectivity over time.

Both the All-Bus and Bus/DPM alternatives improve connectivity, but in different ways. The All-Bus alternative increases the general level of service throughout the downtown area. The Bus/DPM alternative also increases bus level of service, but focuses this increase on the east city of the CBD. Level of service increases on the west side are permanent trip interchanges made possible between specific trip ends. This will enhance the perceived connectivity between these functions.

d. CBD Opportunities:

An analysis of opportunities afforded the CBD has produced three major findings. These are:

- Anticipated growth in downtown will not occur unless transportation is improved. Transit improvements in downtown are assumed in the Bunker Hill Development Plan and the Central City Development Plan and are a necessary element of achieving the goals of these adopted plans.
- It should be pointed out, however, that transit alone will not stem deterioration throughout downtown. It can be used selectively as a means to reinforce areas where growth is on the increase.
- Implementing a DPM along the West Side Corridor will result in significant economic benefits for the City of Los Angeles. It reinforces a trend of development in this portion of downtown. Transit in combination with other forces can promote development in other parts of downtown; however, for near term benefits the West Side appears most promising.

In terms of development potential, implementation of the Bus/DPM alternative will result in positive impacts on under-utilized land. The impacted area measured in square feet, and within 1200 feet of the guideway, includes:

COMMERCIAL CORE

- Bunker Hill 460,000
- Outside Bunker Hill 1,360,000

OUTSIDE COMMERCIAL CORE 1,020,000

TOTAL 2,840,000

e. Social Impacts

Both new housing and rehabilitation of existing housing are potentially positively affected by the All-Bus and Bus/DPM alternatives. It is difficult to draw firm conclusions regarding the degree of this impact because the presence of a transportation improvement alone cannot produce the housing renewal. This is true for a DPM as well as an expanded bus system. Transportation improvements can only act as catalysts in the redevelopment process.

However, given the fact that a DPM is a permanent improvement, permanent accessibility benefits can be achieved which are not possible through the uses of buses alone. Because of these accessibility benefits, it is possible to estimate (on the basis of geographic influence area) that 37.6 acres are potentially adaptable to new housing within the Bus/DPM alternative. Of this area, 26.0 acres reside within the South Park redevelopment area, and 11.6 acres within the Bunker Hill redevelopment area.

On the negative side, potential social impacts include loss of housing and loss of jobs. Impacts on housing can occur in both the short and long term. In the short term the effects are due to construction, and in the long term the effects are due to demolition of residential structures. It is not expected that there will be any loss of housing in the short term, from any of the alternatives examined. They are therefore equivalent in this count.

f. Economic Impacts

Implementation of the Bus/DPM alternative will reinforce economic linkages in downtown. The DPM alone will produce the fol-

lowing increases in annual sales and tax revenues.

SALES

- Retail \$25.8 million
- Hotel Room 5.0 million

TAX REVENUES

- Property \$4.70 million
- Retail Sales .26 million
- Hotel Room .30 million

TOTAL \$5.26 million

The All-Bus alternative will also have some positive impact on sales and tax revenues, but the magnitude of the impact will be much less than for the Bus/DPM alternative.

Implementation of the Bus/DPM alternative will result in major benefits for the Convention Center. It is reasonable to expect that a large number of people will use a people mover for access to hotels, restaurants, shopping and other tourist activities. Stimulating activity at the Convention Center will have ridership benefits for the people mover as well. Convention Center officials estimate that each convention attendee will use the system about four times each day.

Coupled with new rates, the DPM connection to hotels will make the Convention Center more competitive. Currently, this facility operates at a net loss of \$1,338,900 per year. Increased competitiveness can help to achieve the goal of seeking 250,000 conventioners annually, which would result in total annual spending of approximately \$53,250,000 per year. Bed taxes created would be about \$960,000 per year and contributions to sales tax would be approximately \$2,220,000 annually. This would result in an annual tax contribution by conventioners of \$3,180,000.

g. Environmental Impacts

Environmental impacts¹ resulting from the implementation of any of the alternatives are expected to be minor. In terms of visual impact, the Bus/DPM alternative results in the intrusion of a guideway structure in the downtown urban setting. It is difficult to say whether the impacts will be positive or negative, and the degree, because of the highly subjective nature of the impact. Assuming that a negative connotation can be attached to this guideway intrusion it can be said that a moderate impact will be experienced in the downtown, with more severe impacts occurring at selected locations.

Because of high bus volumes, it can be expected that noise impacts will be produced for both the All-Bus and Bus/DPM alternatives. For the former the impacts will be generally felt throughout the downtown area, whereas in the latter they will

¹A more detailed discussion of environmental impacts is contained in the Preliminary Environmental Assessment.

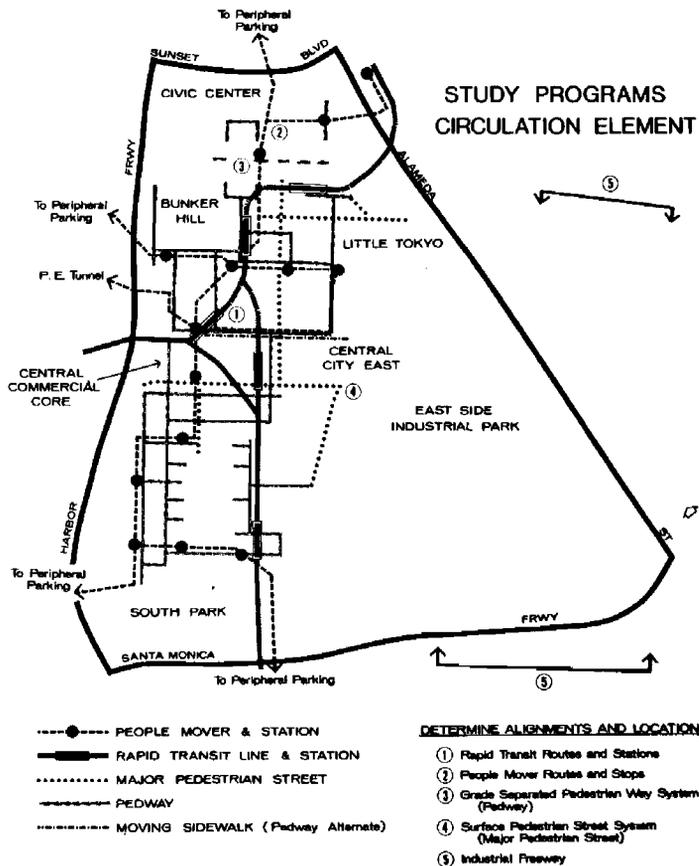
be more localized, on the east side of town. Because of federal noise criteria, the noise impact of the DPM is expected to be very minor, if at all noticeable.

The Null alternative will have a net increase in air pollutants, because of deteriorating level of service. The All-Bus alternative will offer some improvement in air quality, because of ridership increases. The Bus/DPM alternative will also have some air quality benefits, due to auto trips which will be diverted to the DPM. In all cases, however, the effects on air quality are expected to be minor.

Energy consumption estimates are quite similar to those for air quality. While improvements in consumption are expected to be minor, the Null alternative results in a deteriorating condition. The All-Bus alternative offers some reduced consumption, due to increased ridership. The Bus-DPM alternative also produces some energy savings, due to general ridership increases and higher efficiency levels of the DPM.

Construction impacts result only from the implementation of the Bus/DPM alternative. The extent of the impacts have not as yet been determined, but in all cases they are mitigatable through standard industrial safety and security precautions. The likely most severe impacts will be attributable to noise, dust, and vibration resulting from the required tunnelling beneath Bunker Hill.

THE PEOPLE MOVER AND REGIONAL RAIL STARTER LINE WERE COORDINATED IN THE CENTRAL CITY COMMUNITY PLAN ADOPTED BY THE LA CITY COUNCIL IN 1975.



The Southern California Rapid Transit District (SCRTD) initiated a major study effort in March, 1975, to analyze the data developed during prior studies and to make recommendations as to the corridors best suited for a mass transit Starter Line Project. That study, conducted by an inter-agency Rapid Transit Advisory Committee with support from SCRTD staff and consultants, is nearing completion; draft reports describing the alternatives analysis have been published, an environmental impact analysis is in process, and regional decision-makers are reviewing the results of the alternatives analysis.

The Starter Line Alternatives Analysis focused on several different rail and bus transit alignments within the San Fernando Valley to Harbor Area corridor shown in Figure III-5. For purpose of analysis and evaluation, several specific

guideway/station alignments were defined; however, SCRTD and the Rapid Transit Advisory Committee (RTAC) deferred to the City of Los Angeles and to CRA's Circulation/Distribution System the ultimate decisions on Starter Line alignments in downtown Los Angeles and on interfaces between the Starter Line and a downtown Circulation/Distribution System.

As the Starter Line Alternatives Analysis and the Circulation/Distribution System Program approached completion, it became apparent to various reviewing agencies that several issues regarding the downtown guideway alignments, the interface between various Starter Line Alternatives and the Circulation/Distribution System, and the implementation time phasing and funding of the two projects needed more detailing. To accomplish this task, a special study task force, coordinated by the Southern California Association of Governments (SCAG) and including representation from SCAG, Caltrans, SCRTD, CRA, and the Los Angeles Ad Hoc Technical Committee on Rapid Transit was established. That task force is currently (July/August 1976) evaluating several alternative combinations of regional rail alignments, regional bus improvements, and Circulation/Distribution Systems. Evaluation criteria include capital costs, operating costs, patronage, cost-effectiveness measures, and, of primary importance, funding requirements, sources, and decisions needed.

The task force plans to complete the evaluation by mid-August, and to issue a report of its findings and recommendations to local decision-makers and federal officials at that time. As soon as it is available, the report of the task force will be submitted to UMTA as an addendum to this proposal.

C. Citizen Involvement Process

Citizen participation was mandated not only by Federal UMTA guidelines but also by the Community Redevelopment Agency Board and Administrator, who felt that participation would be an important and necessary element of the Program. Accordingly, upon invitation of the Mayor and the City Councilman in whose district the DPM lies, the citizen participants became an integral element of the Program Team, along with technical consultants and public agency representatives. The participation was predominantly through the format of a regularly-convening group (the Citizens Advisory Panel, or CAP), with citizen outreach when particular input was needed which the group members could not provide.

CAP was given the following mandate:

- a) Its authority was advisory, as distinguished from policy or decision-making authority, which was the prerogative of the Agency.
- b) It was to review and make input into virtually all tasks of the Program.
- c) It would last the entire length of Phases I and II of the Program.
- d) It had full access to all Program information.

The Agency's role was supportive, but not directive. It did not mandate a particular group structure, but did provide a number of resources, including the equivalent of five full-time people devoted to CAP: a full-time city planner/architect as liaison between the Agency and CAP, two community consultant firms (Barrio Planners, Inc. and the Los Angeles Community Design Center) to support CAP's

work, the required secretarial and reproduction support, and considerable input by the technical consultants and the Agency transportation planning staff. All in all, the dollar value of these services exceeded \$170,000.

In addition to those CAP members originally appointed by the Mayor and City Councilpersons, the Agency invited potential members and member organizations as they were identified. The CAP mailing list eventually grew to 200 members, of whom approximately thirty remained active throughout most of the Program. The members of CAP included professional and quasi-professional planners, architects and engineers, who were often also experienced in citizen participation. There were representatives from communities peripheral to downtown, as well as people particularly concerned with transit dependency, environmental issues, and the needs of the elderly. In addition, a number of students, Vista volunteers, and representatives of public officials and agencies attended.

Supplementing the formal CAP organization, field contacts were made with individual citizen groups as the need arose. For example, urban design consultants toured several peripheral communities with community members in order to determine the effect of peripheral garages on these communities.

The formal CAP and citizen outreach participation made input into almost all of the Program tasks, including the definition of goals and objectives; determination of activity centers; transit alternatives definition, screening and evaluation; and the modeling and evaluation methodologies. CAP also supported the Program's continuation at two crucial points.

The citizens have introduced new ideas into the planning process. They were "watchdogs" and monitors of the Program in terms of maintaining the interests of the public as a whole. They were highly committed and effective critics of a number of aspects of the Program, which improved as a result of that criticism. The citizens proved ultimately to be a "loyal opposition" which supported continuation of the Program at critical points. They reinforced the Agency in using its limited authority to work towards a comprehensive solution to a comprehensive downtown transit problem. They became a body of citizens educated in transportation planning and participation issues who may continue to serve as a vital community resource to the entire City. In these important respects the citizens were invaluable.

At the conclusion of Phase II, CAP members made it clear that their support of the Program is contingent upon development of a comprehensive and balanced transit system serving all portions of downtown. Their major conditions for continued support of the program are that the City:

1. Proceed under an organizational framework which includes opportunities, staff, and financial resources for inter-agency, municipal and regional coordination for comprehensive planning to assure that engineering plans, route locations and implementation responsibilities are fully coordinated with, and are designed to serve, future population distribution and land uses.
2. Provide for a balanced central city transportation system serving existing and future needs of the downtown, the peripheral communities, and the region, and that such a system be expressed in a comprehensive central city transportation system plan.

3. Contain flexibility in order that components of a balanced transportation system (including flexibility in the currently proposed people-mover route location and design) will be susceptible to adjustment to permit coordination of all components with comprehensive planning considerations.

The CAP report with a cover letter is incorporated as part of this proposal. It is recommended that these CAP documents be read in their entirety in order to fully understand CAP's position and intentions for future study.

The Agency transportation staff concurs with the validity of many of the issues which CAP has raised, and is currently working with CAP to develop a study and participatory design for the next Program phases which will specifically deal with those concerns. Participation during the next phase will be designed to incorporate a wider range of representation than was possible previously. There will be a special effort to involve citizens in making input to the design of such user-oriented components of the DPM as the stations, signing and graphics, passenger security systems, and vehicle interiors.

IV. THE DPM SYSTEM

A. Physical Description

1. The Downtown People Mover

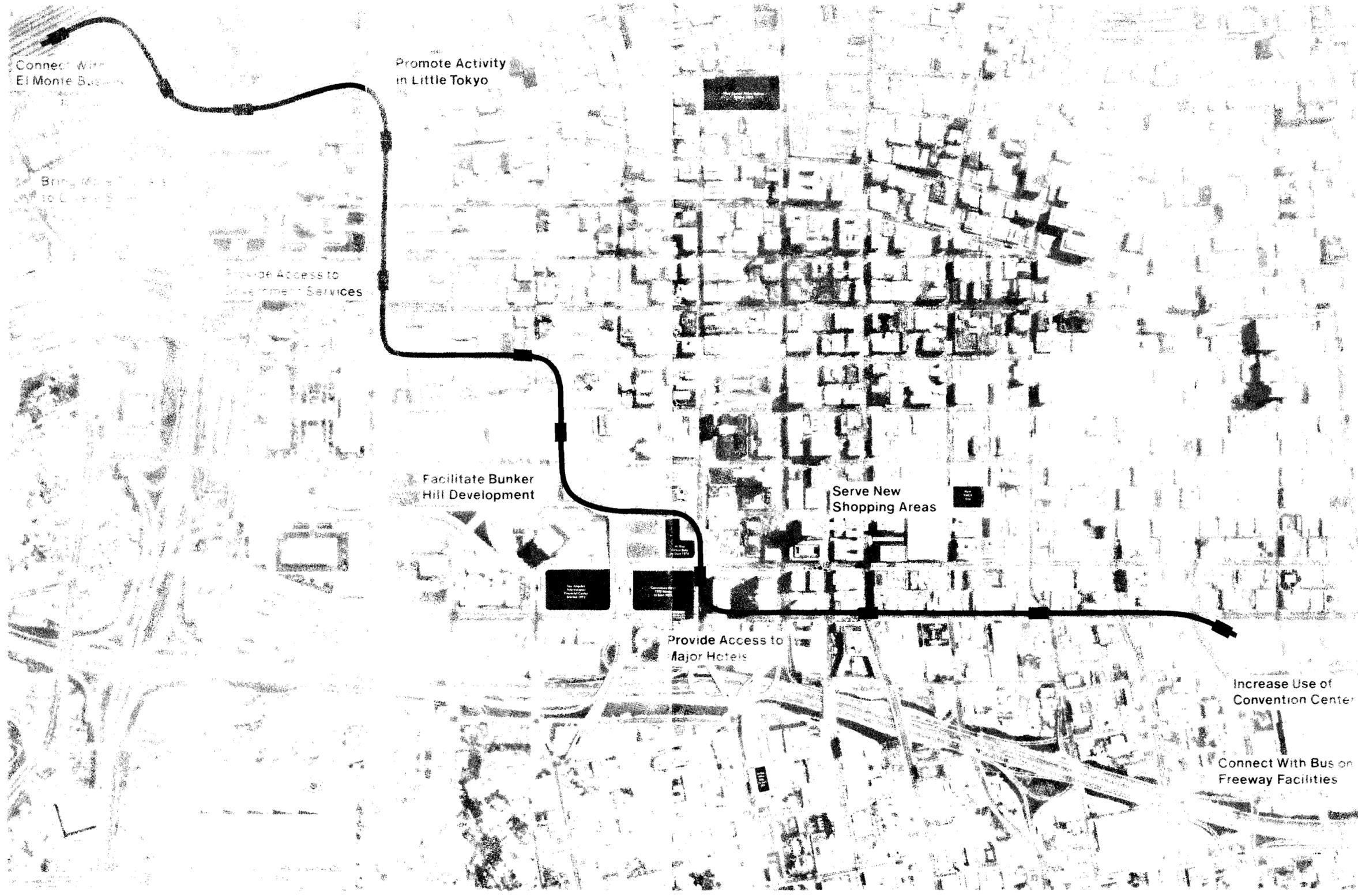
The Downtown People Mover (DPM) is designed to be a critical element of the Central City Circulation/Distribution System. The DPM offers high quality Circulation/Distribution service to major activity centers, and will provide the Central Business District with a cohesive force to reestablish the links which have deteriorated between certain areas over the years.

The DPM alignment illustrated in Figure IV-1 is a corridor connecting regional bus and parking intercept facilities at Union Station and the Convention Center. This corridor provides services to the government center, the major hotel and professional office concentrations and the financial center.

Plan and profile drawings of the DPM alignment are included with the route description which follows. The alignment was developed on the basis of the DPM design criteria, the engineering constraints, and the urban design considerations developed during the planning phase.

The alignment shown has been used as the basis for the order of magnitude cost estimate. Alternative alignments have been analyzed and modifications to the proposed alignments may result from more detailed analysis during the preliminary design phase. Columns supporting the guideway will generally be placed in public rights-of-way, where practicable, to avoid property acquisition and pedestrian disruption.

The physical characteristics of the DPM system are summarized below and described in more detail in the following paragraphs.



INITIAL SEGMENT OF DPM SYSTEM

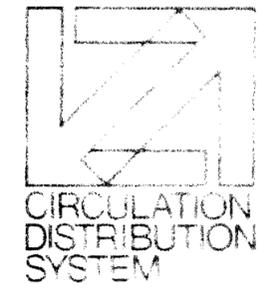


FIGURE V-1

Physical Characteristics of
the DPM Initial Segment

Length of guideway

- Elevated portion 14,000 feet
- Subway portion 1,800 feet

Number of Stations 11

- Elevated 10
- Subway 1

Average station spacing 1,395 feet

Number of vehicles 46

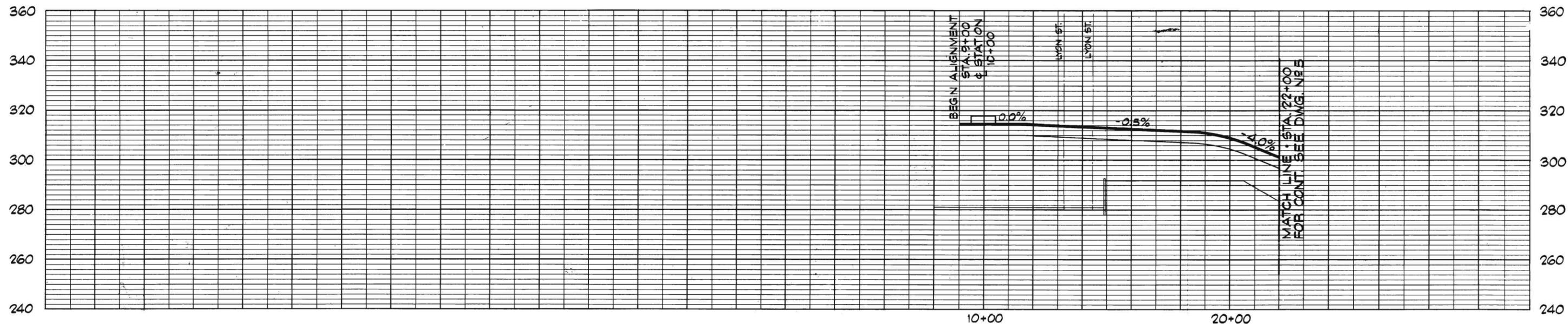
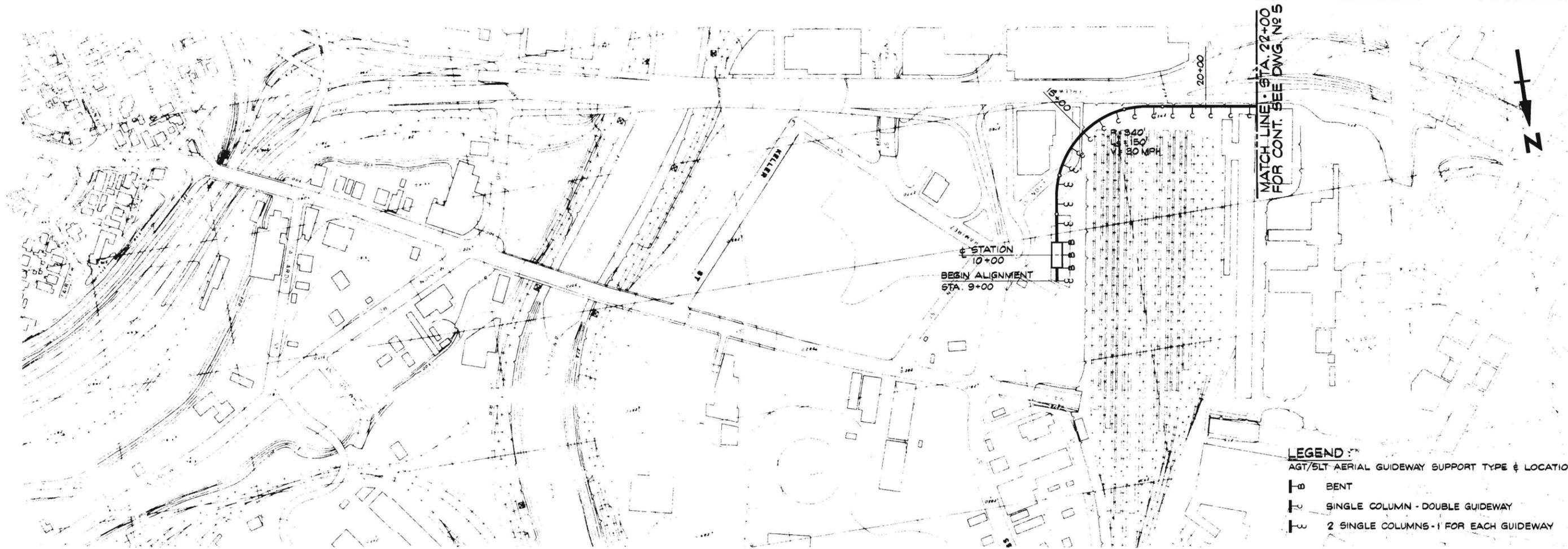
Number of vehicles per train 1-3 (1)

a. Route Description

The route's northern terminus is a center platform aerial station incorporated into a regional-bus and auto intercept facility located east of Union Station. From the station the route proceeds south in aerial configuration towards the end of the Union Station track area, then curves in a westerly direction and continues west along the north side of the Hollywood Freeway off-ramp to Alameda Street, descending in elevation to a center platform aerial station located just east of Alameda Street (see Figure IV-2).

Proceeding west from the Alameda Street station, the aerial route crosses over Alameda Street and curves in a southerly direction over Arcadia Street, the Hollywood Freeway and Aliso Street before entering the parking area on the east side of the new Federal Building. A center platform aerial station will be located east of the new Federal Building and north of Temple Street (see Figure IV-3).

(1) Vehicle numbers were based on 35-foot long vehicles used for planning and cost estimating. Selection of a smaller vehicle could require larger train consists.



LOS ANGELES BUNKER HILL AND CBD/CDS
AGT SYSTEM

UNION STA. - CONV. CTR. PEPELMOVER (VIA FIGUEROA ST.)
PLAN & PROFILE
STA. 9+00 TO 22+00

HORIZONTAL SCALE 200 0 200 400 600 FEET

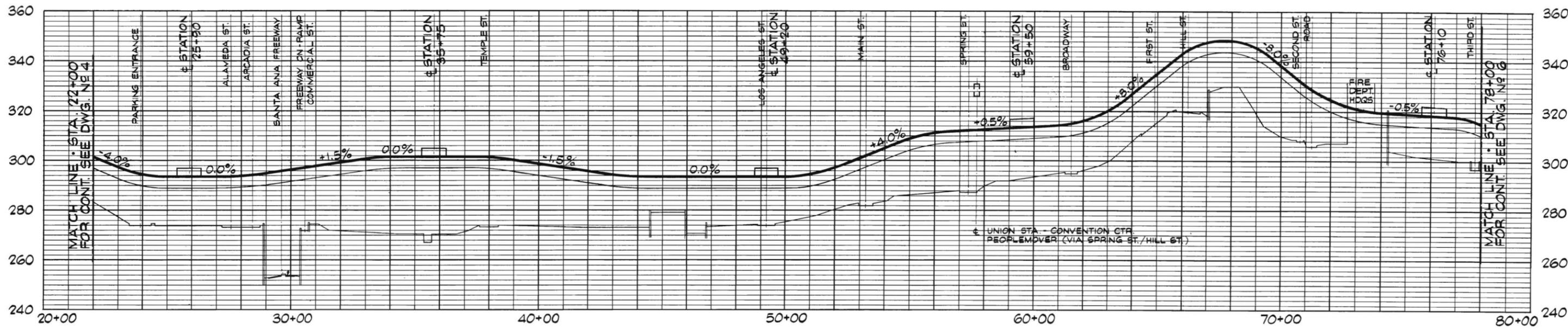
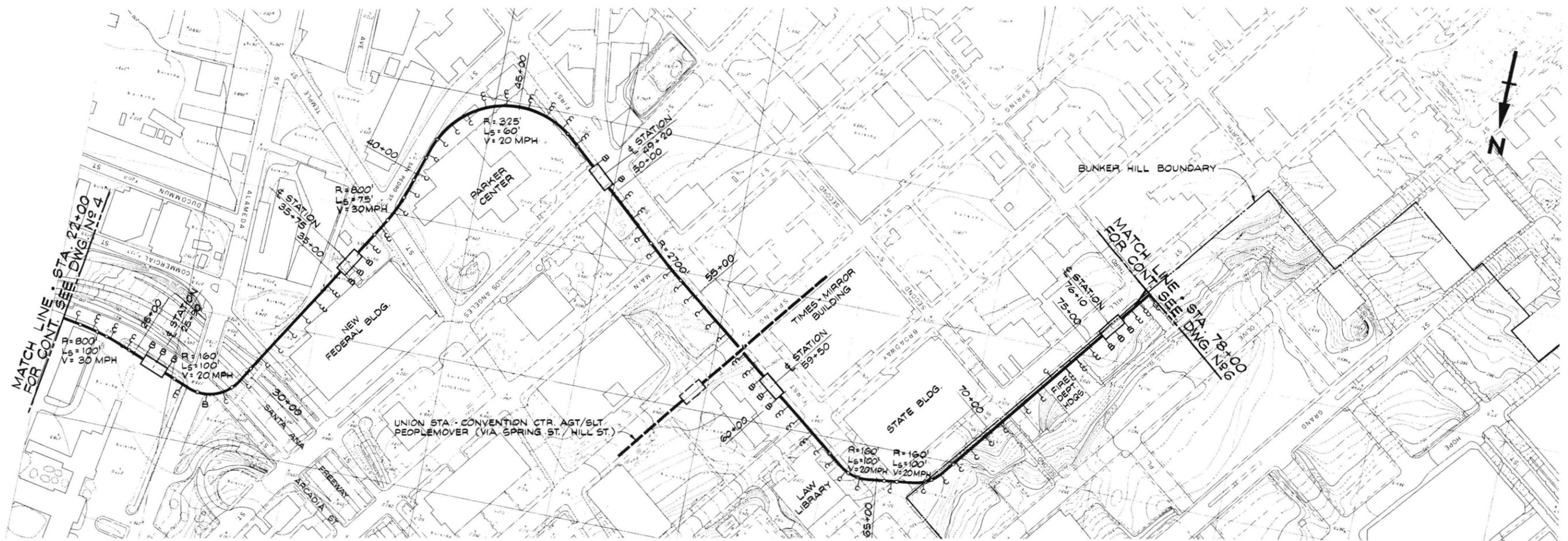
VERTICAL SCALE 20 0 20 40 60 FEET

DWG. N° 4

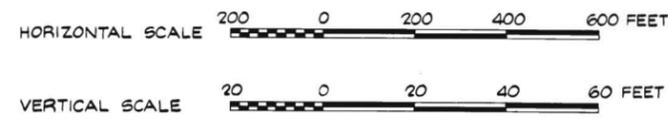
FIGURE IV-2

KAISER
ENGINEERS

4-2-76



LOS ANGELES BUNKER HILL AND CBD/CDS
 AGT SYSTEM
 UNION STA. - CONV. CTR. PEOPLEMOVER (VIA FIGUEROA ST.)
 PLAN & PROFILE
 STA. 22+00 TO 78+00



DWG. N^o 5

FIGURE IV-3

KAISER
 ENGINEERS

From the new Federal Building station the aerial route would cross over Temple Street and turn west over the automobile servicing and parking facilities of the Los Angeles Police Department to a center platform aerial station located adjacent to and north of First Street and spanning Los Angeles Street. It is planned that a connection between this station and the New Otani Hotel and Little Tokyo will be provided. From the Parker Center Station, the aerial route continues west in private right-of-way along the north side of First Street rising in elevation to follow the natural slope of existing ground and crossing over Los Angeles Street, Main Street, and Spring Street, passing in front of City Hall South and to the south of City Hall to a center platform aerial station located just north of First Street between Spring Street and Broadway in front of the site of the demolished Old State Building. This station will be designed to function as a transfer station to a possible later Spring/Hill Street corridor line which is planned to cross over the proposed DPM route at the Spring Street/First Street intersection (see Figure IV-3).

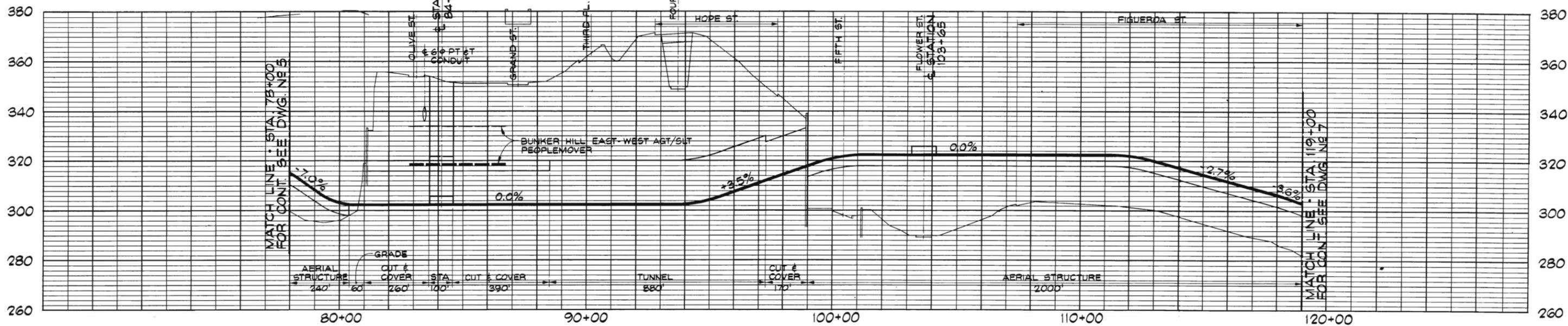
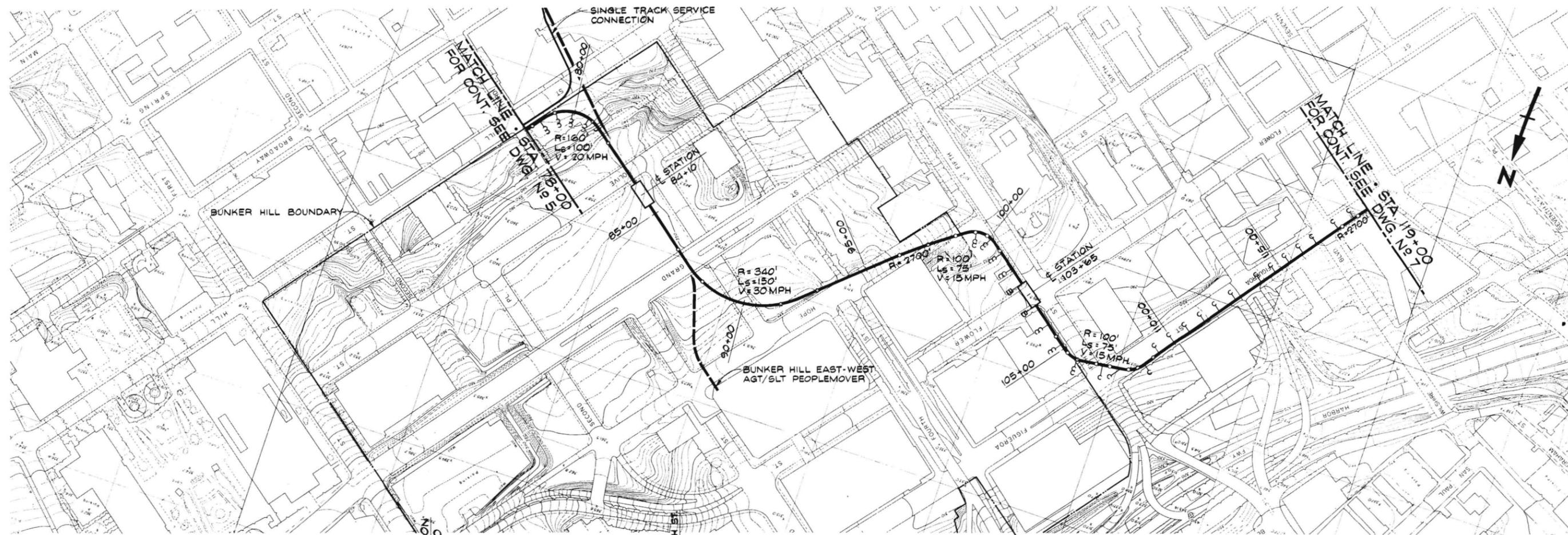
Proceeding west from the Civic Center station, the aerial route crosses over Broadway and continues along the north side of First Street passing in front of the Law Library on an ascending gradient to follow the existing contours. Before reaching Hill Street, the aerial route curves to the southwest, crosses diagonally over First Street and Hill Street, and turns south to an alignment along the west side of Hill Street inside the Bunker Hill boundary line. After crossing over Hill Street, the vertical alignment crests and descends in elevation following the natural gradient of the existing ground.

The aerial route then proceeds south along Hill Street crossing over Second Street and passing through an area currently occupied by Los Angeles Fire Department buildings between Second and Third Streets. These buildings will be demolished to make way for the route. A center platform aerial station has been located west of Hill Street to the north of Third Street (see Figure IV-3). This station site is within the Bunker Hill boundary line and is an optional station. The implementation of this station is dependent on the development in this portion of Bunker Hill. It has been included in the cost estimate.

Proceeding south from the Bunker Hill East station, the aerial route descends in elevation, crosses over Third Street, and then curves to the west to a location directly underneath the future Bunker Hill East-West People Mover route. The DPM route transitions from aerial structure to subway configuration as it turns west into Bunker Hill, with the tunnel portal located in the steep slope west of Hill Street. A side platform subway station is situated just west of Olive Street to the north of Third Place one level below the future Bunker Hill East-West People Mover subway station with transfer facilities provided between the two levels. Proceeding west from the subway station, the route crosses underneath Grand Avenue midway between piers supporting the Grand Avenue viaduct.

West of Grand Avenue, the route turns south and continues in subway configuration crossing underneath Third Place, Fourth Street and Hope Street. After crossing under Fourth Street, the subway ascends in elevation to a tunnel portal located on the west side of Hope Street to the north of Fifth Street. At this point the route transitions from subway to aerial configuration and turns to the west to an alignment along the north side of Fifth Street, and proceeds to center platform aerial station located at Flower Street (see Figure IV-4). From the Flower and Fifth Station the aerial route continues west along the north side of Fifth Street towards Figueroa Street, turns southwest just east of Figueroa Street crossing diagonally over Fifth Street and Figueroa Street, and then turns to the south to an alignment over the sidewalk on the west side of Figueroa Street (see Figure IV-5). The aerial guideway along Figueroa Street will be supported on cantilevered beams on eccentric piers located in the sidewalk resulting in decreased sidewalk width at the pier locations.

Proceeding south over the west sidewalk of Figueroa Street, the gradient of the aerial route would generally follow the existing gradient of the street. A center platform aerial station will be located between Seventh Street and Seventh Place. A side platform aerial station is proposed just north of Ninth Street. The implementation of this station is optional and is dependent on development in the area. It has been included in the cost estimate. This station will require bents spanning Figueroa Street for support of guideways and platforms.



LOS ANGELES BUNKER HILL AND CBD/CDS
 AGT SYSTEM
 UNION STA.- CONV. CTR. PEPELMOVER (VIA FIGUEROA ST.)
 PLAN & PROFILE
 STA. 78+00 TO 119+00

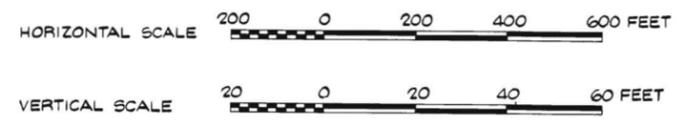


FIGURE IV-4

DWG. No 6

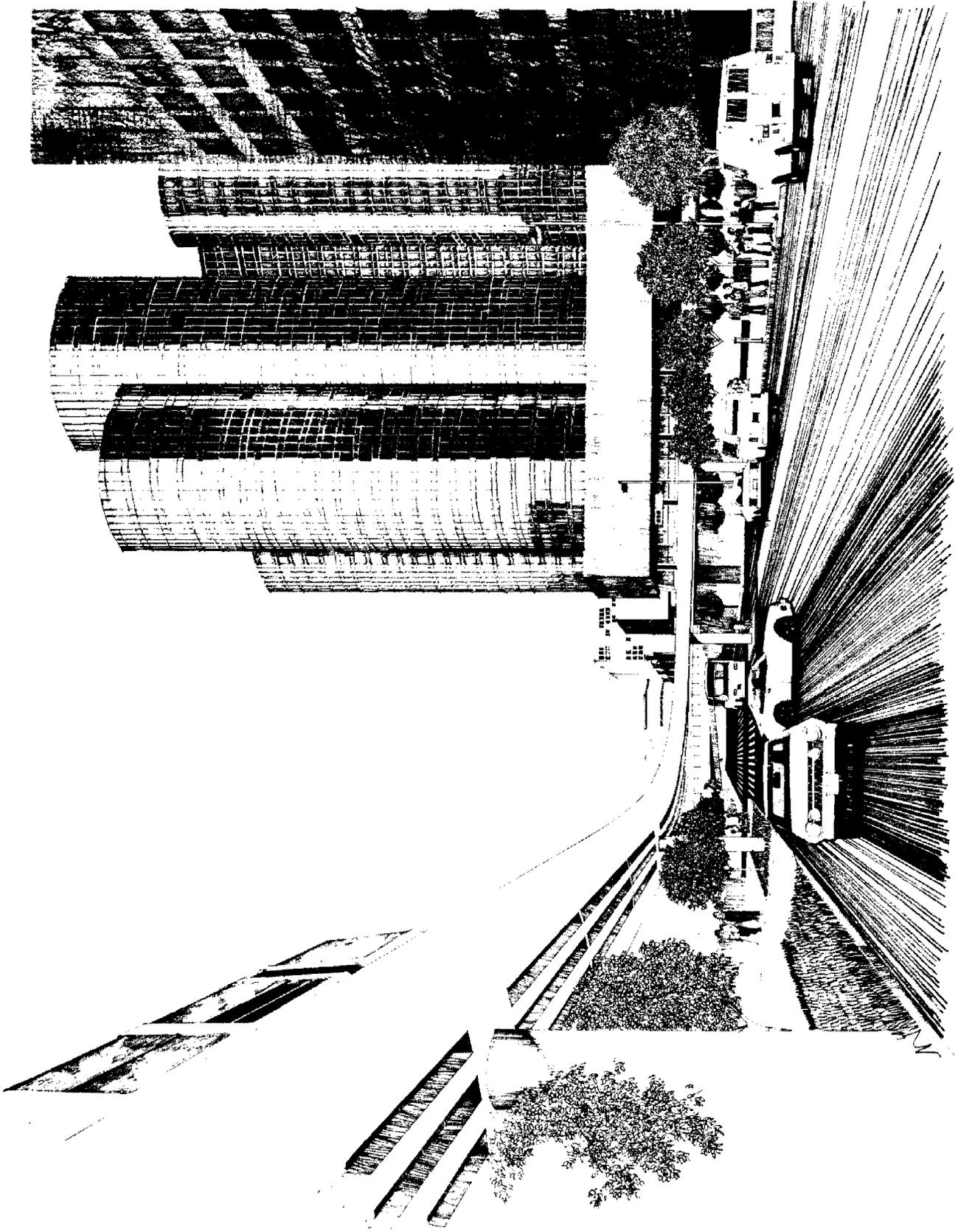


FIGURE IV-5

Looking North on Figueroa Street, North of Sixth Street

After crossing over Olympic Boulevard, the aerial route transitions to the west and rises in elevation to enter the center platform Convention Center station, which will be integrated into a freeway bus and auto intercept facility located on the parcel bounded by Eleventh, Trenton, Twelfth, and Figueroa Streets (see Figure IV-6).

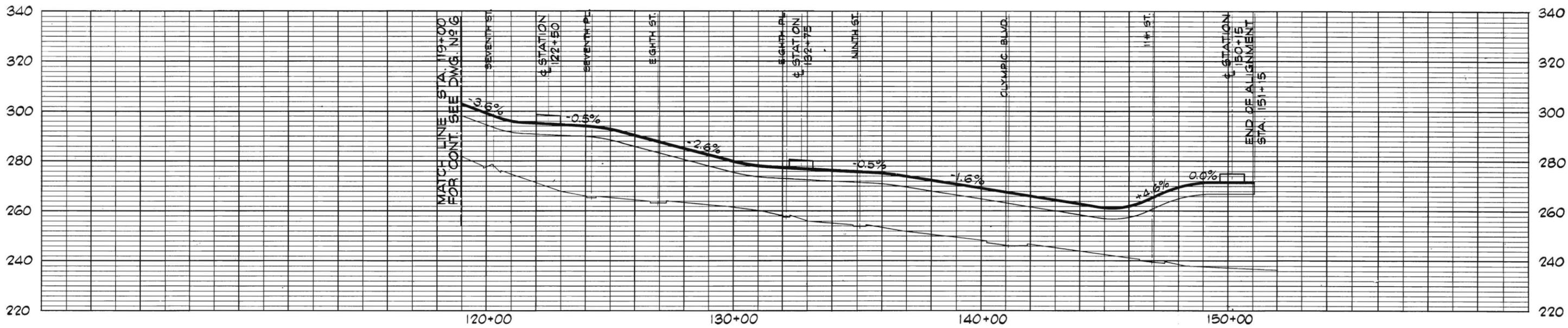
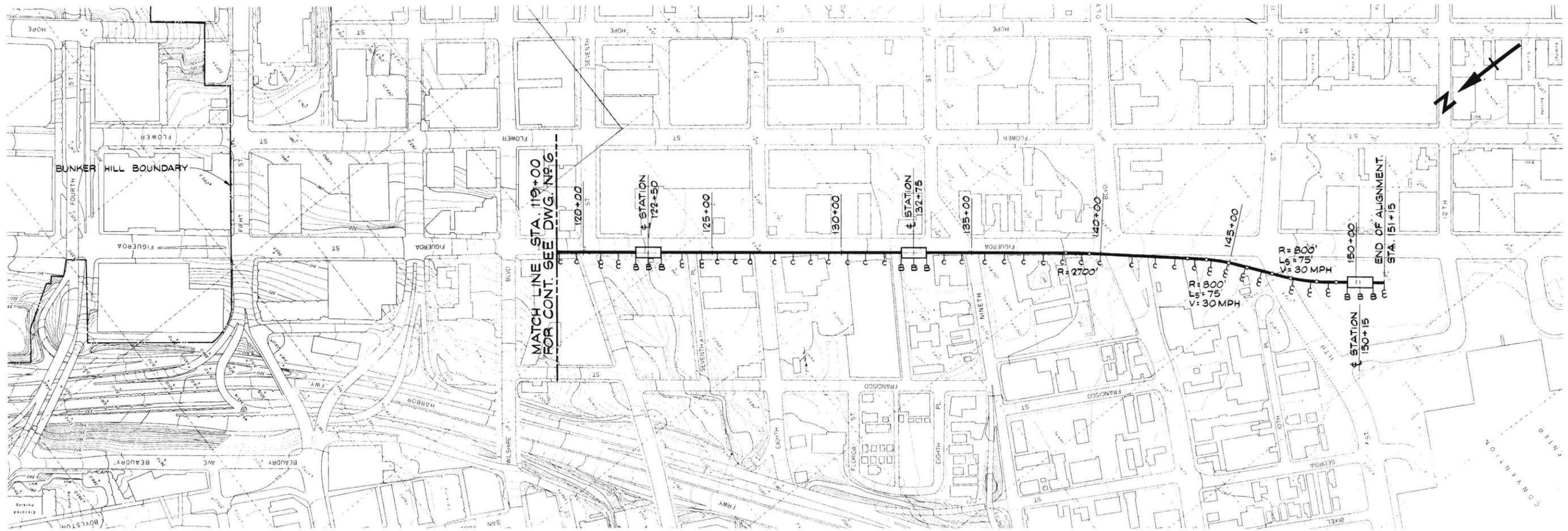
b. Guideway

The DPM guideway will in general be a double-track, aerial structure. A portion of the guideway within the Bunker Hill Redevelopment Project area will be in subway configuration thereby taking advantage of the unique topographic features of the Bunker Hill area and also utilizing existing peplemover right-of-way and easements. The vehicle-guideway interface varies considerably among prospective DPM system suppliers, but for estimating purposes it has been assumed the vehicle will use a lateral guidance system.

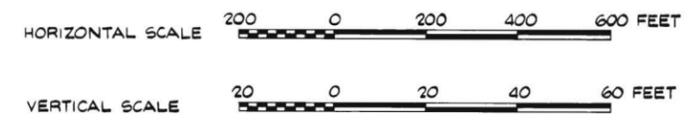
The proposed DPM alignment includes many sharp curves and requires a wide variety of girder span lengths. In consideration of these factors, preliminary analysis indicates that a guideway structure using steel girders will have a slight economic advantage. Therefore, this type of section as shown on Figure IV-7, has been used for the development of the cost estimate. The typical guideway section assumed for purposes of the order-of-magnitude cost estimate is one design solution for the given situation. Other possible solutions include both side and center guidance arrangements, utilizing all-concrete, all-steel, and steel/concrete composite designs.

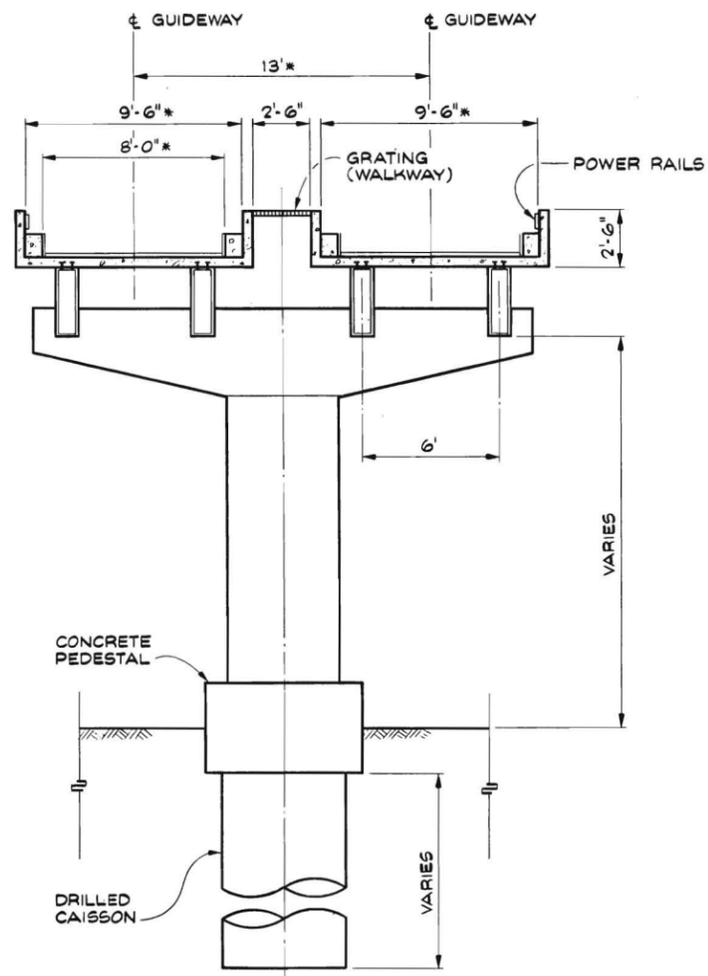
The assumed guideway structure consists of two welded structural steel, rectangular, box-shaped girders with a composite, cast-in-place concrete deck slab and integral parapet walls. Reinforced concrete curbs are cast in place at the edges of the vehicle running surface.

The wearing surface is formed by a 2-inch thick concrete topping consisting of nonshrink grout. This topping is provided to maintain construction surface tolerances for a comfortable ride.

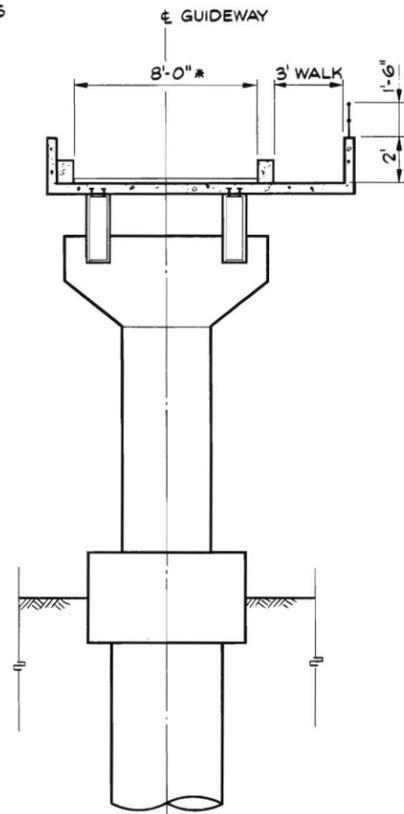


LOS ANGELES BUNKER HILL AND CBD/CDS
 AGT SYSTEM
 UNION STA.- CONV. CTR. PEOPLEMOVER (VIA FIGUEROA ST.)
 PLAN & PROFILE
 STA. 119+00 TO 151+15

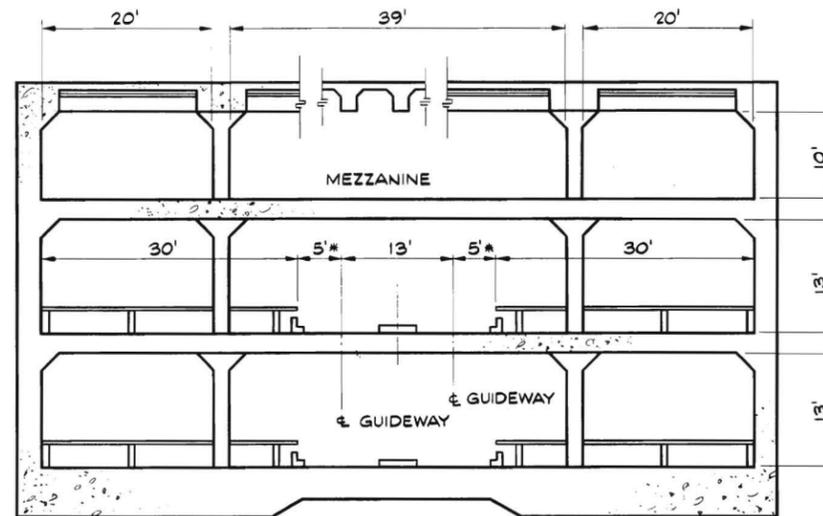




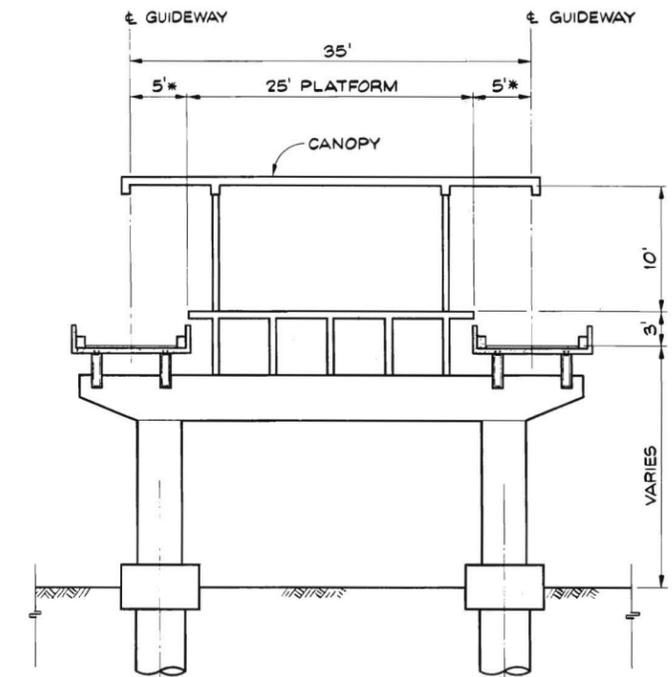
TYPICAL AERIAL STRUCTURE
DOUBLE GUIDEWAY



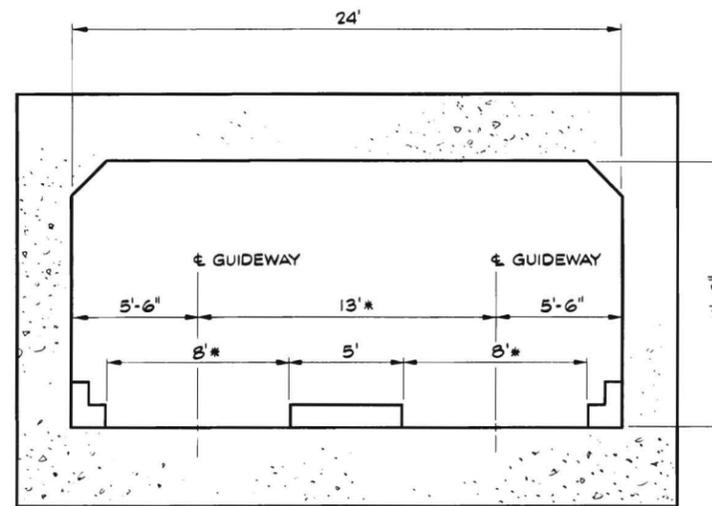
TYPICAL AERIAL STRUCTURE
SINGLE GUIDEWAY



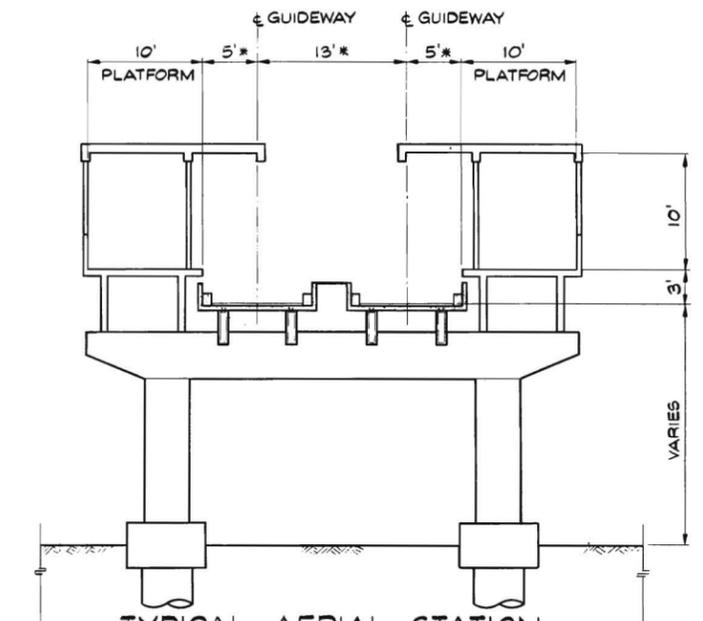
DOUBLE LEVEL SUBWAY STATION



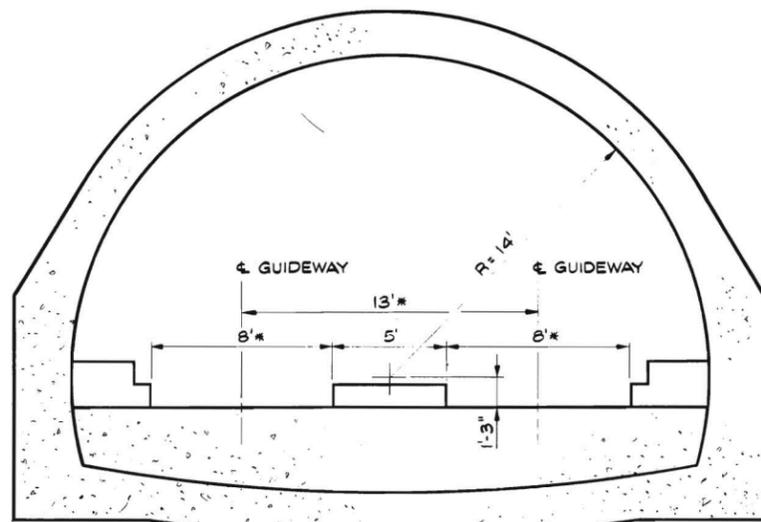
TYPICAL AERIAL STATION
CENTER PLATFORM



CUT & COVER - DOUBLE TRACK



TYPICAL AERIAL STATION
SIDE PLATFORM



TUNNEL - DOUBLE TRACK

NOTE:

DIMENSIONS ARE SUBJECT TO CHANGE FOR VARIOUS VEHICLE REQUIREMENTS. DIMENSIONS MARKED THUS (*) ARE SPECIFIC FUNCTIONS OF VEHICLE WIDTH.

LOS ANGELES BUNKER HILL AND CBD/CDS
AGT SYSTEM

TYPICAL SECTIONS

DWG. No 12

FIGURE IV-7

All guideway sections located over roadway, sidewalk and parking areas are drained to the columns to prevent water from falling on vehicles or pedestrians below.

The guideway is supported on cast-in-place, reinforced concrete columns integral with pier heads. Where superelevation is applied, the pier heads are sloped.

For purposes of the order-of-magnitude cost estimate it is assumed that the guideway columns would be supported on a single "cast-in-drilled-hole" concrete pile (caisson) which would function as an extension of the column. A concrete collar or pedestal would be provided at the top of the caisson to restrain it against lateral movements. A single "cast-in-drilled-hole" concrete pile would minimize the area required for construction and, therefore, present the least hindrance to adjacent traffic, utilities, and property.

The aerial double guideway structure shown on Figure IV-7 will, if applied to a normal Los Angeles CBD street scenario, require one or more traffic or parking lanes for the supports. An alternative to this infringement on existing street width is to support the aerial guideways on cantilevered beams on eccentric piers located in the sidewalk. This arrangement, however, will result in decreased sidewalk width at the pier locations. The eccentric pier/cantilevered beam assemblies can be constructed of structural steel instead of reinforced concrete which would reduce the size and bulk of the structure.

Portions of the DPM route within the Bunker Hill Redevelopment Project area will be in subway configuration. Two types of subway construction have been considered: driven tunnel using a double-guideway, horseshoe-shaped, concrete-lined tunnel section; and reinforced concrete box section using cut-and-cover construction techniques. Typical sections of both types are shown on Figure IV-7.

c. Stations

The DPM passenger stations will be designed to accommodate the forecasted number of patrons with safety, comfort, and speed. While similar functionally, they will vary architecturally depending on guideway configuration, capacity requirements, access, and individual site conditions. All will have a platform level, a concourse level, and non-public areas devoted to DPM system operations.

The platform at the vehicle floor level will permit the lateral movement of passengers boarding and alighting from the DPM vehicles and will be designed to accommodate the maximum train length. The concourse will contain the fare collection equipment if required. Vertical circulation between levels will be accomplished with escalators, stairs and an elevator.

The DPM system will have two basic types of passenger stations: aerial and subway. The aerial stations will include center-platform and side-platform type stations. The station platforms will be constructed of precast concrete and supported by concrete bents. The platforms will be covered with a canopy for weather protection. The guideways adjacent to the station platforms will also be supported by the bent structure. The subway station will have side platforms with the concourse located above.

Union Station will have a center platform aerial configuration and be integrated into a freeway bus and auto intercept commercial complex located to the east of Union Station. Access to the platform will be by escalators, stairs, and an elevator from a concourse located below the platform. The concourse will be accessed from the auto parking levels and from bus bays by means of escalators, stairs, and elevators, and will provide space for the fare collection facilities if required.

Union Station at Alameda Street will be located north of the Hollywood Freeway just east of Alameda Street and have a center platform aerial configuration with a concourse located at grade. An escalator/stair facility will provide access to the west end of the platform with an elevator and emergency stairway located at the east end.

New Federal Building Station will have a center platform aerial configuration and be located above the parking area to the east of the New Federal Building and north of Temple Street. The platform will be accessed from the south via an escalator/stair from an elevated concourse one level below the platform. The concourse will contain fare collection facilities, if required, and be accessed by pedway from the New Federal Building and by escalator/stair from Temple Street. An elevator and emergency stair would be provided at the north end of the platform.

Parker Center Station will have a center platform aerial configuration and span Los Angeles Street just north of First Street. A concourse with ticketing facilities, if required, will be located at-grade within the auto garage east of Los Angeles Street with an escalator/stair providing access to the center platform above. An elevator and emergency stair will be provided at the west end of the platform. A bridge connection to the New Otani Hotel is proposed and its implementation is subject to negotiation of an agreement with the Hotel.

Civic Center Station will be located north of First Street between Spring Street and Broadway, and will have a center platform aerial configuration (see Figure IV-8). The platform will be accessed at the east end via an escalator/stair facility from a concourse located at-grade below and an elevator and emergency stair will be located at the west end of the platform. Transfer between the DPM route and the proposed Spring Street/Hill Street route (if implemented) will occur at this station via the concourse located at-grade.

Bunker Hill East Station, although optional at this time, has been included in the cost estimates. It will have a center platform aerial configuration and be located within the Bunker Hill boundary line west of Hill Street and north of Third Street. The platform will be accessed from a concourse located at-grade via an escalator/stair facility at the south end, and by an elevator/emergency stair from the north end.

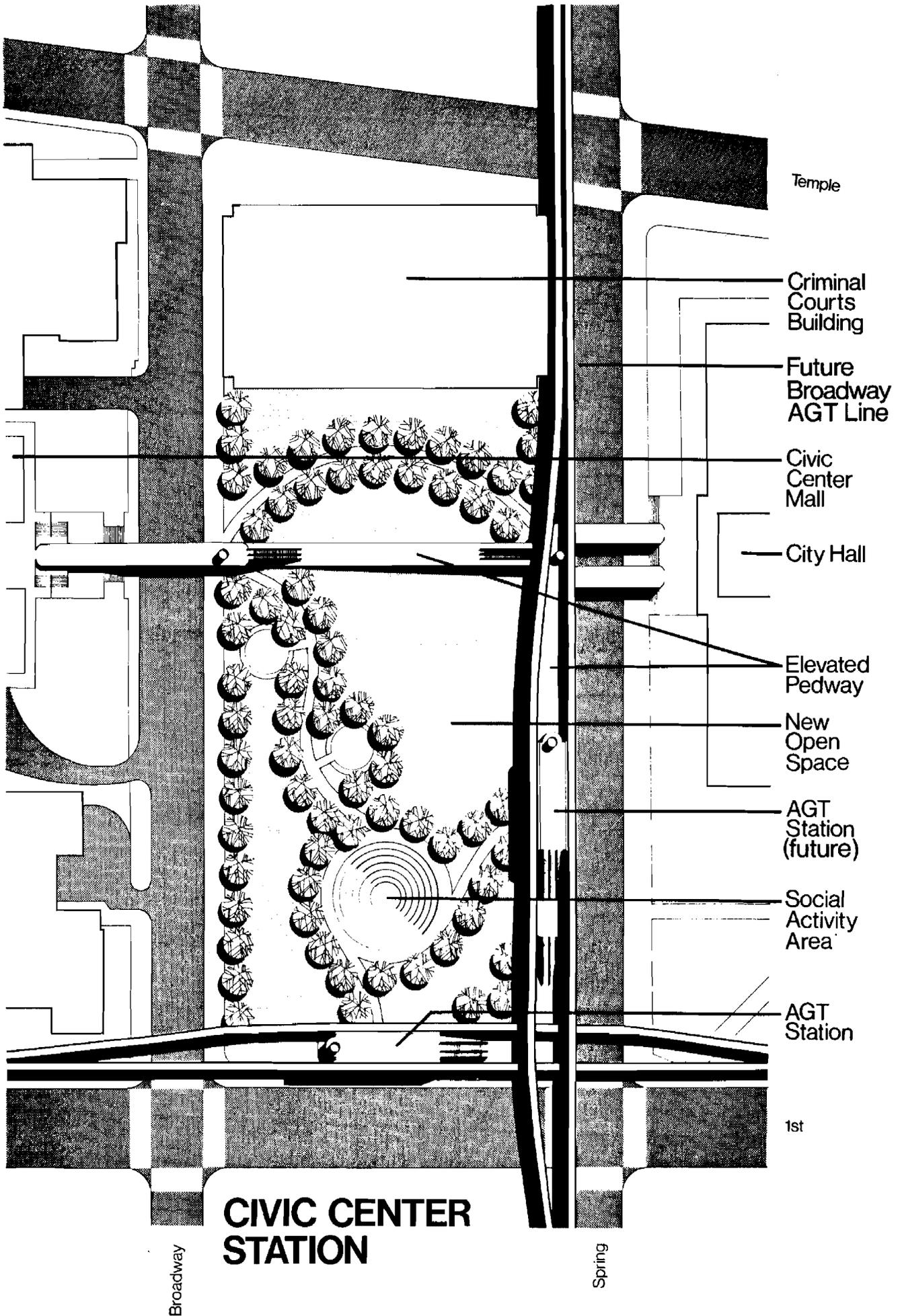


FIGURE IV-8

Bunker Hill Station will have a side platform subway configuration and be located beneath the Bunker Hill Redevelopment Project area north of Third Place just west of Olive Street. This station will be located one level below the planned Bunker Hill East-West People Mover station with access facilities (escalators/stairs, elevators) between the two platform levels and to the subsurface concourse located above the upper platform level.

Flower and Fifth Streets Station is proposed to have a center platform aerial configuration and to span Flower Street along the north side of Fifth Street. However, this station can also be located west of Flower Street adjacent to the Bonaventure Hotel development, or east of Flower Street integrated into an office building planned there. Access to the platform will be by escalators/stairs from a concourse with fare collection facilities, if required, and by an elevator and emergency stairway.

Seventh Street/Figueroa Street Station will be located along the west side of Figueroa Street between Seventh Street and Seventh Place and have a center platform aerial configuration. A concourse with fare collection facilities, if required, will be located at-grade and north of the platform. Access to the southbound platform will be by means of an escalator and stair from a concourse located at-grade on the west side of Figueroa Street. The northbound platform will be accessed from a concourse on the east side of Figueroa by means of an escalator and stairs and a pedestrian bridge over Figueroa Street. In addition, each platform will be accessible by means of an elevator.

Convention Center Station will be located west of Figueroa Street between Eleventh and Twelfth Streets. This station will be integrated into a freeway bus and auto intercept and commercial facility located adjacent to the Convention Center. The station will have an elevated, center platform accessed from a concourse level below by escalators, stairs, and an elevator. The concourse level will be located above the freeway bus bays with escalator/stair/elevator access from the bus bays and adjacent auto parking levels.

d. Maintenance and Storage Facilities

The DPM maintenance and storage facilities will be an integrated complex consisting of a maintenance shop building, vehicle storage area, yard access guideway, car washer, dispatch area, access roads, and other miscellaneous yard facilities. These facilities have tentatively been located near Union Station in the unused portion of the track and platform area east of the tracks currently used by AMTRAK. This site is adequate in size to accommodate the maintenance and storage facilities required for the DPM system as described. The facility will be designed to handle the vehicle fleet required for the DPM. However, the site is sufficiently large to provide for additions to accommodate the vehicles required for later expansions.

Vehicles will access the facility by a single guideway connecting to the main line north of the Union Station terminal. The access track will proceed north from Union Station in aerial configuration crossing over Macy Street, then descend to grade on a 10% gradient to the train dispatch area which will have two side platforms connected with an underground passageway and have space for the control system equipment. From the dispatch area, an at-grade guideway will proceed south providing access to the vehicle storage area, car washer, and maintenance shop facilities.

The vehicle storage area will have sufficient guideway to accommodate the vehicles required with space available for future trackage for additional vehicles. The required length of DPM vehicle storage guideway would be approximately 2,300 ft.

Daily inspection and interior cleaning of vehicles will be performed in the storage area. Exterior car washing will be performed in a car washer facility located on a siding.

The maintenance building will include the vehicle maintenance and supporting shops, offices, and the central train control facilities. The maintenance area will contain lift bays with portable jacks to be used for wheel removal, heavy maintenance, and other under car work, and also pit bays for under car maintenance, routine inspection, lubrication, component exchange, test, checkout and minor repairs. The shop area will be located adjacent to the maintenance area to accommodate shop offices, component shops, spare parts and tool storage, lunch room, locker room, toilets, and wash rooms.

The central train control facilities will be located on a second floor above the shop offices.

e. Vehicle

The DPM vehicles will be based upon existing hardware with minimum modifications for adaption for the DPM. The vehicles will be compatible with the electrical, control and other subsystems. They will be operated singularly or in trains, will be equipped for both manual and automatic operation, and will be reversible to permit operation in either direction. Maximum scheduled speed will be 30 mph.

Vehicles will not be less than 20 feet nor more than 40 feet long. Vehicles will be at least 7'-6" wide. The interior ceiling height where passengers must walk or stand will not be less than 6'-10", except at doors. The maximum consist will be compatible with station platforms 100 feet in length.

At least one pair of bi-parting doors shall be provided on each side of the vehicle. Door opening shall be at least 6'-6" wide and 6'-8" high. Vehicles 28 feet long or longer shall have two pairs of doors per side. Doors shall be provided with interior and exterior manual release for operation with or without power.

There will be one seat per four passengers at normal vehicle capacity. Space will be provided for wheelchairs. Sufficient stanchions or handholds will be provided for all standing passengers at crush vehicle capacity. The entire floor area shall be covered by flame resistant carpeting.

The motive power source for the vehicle will be electric motors. Current collector shoe assemblies will be provided on each vehicle in redundant pairs. Loss of one shoe assembly or part thereof will result in no loss of performance under any circumstances. Each vehicle will be equipped with at least two independent brake subsystems. Vehicle guidance shall be such that there is continuous guidance by a positive force. Each vehicle shall be equipped with an automatically controlled air comfort equipment. The air comfort subsystem shall cause air to be circulated continually throughout the vehicle.

f. Electrification

The electrification system will distribute power to the vehicles in the form of either alternating (3 phase AC) or direct current (DC). The wayside distribution system will consist of either side running or under running contact rails. Power rails will be covered to protect personnel from contact. Power rail breaks will be provided at each load center feeder.

The electrical feeder will be designed to provide two feeders to supply power to the contact rails for each guideway at each load center, limit the maximum voltage drop to any vehicle under normal headway and operating conditions to 15% for AC systems and 25% for DC systems, and to provide breakers controlled locally and by the supervisory system including auxiliary contacts for use by supervisory indication circuits.

The substations will be designed to tolerate the outage of a single substation without degraded service. Each substation will be designed with the capacity to handle the simultaneous starting of two trains. The substations will be located at passenger stations when possible.

g. Automatic Train Operation and Control

Safety will be of the utmost importance and is the prime factor in the design and construction of the control system. Fail-safe design principles will be employed throughout. That is, if an equipment failure, human error, failure to act, adverse external influence or other condition affects the proper operation of the system, the system will be designed to revert to a state known to be safe.

The system will have the capability to operate trains at 60 second headways, but will allow headways in excess of 60 seconds. The maximum scheduled train speed will be 30 mph. The control system shall be designed to permit expansion to a larger, more complex route arrangement with a minimum of modifications. The automatic control system will permit bi-directional operation on specific portions of the system.

The trains will operate without attendants and normally with supervision at the central control center. In the event of failure of the central control computer or similar device, the system will continue to

operate without loss of safety and subject to the control of the central control operator.

The system will adjust train dwell times at the stations, as required by the line supervision system. The system will control the stopping of trains at passenger stations and terminal zones.

The central control facility will be located in the maintenance building. Activities which will be performed at this facility include routine and emergency passenger communications, television surveillance of each station platform and fare collection area, and monitoring of vehicle and electrical systems.

h. Communication Systems

Central Control and the DPM vehicles will be linked by a voice communications system. The system will function in such a way that personnel at Central Control have the capability to make public announcements both selectively to any combination of vehicles or to all vehicles at once. They will also have the capability to engage in semi-private conversation with individual passengers. Equipment for playing prerecorded, repetitive messages (automatically activated) will be incorporated into the system.

A system will be provided for one-way, hardwired communications from Central Control to the station platforms. The system will accommodate prerecorded messages as well as live messages.

A radio system will be provided which will function as a communications link between maintenance personnel anywhere along the route and personnel in the maintenance yard office as well as on all mobile and portable units.

A telephone system will be provided for direct line communications between fixed locations throughout the DPM. Except for those sets located on station platforms and in the fare collection area, each telephone set will have a direct-dialed capability of calling any other set in the network.

Television coverage will be provided at all passenger stations so that the Central Control operator can have visual surveillance of the stations platform and of fare collection areas. This closed circuit television coverage will be monitored at the Central Control console by manual selection or by

automatic timed sequencing.

Selected vehicles, to be used in late-night service, will be equipped with communication devices to transmit passenger security data (including visual capability). This data will be monitored at Central Control.

2. Bus Intercepts

Major regional bus intercept facilities will be constructed at the Union Station and Convention Center DPM stations. These facilities will be integrated with large parking intercept garages. These bus intercepts will be designed to provide for a fast, convenient transfer between buses and DPM vehicles.

The Union Station intercept facility will be tied directly to the El Monte Busway and be connected via convenient surface street routing to the Pasadena Freeway. Regional buses on the Golden State Freeway will access the intercept facility via the El Monte Busway. Preliminary estimates of 1990 bus volumes indicate a peak hour volume of approximately 65 buses and a daily volume of approximately 300-350 buses (estimates for 1990 are approximately 40 per cent lower). These volumes will be refined during the preliminary engineering phase. The bus/parking intercept will be defined in detail in the preliminary engineering phase also.

The Convention Center bus intercept facility will be tied directly to the Santa Monica Freeway bus routes and connected via convenient surface street routing to the Harbor Freeway. Preliminary estimates of 1990 bus volumes indicate a peak hour volume of approximately 85 buses and a daily volume of approximately 400-450 buses. These volumes and the definition of the facility will be refined during the preliminary engineering phase.

Schematic layouts of both intercept facilities showing the bus and parking elements as well as the DPM station are shown on the following pages.

3. Parking Intercepts

Major parking intercepts will be constructed at the Union Station and Convention Center DPM stations. The facilities will be integrated with regional bus intercepts, and will be designed to provide a fast, convenient transfer to the DPM system for the auto user. The facilities are proposed to accommodate three types of

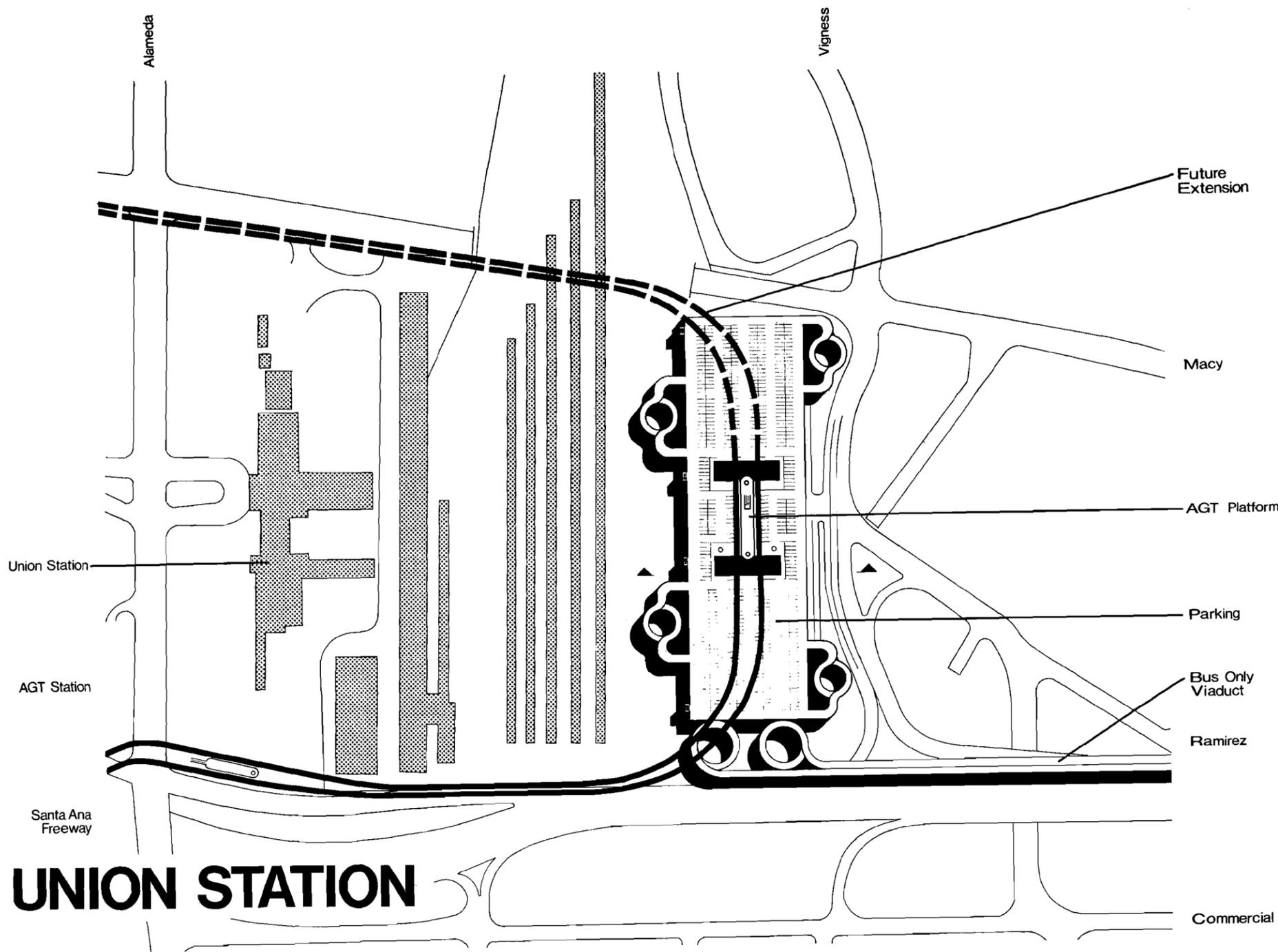
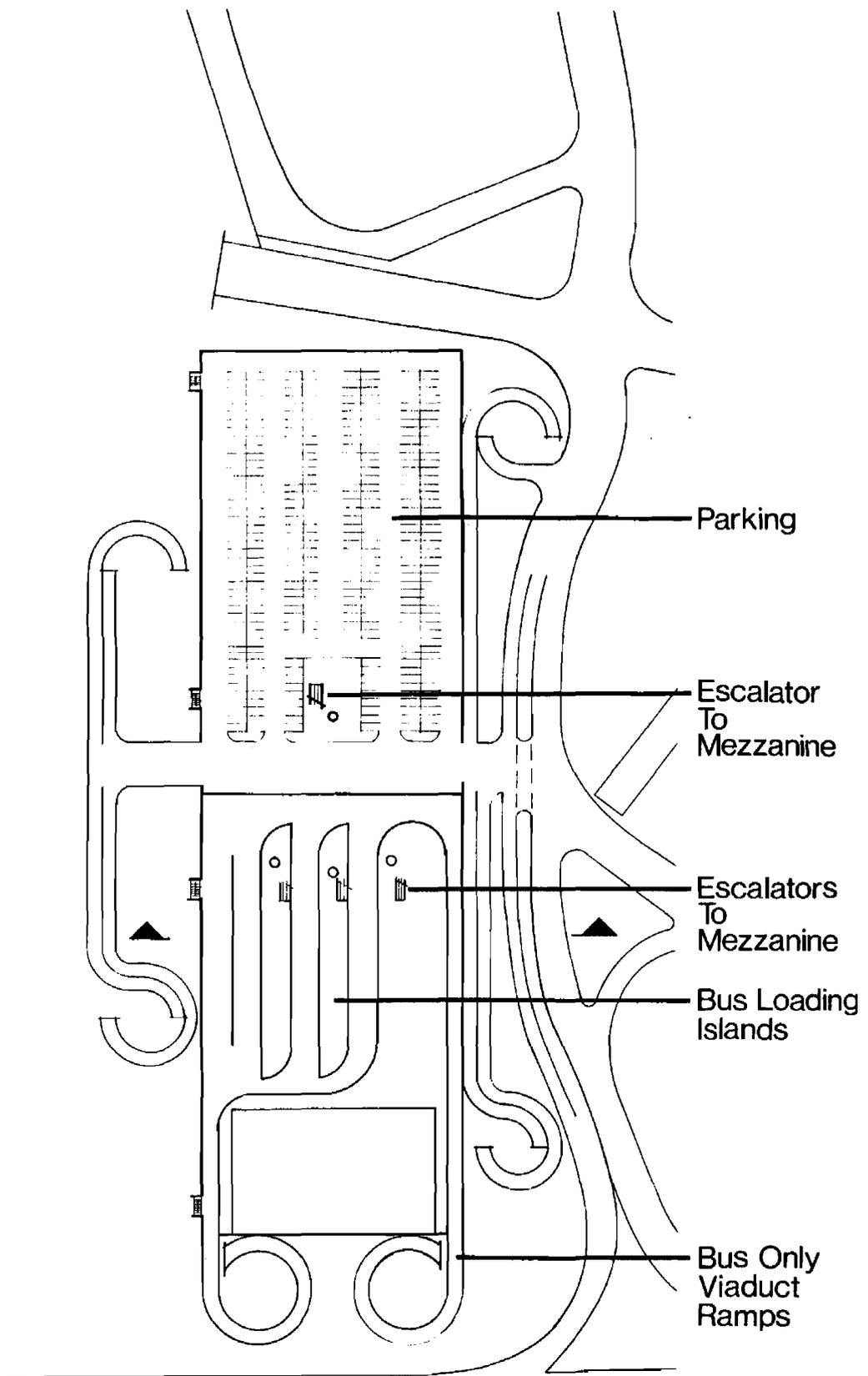
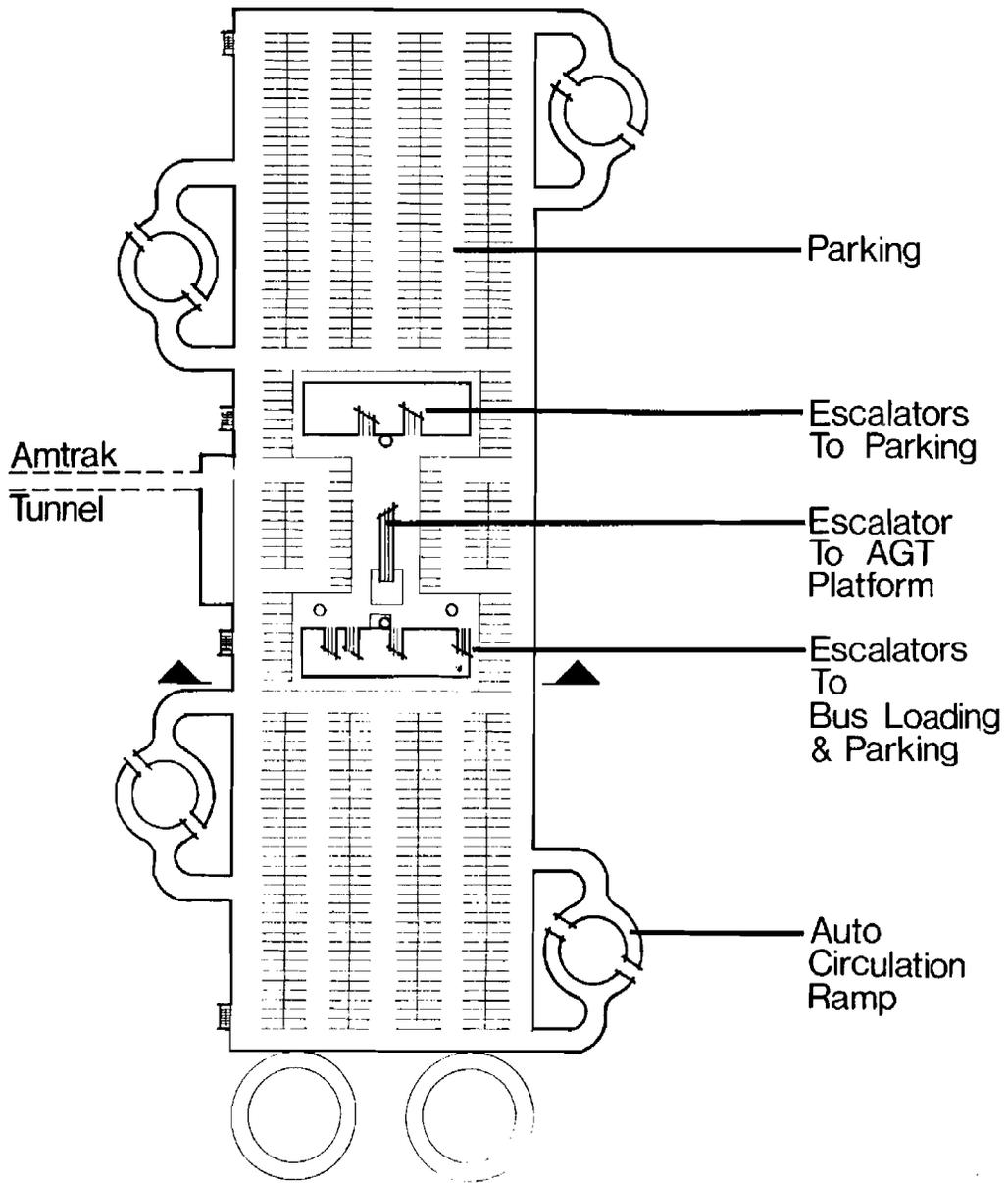


FIGURE IV-9



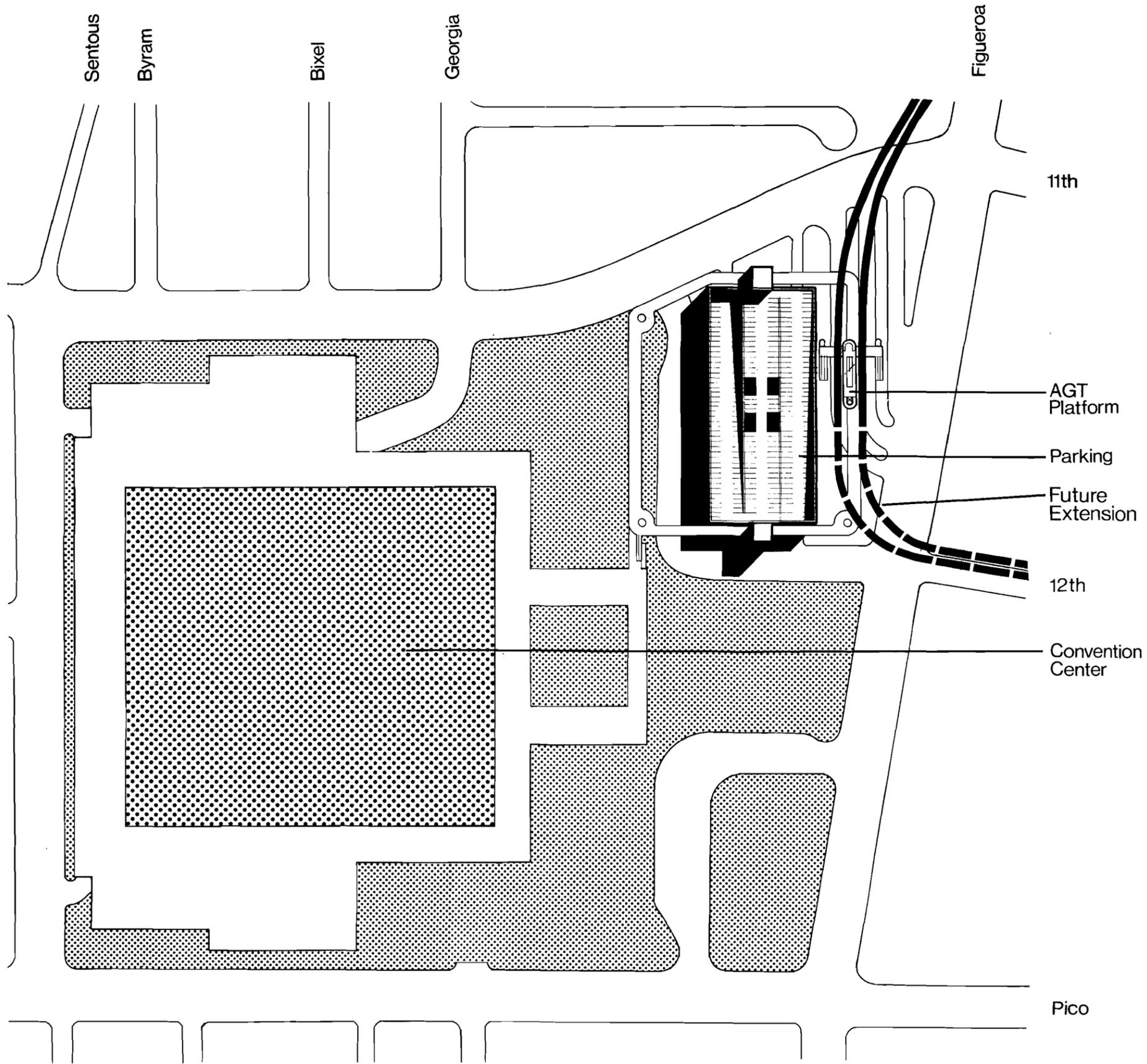
**UNION STATION
Bus Loading Level**

FIGURE IV-10



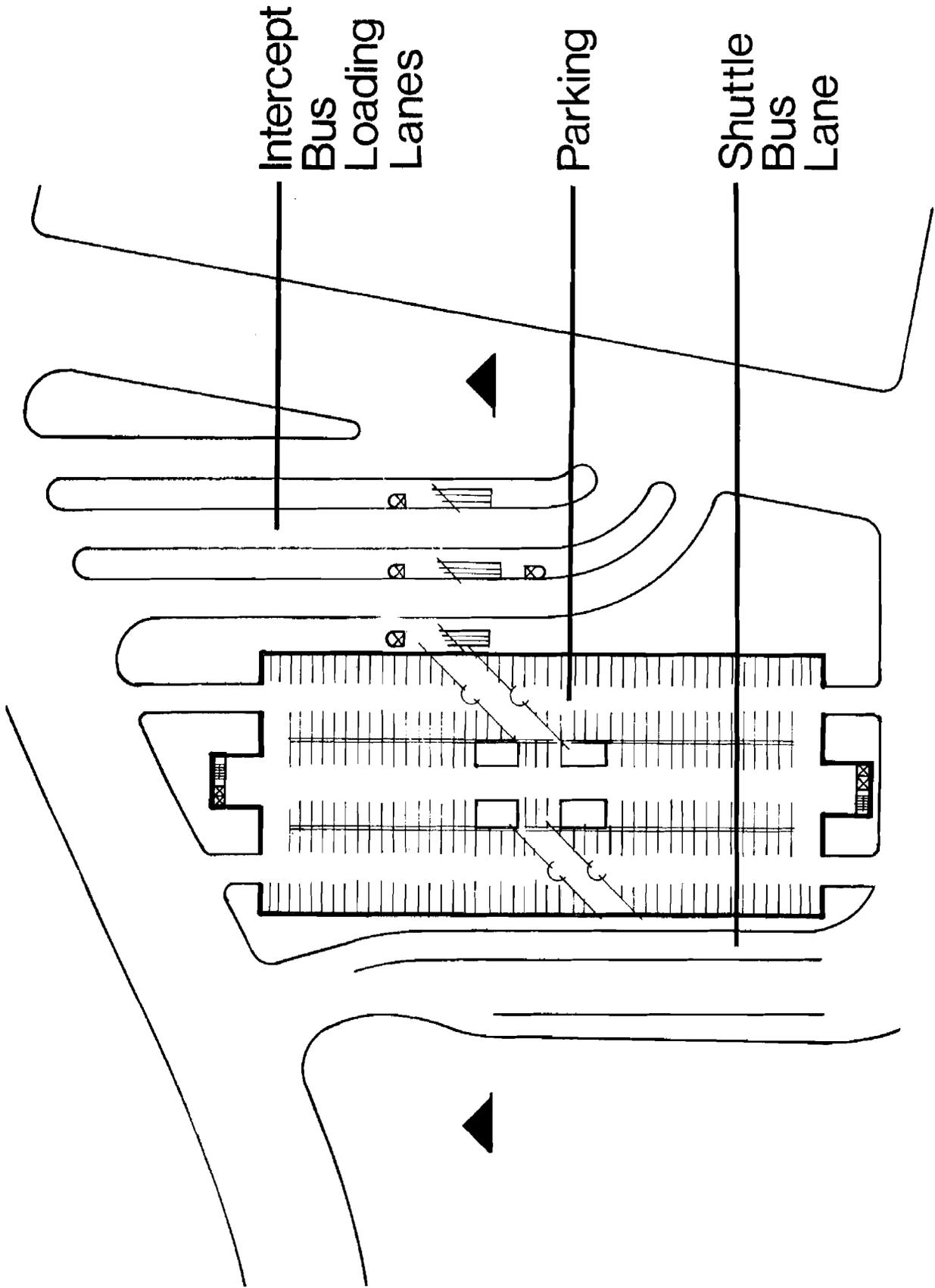
**UNION STATION
Mezzanine Level**

FIGURE IV-11



Site Plan
CONVENTION CENTER

FIGURE IV-12



CONVENTION CENTER

Ground Level

FIGURE IV-13

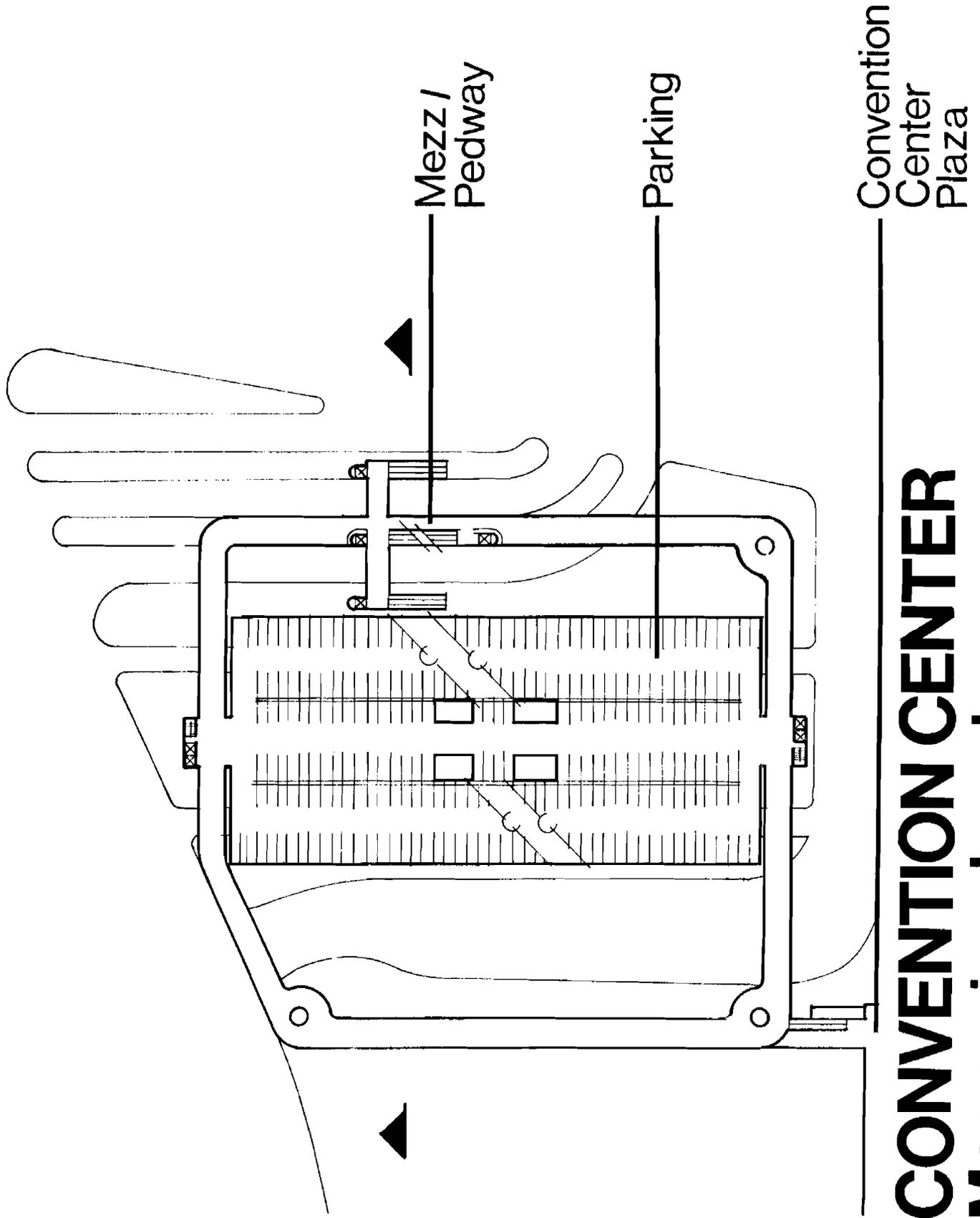


FIGURE IV-14

parking - carpool, long term (daily), and short term (partial day). Carpools will receive preferential treatment within the facilities. The Union Station intercept facility will be accessed by special ramps from the San Bernardino Freeway and Golden State Freeways, as well as from the surrounding local streets. Two thousand parking spaces are proposed initially with approximately 750 for car pool use, 750 for long term parkers and 500 for short term parkers. Schematic drawings of the facility are shown on Figures IV 9, 10 and 11. The definition of the facility will be refined during preliminary engineering.

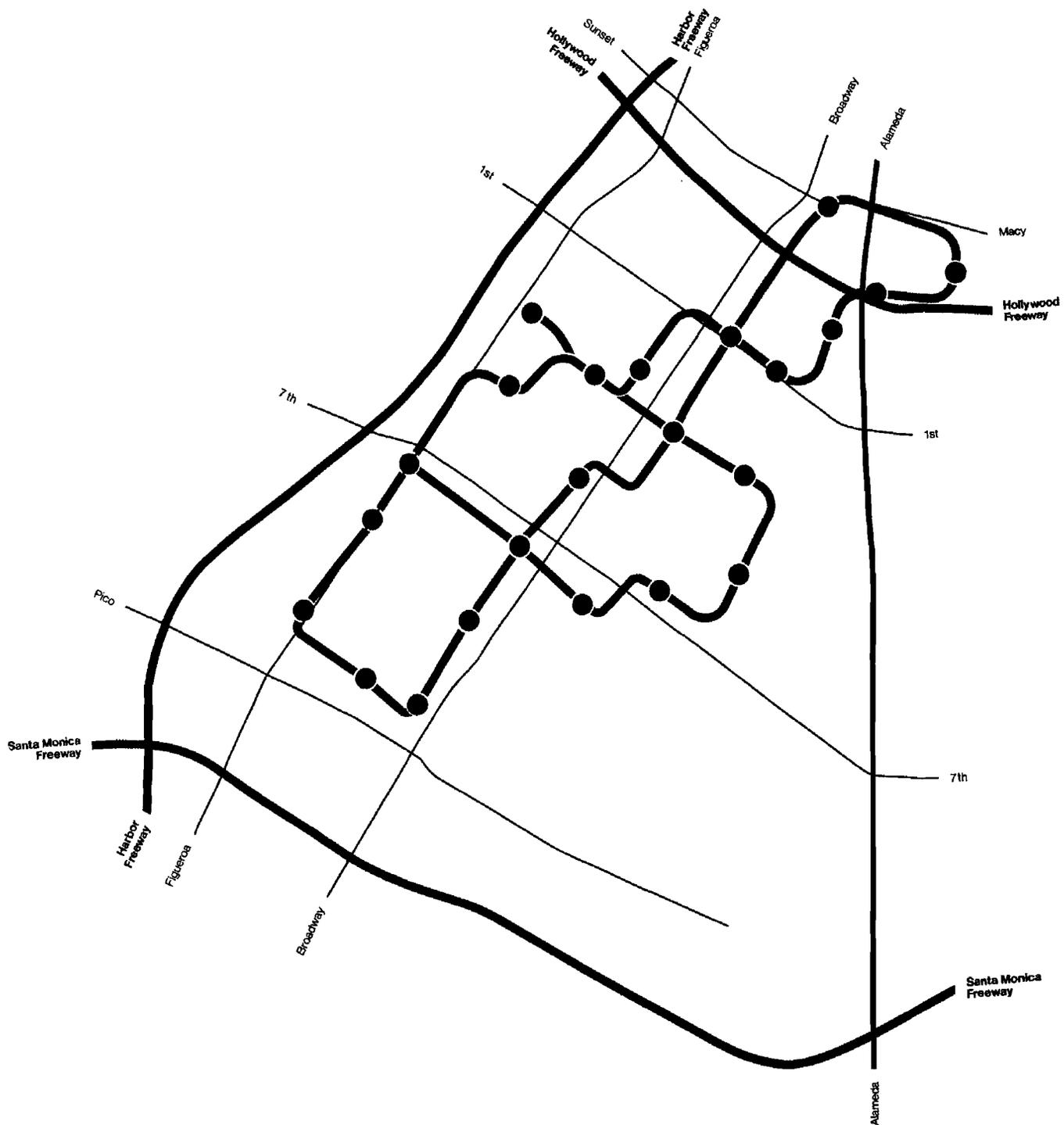
The Convention Center intercept facility will be accessed initially via local streets and will intercept Santa Monica and Harbor Freeway traffic. Special ramps from the Harbor Freeway are proposed for future implementation. Approximately 1750 parking spaces are proposed, of which 750 are present today. The split of these 1750 spaces will be approximately 750 for car pools, 750 for long term parkers and 250 for short term parkers. Schematic drawings of this facility are shown on Figures IV 12, 13, and 14. The definition of this facility will be refined during preliminary engineering.

4. Potential Phasing of the DPM System

The DPM portion of the Improved Bus/DPM C/DS is designed to be an initial segment.

Future extension of this initial segment to provide an ultimate network is illustrated in Figure IV 15. This system, if completed, will offer high quality circulation/distribution service to the major activity centers located within the central areas of the City of Los Angeles. It will provide the Central Business District (CBD) with a cohesive force which has been lost over the years, the absence of which has produced deterioration of certain areas, particularly the eastern and southern portions of the downtown.

As in the first phase, additional stations will be located at freeway intercept points to interface the system with the regional transportation network and stations will be located at one-quarter mile intervals along the network to provide the user with improved accessibility throughout downtown.



DPM
Complete
Network

FIGURE IV-15

Recognizing that implementation of the full network represents a significant capital investment and that portions of the system may be modified as conditions in downtown change, the concept of staged implementation has been applied to the program. By staging implementation of the system into a few sequential implementation elements, investment can be spent to maximize local goals and the element of risk in construction guideways can be reduced.

B. OPERATIONAL DESCRIPTION

1. Operating Plan

The DPM operating plan has been developed using the 1990 patronage estimates developed for the combined Bus/DPM Circulation/Distribution System, and using the vehicle size (35 feet long) and capacity (60-70 passengers) used to develop the capital cost estimate. The initial year patronage has not been directly developed using the forecasting models, but has been extrapolated from the 1990 estimates; an operating plan for the initial year has been developed using these patronage figures.

The frequency of operations for the peak hour was determined under the assumption that 50 per cent of the peak hour volume would occur in the peak 20 minutes. The off-peak service frequencies were scaled from the peak hour frequencies. A 20-hour operating day, Monday through Saturday, and a 16-hour operating day Sunday and prime holidays was assumed. A maximum headway limitation of 8 minutes was also assumed.

Dwell times at stations were assumed to be 30 seconds nominally at Union Station and Convention Center, and 20 seconds nominally at all other stations.

The following data were used to develop the operating plan:

System Length	-	2.69 miles	
Number of Stations	-	11	
Round Trip Time	-	23 minutes	
Peak Link - PM	-	7th & Figueroa to 9th & Figueroa	
		<u>Initial</u>	<u>1990</u>
Peak Line Volume	-	4600 pass/hr.	6400 pass/hr.
Peak Peak Volume	-	6900 pass/hr.	9600 pass/hr.
Peak Hour Volume	-	7850 pass/hr	11000 pass/hr
Noon Hour Volume	-	1800 pass/hr	2500 pass/hr
Daily volume	-	58,100 pass.	81,400 pass.
Yearly Volume	-	18,000,000 pass.	25,000,000 pas.
Peak Hour Headway	-	98 seconds	81 seconds
Peak Hour Consist	-	3 car trains	3 car trains
Peak Hour Vehicles Required (Does Not Include Spares)	-	42 vehicles	51 vehicles

The operating plans on Table IV-1 indicate the frequency of service by time of day and by day of the week for both initial year and 1990. The total annual vehicle mileage is 1,979,000 for the initial year for 2,346,000 for 1990 including a "deadhead" allowance for vehicles

TABLE IV - 1
OPERATING PLANS

PERIOD	<u>INITIAL</u>			<u>1990</u>		
	CONSIST	HEADWAY	MILES	CONSIST	HEADWAY	MILES
<u>WEEKDAY</u>						
5:00 - 6:30 a.m.	3 car trains	5.8 min	250	3 car trains	4.6 min	316
6:30 - 9:00 a.m.	3 car trains	1.6 min	1485	3 car trains	1.4 min	1792
9:00 - 4:00 p.m.	3 car trains	2.9 min	2356	3 car trains	2.3 min	2954
4:00 - 6:30 p.m.	3 car trains	1.6 min	1485	3 car trains	1.4 min	1792
6:30 - 1:00 a.m.	3 car trains	4.6 min	1372	3 car trains	4.6 min	1372
	Daily Subtotal		6,948	Daily Subtotal		8,226
	Annual Subtotal		1,771,740	Annual Subtotal		2,097,630
<u>SATURDAY</u>						
5:00 - 9:00 a.m.	1 car trains	5.8 min	220	1 car trains	5.8 min	220
9:00 - 6:00 p.m.	2 car trains	2.9 min	2001	2 car trains	2.9 min	2001
6:00 - 1:00 a.m.	1 car trains	5.8 min	387	1 car trains	5.8 min	387
	Daily Subtotal		2,606	Daily Subtotal		2,606
	Annual Subtotal		135,510	Annual Subtotal		135,510
<u>SUNDAYS AND HOLIDAYS</u>						
8:00 a.m. - 12:00 midnight	1 car trains	5.8 min	900	1 car trains	5.8 min	900
	Daily Subtotal		900	Daily Subtotal		900
	Annual Subtotal		52,200	Annual Subtotal		52,200
	DAILY TOTAL		10,454	DAILY TOTAL		11,732
	ANNUAL TOTAL		1,959,450 mi	ANNUAL TOTAL		2,285,340
	+ 1% DEADHEAD		19,590	+ 1% DEADHEAD		22,850
	<u>T O T A L</u>		1,979,040 mi	<u>T O T A L</u>		2,308,190

IV-33

not in service. Including spare vehicles, the total vehicle fleet requirement is estimated at 46 vehicles initially and 56 vehicles in 1990.

2. Service Characteristics

The DPM system will improve circulation within downtown as well as providing a critical distribution function for the regional transportation system. Travel efficiency will be improved both for trips entering and leaving the CBD and for the trips that are internal to it. Trips into and out of the CBD will be improved by the use of the bus and auto intercept concept, which eliminates the slower through-town distribution of passengers, either by bus or automobile. Currently, a bus or car entering downtown can expect to spend up to 25 to 30 minutes to traverse its CBD distance, depending on time of day. For most trips this is significant. The DPM operating time between auto/bus intercepts will reduce this time almost in half for trips whose destinations are within the DPM service corridor, and as a result, the DPM will be a useful substitute for the automobile when traveling within the CBD. The intercepts will allow the automobile driver to park his vehicle in one of the intercept facilities at lower cost than in-town parking, and travel to his downtown destination via the DPM. Nine disembarkation points within the downtown will allow easy access to the civic center and related government buildings, the major hotels, the professional office concentration, the financial center, and tourist attractions. The other major function provided by the DPM will be the distribution of CBD-bound regional bus travelers. This function is greatly enhanced by the fact that about 750 regional buses will make use of the intercept points each day. Thus, the efficiency of the regional transit system will be improved, both in terms of total travel time and traveler convenience.

The efficiency of travel into and out of the CBD will extend to all modes. The single-occupant automobile driver will benefit by reduced travel time to CBD destinations, as will the traveler entering the CBD by freeway bus, intercity bus, and inter-regional rail. Carpools as well will benefit from reduced travel time, and in addition, the intercepts will provide a common destination for passenger discharge, rather than the multiple destinations which currently characterize many carpool travel patterns, therefore making carpools more efficient and hopefully more attractive.

Internal circulation within the DPM corridor will be improved considerably, particularly for medium to long

trips. The following table, Table IV-2, indicates the station-to-station travel times on the DPM system. The average trip length is estimated to be about 1.15 miles and the average travel time on the DPM system about 5 minutes.

C. COSTS

1. Capital Costs

The order-of-magnitude capital cost estimate is presented in the accompanying table.

The cost elements indicated by the table include the following items:

- Guideway covers the cost for construction of all mainline aerial and subway structure including demolition, utility relocation and maintenance, underpinning, surface restoration and landscaping. The utility maps obtained formed the basis for assessments of the utility relocation costs.

TABLE IV-3
ORDER-OF MAGNITUDE
CAPITAL COST SUMMARY

DIRECT COST

Guideway	\$ 34,970,000
Stations (includes \$260,000 for fare collection subsystem)	11,460,000
Electrification	5,470,000
Control and Communication	3,490,000
Vehicle Maintenance and Storage	4,810,000
Vehicles	12,650,000
Right-of-Way	2,000,000
SUBTOTAL	<u>\$ 75,850,000</u>

INDIRECT COST

Engineering & Construction Management	<u>\$ 9,930,000</u>
Total Direct & Indirect Cost	\$ 84,780,000
Contingency	19,220,000
Subtotal	\$104,000,000
Escalation	<u>29,000,000</u>
Subtotal	\$133,000,000
Special Bus/Auto Intercept Facilities* (Union Station and Convention Center Station)	<u>34,000,000</u>
TOTAL	<u>\$167,000,000</u>

*Order-of-magnitude allowance to be refined.

- Stations cover the costs of the station structures and include costs of access structures, architectural finishes, lighting and other electrical equipment, mechanical equipment including escalators and elevators, fare collection equipment, if required, including fare gates and money changers, and station graphics.
- Electrification includes costs for all equipment and facilities for vehicle propulsion power, starting at the supply point and extending through the various transit system distribution and transformation facilities, and including the power rails on the guideway, the power system supervisory control and the substation enclosures.
- Control and Communication includes the design, manufacture, installation, warranty and testing of electrical and electronic facilities and equipment to automatically operate the system, including a control console, data transmission system, block circuits, station logic and control, wayside antennae, cables and accessories, closed circuit television equipment and cables, telephones, radios, and public address system. (the special surveillance device on the vehicles is not included) The central control facility is housed in a partial second floor on the vehicle maintenance shop building and the structural costs are included in the costs for Vehicle Maintenance and Storage Facilities.
- Vehicle Maintenance and Storage Facilities include the costs for the maintenance shop building, vehicle storage and access guideways, switches, site work, paving and fencing, shop equipment, and yard electrification including vehicle propulsion power.
- Vehicles include the design, manufacture, installation, warranty and testing of the car body, auxiliaries, onboard control and communication equipment and propulsion and controls.
- Right-of-Way covers the cost for non-public land and easements required.
- Engineering and Construction Management includes the costs for preliminary engineering, detailed planning and design, project administration, general procurement, and construction management and inspection.

- Contingency is an allowance for undefined or unknown items or conditions that might develop during design and construction.
- Escalation is an allowance for increases in costs of labor and materials not offset by increased productivity. The implementation schedule assumes a mid 1979 construction completion with an opening date late 1979.

The following assumptions have been made in the preparation of the order-of-magnitude capital cost estimate:

- The estimate is based on labor and material prices and conditions in the Los Angeles area as of April 1976.
- The estimate is based on engineering and construction being performed on a one-shift standard work week except for tunneling and cut and cover subway work, which is based on a three-shift and double shift standard work week, respectively; and erection of aerial superstructure, which is based on night shifts.
- Owner costs for such items as legal, finance, insurance and project administration are not included.
- Training, pre-revenue, and start-up costs by the owner's staff are not included.

2. Operating Costs

Operating cost estimates have been developed based on the estimated initial year patronage and operating plan and the 1990 patronage and operating plan and the following assumptions.

- Operating year is 1990.
- Costs are in 1976 dollars.
- Operated by City of Los Angeles and maintained by City employees.
- Labor rates are based on current agreement between SCRTD and Amalgamated Transit Workers Union with an assumed 7% increase to the July 15, 1975, wages.

- Power cost is \$0.03Kwh, which is same rate being used for SCRTD alternatives analysis.
- City is self-insured and pays claims settlements out of a fund established for such purposes.
- Fringe benefits are calculated as 30% of base salary.
- City administrative overhead markup is 15% of all costs.
- Escalator and elevator maintenance is done under a contract to either supplier or outside maintenance contractor.
- DPM maintenance facility is guarded by security guard on a full time basis.
- System operates 20 hours per day Monday through Saturday, and 16 hours per day on Sunday and Holidays.

Table IV-4 presents a detailed breakdown of the operating cost estimate. Estimates for initial year operation of the DPM system will be developed during the preliminary engineering phase.

TABLE IV-4
OPERATING COST

LENGTH	2.69 Miles - Double Guideway		
STATIONS	11		
		INITIAL	1990
VEHICLES		46 operating 1,979,000 mi/yr	56 operating 2,308,200 mi/ yr
OPERATIONS	Two men on duty at all times, 1 supervisor + 1 dispatcher 14,136 manhours/year	\$ 90,950	\$ 90,950
<u>MAINTENANCE</u>			
Supervision	1 supervisor + 1 clerk on a shift, 1 clerk on second shift, 6,240 manhours/year	47,840	47,840
Vehicles Labor-Repair	Major shift - foreman, 2 mechanics, 2 electricians, 2 laborers. Other shifts - 1 mechanic, 1 electrician. Total of 24,616 manhours	196,470	196,470
Inspector & Hostlers	1 inspector, 1 hostler all shifts 14,136 manhours	110,215	110,215
Cleaning	1 washer/1 cleaner on 2 shifts 8,320 manhours	58,530	58,530
Materials Spare Parts	20% of vehicle labor - \$365,215	73,040	73,040
Contract Work	\$0.02/veh mile \$1000/veh/yr	39,580 46,000	46,160 56,000
Way & Structures Labor	Major shift - foreman, mechanic, electrician, laborer, other shifts - mechanic & electrician 20,416 manhours/yr	166,180	166,180
Materials	40% of Way & Structure Labor	66,470	66,470

		INITIAL	1990
Stations Labor	1 foreman, 3 cleaners - 1 shift 8,320 manhours	\$ 58,675	\$ 58,675
Materials	Cleaning/Refurbish/Mis- cellaneous \$800/Sta/Yr x 11	8,800	8,800
Contract Work	Escalators - \$2400/yr x 30 Elevators - \$2000/yr x 13	72,000 26,000	72,000 26,000
FARE COLLECTION	2 money collectors, 1 shift - 4,160 manhours	32,860	32,860
SECURITY	1 guard full time at Yard & Shop - 8,760 manhours	57,965	57,965
LIABILITY COVERAGE	Self-insured, claim settlement fund based on \$0.012/pass	216,000	302,800
POWER	Propulsion - vehicle miles x 6.8 Kwh per vehicle mi + 8% line losses. 11 stations - 11 stations - 3,358,000 Kwh/yr. Maintenance 1,752,000 Kwh/yr + 10% Contingency @ 0.03 Kwh	1,979,000 veh/mi 21,608,000 Kwh 648,240	2,308,200 veh/mi 24,268,000 Kwh 728,000
SUBTOTAL DIRECT COST		\$2,015,815	\$ 2,198,955
LABOR FRINGES	30% of Direct Labor (\$819,685)	\$ 245,905	245,905
SUBTOTAL		2,261,720	2,444,860
GENERAL & ADMINISTRATION	Cost of General & Ad- ministrative support of operating division @ 15%	\$ 339,260	\$ 366,730
TOTAL O & M COST	Cost per passenger - \$0.144 (initial), \$0.122 (1990) Cost per vehicle mile - \$1.31 (initial, \$1,222 (1990)	2,600,980	2,811,690

D. IMPACTS

Implementation of the People Mover will have impacts on the downtown environment. Some of these impacts will be lasting whereas others will be transitory and eliminated at the completion of construction. This section contains a summary of the impact assessment for major impact categories including: physical; user groups; historic sites; energy consumption; air quality; aesthetic issues; and growth inducement. A more detailed writeup of these and other impacts is contained in the Preliminary Environmental Impact Assessment prepared for the People Mover Project.

1. Physical Construction Impacts

Implementation of the People Mover will result in physical impacts. In most cases the impacts tend to be localized, affecting only the immediate area within which construction is taking place, although in certain instances the impacts may extend beyond this area. In most cases the impacts of construction are perceived as inconvenience, but in some instances may extend to public health and safety. Appendix C is a summary of the construction planning and staging program for the People Mover. It is designed to mitigate impacts due to construction activity.

2. Impact On Affected User Groups

There are a number of factors which can be used to determine the nature and extent of impacts felt by certain user groups. The major user group is normally referred to as transit dependents. Within this category are such groups as the elderly and the handicapped. For the present analysis, the general category of transit dependents was used as the reference group, with particular attention given to the physically handicapped. The evaluation factors used for the impact analysis relate to all transit users in some cases, and the transit dependent groups in others. They include mobility, cost, safety and security.

Transit dependents are affected by a generally positive impact, namely the provision of improved transit services. The nature of the impact is generally that all transit dependents who frequent the downtown for various activities (including retail shopping, employment, access to residence, and recreation) experience an increased degree of mobility since the level of service of CBD-wide public transportation is improved. Further, for transit dependents having trip destinations and/or origins within the corridor, level of service is markedly improved, producing an even greater positive impact. In numerical terms, the corridor contains

4400 transit dependents under existing (1975) conditions, and 5600 transit dependents under a total population assumption of 25,000 for the year 1990.

The physically handicapped have specific limitations which cause impaired mobility in a functional as well as a physiological sense. Neglect in the planning for the needs of these individuals has produced significant physical barriers to mobility. These barriers are sometimes difficult and at other times impossible to negotiate. Bus doors and entrance steps, station boarding platforms, and internal bus seating accommodations are examples of such barriers.

Most of these physical barriers can be mitigated and oftentimes eliminated through proper design of future transportation systems. In the case of a new system, such as the people mover, the needed vehicle modifications, including interior space design, can be made during the design stages, before the system is placed into operation. Similarly, stations and other facilities are also subject to modification during the design stages. Because of this, the people mover would have a potentially positive impact. The extent, however, is dependent upon the incorporation of appropriate design criteria affecting both vehicles and stations.

Cost to the system user is another factor which must be considered. The fare structure and average trip expenditures (out-of-pocket) are measures of the cost of the system which can be used to identify impacts on potential users. While a 10 cent fare has been used for the analysis and projected financial program, actual fare policy has not been resolved, and so the impact cannot be fully assessed at this time. Fare policy will be established and its impacts will be addressed in the Environmental Impact Assessment.

Safety and security have been treated in separate terms for the analyses conducted to date. Safety aspects involve threats of personal injury which may result from system operation, such as system malfunction (by either mechanical failure or human error) or calamity resulting from system operation in conjunction with other modes. In the former case there are possibilities of system breakdown, the inappropriate opening or closing of vehicle doors, or accidents involving crashes or derailments. In the latter case there are possibilities of collision between autos and/or buses with guideway supports, and other surface level accidents somehow otherwise resulting from system operation.

Security aspects, on the other hand, involve threat of personal harm or loss of property resulting from violence or vandalism. In this case, the transportation system becomes the stage for the incident by offering (or not being able to prevent) the opportunity for such acts. Possible incidents range from pretty vandalism and defacing to more serious crimes involving the threat of bodily harm.

At this state of the analysis, neither the safety or security impacts have been adequately assessed to specify them in numerical terms. However, safety impacts are expected to be minor and mitigatable through proper physical and operational design. A potential opportunity for violence and/or vandalism exists with the people mover. This opportunity will be dealt with through law enforcement and surveillance, which can often produce substantial mitigating effects. Pedestrian safety is expected to experience a favorable impact, because grade separation will reduce the possibility of collision between vehicle and pedestrian.

3. Impact on Historic Sites

Within the Central City, the Cultural Heritage Board of the City of Los Angeles has designated the following as historic monuments:

Bradbury Building 304 South Broadway	Philharmonic Auditorium 427 West 5th Street
St. Joseph's Church 218 East 12th Street	St. Paul's Cathedral 615 South Figueroa
St. Vibiana's Cathedral 114 East 2nd Street	Los Angeles Athletic Club 431 West 7th Street
Fire Station #23 225 East 5th Street	Palm Court, Alexandria Hotel 5th and Spring Street
California Club 538 South Flower	Cole's P.E. Buffet 118 East 6th Street
Central Library 630 West 5th Street	Garfield Building Lobby 403 West 8th Street
Biltmore Hotel 515 South Olive	Global Marine Building 811 West 7th Street

The sites on which there are no expected impacts (based on the preliminary assessment) include Bradbury Building, St. Joseph's Church, St. Vibiana's Cathedral, Fire Station #23, California Club, the Philharmonic Auditorium, Los Angeles Athletic Club, Palm Court, Cole's P.E. Buffet, Garfield Building Lobby.

Some of the historic sites, however, will likely be impacted -- again based on the preliminary assessment.

Both the Central Library and the Biltmore Hotel will experience visual impacts and improved accessibility, south from the 5th and Flower station. Accessibility is somewhat less for the Biltmore Hotel, as the distance from the station is two blocks.

St. Paul's Cathedral is the most severely impacted of the historic sites. The guideway, as it is currently envisioned, will pass directly in front of the Cathedral, in elevated configuration. Thus a potentially severe visual impact results. Because the guideway is located directly in front of the Cathedral (over the near curb lane), noise impacts may also result. It is difficult to specify the degree of this impact until further analysis has been conducted. A portion of this analysis will consist of noise contours along the length of the guideway. The Cathedral will experience accessibility benefits as well, with the nearest station located at a distance of two blocks to the south.

It is not expected that the Global Marine Building will experience noticeable visual impact, as the building has only a minor view of the guideway. Accessibility benefits are expected to be significant, with an AGT station located one block to the west.

All of the above impacts can possibly be mitigated during the design stage, since a detailed assessment of alignments will be considered.

4. Energy Consumption

The preliminary analysis conducted to date has considered the energy consumption characteristics of the people mover. The expected change in energy consumption within the Central City has been estimated by first calculating the expected consumption of operating the people mover system. The expected energy savings from automobile diversion is then subtracted to yield the net energy consumption. The expected energy consumption of the people mover includes fuels used in propulsion, station operation, and maintenance. The following tabulation summarizes this information.

DPM ENERGY CONSUMPTION

	ANNUAL KWH	DAILY KWH ⁽³⁾
Propulsion ⁽¹⁾	14.534 x 10 ⁶	39,820
Stations	3.358 x 10 ⁶	9,200
Maintenance	1.752 x 10 ⁶	4,800

(1) Propulsion = Vehicle-miles x 6.8 KWH/Vehicle + 8% line losses

(2) 10%

(3) Daily figures - annual - 365

The expected automobile travel will be diverted to the people mover is 25,740 daily vehicle-miles of travel. (This figure does not include purely internal trips which are diverted). Assuming an estimated auto fuel economy of 17.8 miles per gallon, the expected fuel savings are 1447 gallons per day. This is based on an assumed 40% improvement in auto fuel economy by 1980, which has been stated as an expected improvement by the major domestic auto manufacturers. In terms of British thermal units, the energy savings are 180,802,000 BTU/day.

The expected energy consumption, from the previous table, expressed in like terms, is 201,990,000 BTU/day. The net energy consumption is therefore 21,188,000 BTU/day. This means, that given the conservative assumptions expressed above, the net effect of the People Mover is to increase energy consumption in the Central City by 170 gallons of gasoline per day or 62,142 gallons per year. (One gallon of gasoline - 124,450 BTU). This is approximately equivalent to the annual fuel use of 74 automobiles, assuming 15,000 annual miles driven at a fuel economy of 17.79 miles per gallon. The impact on energy consumption is therefore negative, but extremely minor, based on this preliminary analysis.

5. Air Quality

Preliminary analysis has concentrated on the production of primary pollutants, namely carbon monoxide (C), hydrocarbons (HC), oxides of nitrogen (NO_x), and sulfur oxides (SO_x). Each of these contribute to the production of photochemical oxidants, commonly referred to as "smog". Estimates have not been made for sulfur oxides, because they are primarily produced by fixed sources, which are not affected by the People Mover. The Los Angeles Central City is contained within the South Coast Air Basin (SCAB), which is the accounting area for air pollution in Southern California. The following tabulation shows the emissions for the primary pollutants in the SCAB for 1970.

EMISSIONS - SOUTH COAST AIR BASIN, 1970
(Tons per day)

SOURCE	HC (react)	PARTICULATE MATTER	NO _x	SO ₂	CO
AUTOMOTIVE	903 (1)	101	938 (1)	39	754 (1)
PLANES, SHIP, RAIL	5 (2)	28	6 (2)	5	46 (2)
STATIONARY	195 (2)	128	361 (2)	258	103 (2)
TOTAL	1103	257	1305	302	7697

PERCENTAGE CONTRIBUTION TO TOTAL POLLUTION

AUTOMOTIVE	81.8	39.3	71.9	12.9	98.1
PLANES, SHIP, RAIL	0.5	10.9	0.5	1.7	0.6
STATIONARY	17.7	49.8	27.6	85.4	1.3

(1) Caltrans Transportation Control Plan, 1974

(2) California Air Resources Board, 1974

From the table it can be seen that the automobile is a major contributor to the production of primary pollutants. Therefore the degree to which automobile usage is affected in the Central City will have direct implications for the production of these pollutants. On a daily basis, the DPM would result in a reduction of automobile travel by 25,740 vehicle-miles of travel (VMT), under conservative assumptions.

To estimate the expected reduction in emissions, vehicle emission factors must be applied to the VMT reduction. These factors are shown in the following table.

AVERAGE FLEET EMISSION FACTORS
LIGHT DUTY VEHICLES IN CALIFORNIA
1975 & 1980 (grams/mile)

	1975	1980
HC EXHAUST	4.4	1.8
NO _x EXHAUST	3.3	1.6
CO EXHAUST	47.6	16.6
HC EVAPORATIVE	1.9	.6

Applying these factors to the VMT estimates produces the following expected reductions in vehicle emissions:

HC EXHAUST	11,290 grams/day
NO _x EXHAUST	10,035 grams/day
CO EXHAUST	104,115 grams/day
HC EVAPORATIVE	10,035 grams/day

Comparison of these expected reductions with regional estimates reveals the fact that the effect of the People Mover on pollutant emissions is also very slight. It is therefore concluded from preliminary analysis that the People Mover produces a favorable, but extremely small impact.

Beyond the formation of photochemical oxidants, carbon monoxide emissions are of particular interest, because of the toxicity associated with them. Carbon monoxide does not require the photochemical process to become harmful, and therefore local production is more important than for other pollutants. Parking facilities are particularly important, because they can result in heavy concentrations of CO, sometimes referred to as "hot spots".

The People Mover System would have accompanying it 3750 new parking spaces, 2,000 of which would be located at Union Station and 1750 of which would be located at the Convention Center. It is therefore necessary to conduct a site-specific analysis of the expected production of carbon monoxide at each of these locations. Such analysis has as yet not been completed. A preliminary assessment is that an increase in CO will result, the severity of which is not known at this time.

6. Aesthetic Issues

Within the context of this preliminary assessment, aesthetic impacts have been interpreted and translated into visual impact. It is the visual presence of the guideway which will have an effect on the aesthetic composition and impression of the Central City.

Visual impacts are most difficult to evaluate, because of the obvious differences in user perception. What is offensive to one individual may be pleasing to another. However, in an effort to assess the visual impact of the People Mover, several factors have been used. The first of these is guideway view obstruction, in which a determination of the visual intrusion of the guideway has been made. The second factor, awkward guideway configuration, attempts to assess the visual impression of the guideway itself, beyond the blockage of views.

For the analysis of guideway view obstruction, visual perceptions of the Central City were characterized as either panorama or transitory. A panorama view is a somewhat permanent perception, taking place either as a wide angle or wide vista. Transitory views on the other hand,

are short-lived in their perception and are primarily linear. Twenty two view sites were identified in the CBD, 9 of which are panoramas and 13 of which are transitory.

A panorama view to the east, centered at the Convention Center is obstructed by the guideway entering a station at this location. The existing 90° view to the east has the existing Harbor Freeway boundary replaced with the People Mover guideway, which disappears into the north horizon.

The second view to be impacted is located along Flower Street, extending northeast and southwest in a linear panorama. The view is obstructed at Fifth Street, cutting off the view to the northeast. The World Trade Center, Security Pacific Bank and the Bunker Hill development would be partially visible beyond the guideway crossing.

A linear panorama along Wilshire Blvd., extending northwest from One Wilshire will be similarly impacted. The view beyond Figueroa is obstructed by the guideway, which crosses Wilshire at that point. Partially visible will be the Los Angeles Hilton Hotel and St. Paul's Cathedral.

Obstructions occur for several transitory views as well. A view to the southeast, at the Harbor freeway, between Third and Fourth Streets, has the guideway appearing in the near horizon.

Transitory views to the southeast from the Harbor freeway, between Fifth and Eleventh Streets, are obstructed by the guideway passing in front. Similarly affected are transitory views to the northwest from the Santa Monica freeway, between Hope and Wall Streets. Other panorama and transitory views are affected, but to a much more limited degree.

Awkward guideway configurations have also been identified in terms of locations where the path of the guideway changes direction, while at the same time negotiating a street crossing. At these locations a double support structure is necessitated, producing a cumbersome-looking loop effect. These structures are commonly referred to as "bents"

The DPM initial increment requires the use of bents as the guideway crosses Alameda, near the Hollywood freeway.

The bents are required from the east side of Alameda until the guideway enters the parking area behind the new Federal Building. Bents are required from the Law Library to the State Office Building as the guideway crosses diagonally over First and Hill Streets. A particularly awkward

configuration occurs as the guideway crosses Fourth Street to a realignment along Figueroa. This is a distance of approximately 1600 feet, all of which would require the use of bents.

7. Growth Inducement

As originally envisioned when introduced into the California Environmental Quality Act, the inducement of growth was generally considered to be a negative consequence. The context for this view was a rapidly-growing state in which suburban and rural areas were being converted to more intensive uses, and in which problems of population, energy and air-quality were becoming acute.

The context of this preliminary assessment, namely the Los Angeles Central City, has long ago undergone these changes in intensity, and has been recently experiencing a period of decline.

This decline has extended to resident population, employment, and measures of economic well-being, producing deterioration and high office vacancies. Within this context the implications of potentially induced growth are positive, rather than negative. Growth inducement is a direct change from the declining state of the Central City which has been in evidence over the past several years.

The DPM will have a favorable impact on the economic well-being of the Central City, and hence a beneficial impact on growth. The analysis performed to date has suggested that a mid-level employment projection of 230,000 by 1990 will be more likely achieved by the implementation of the Project.

V. TECHNICAL APPROACH

This proposal for the Downtown People Mover (DPM) project for the City of Los Angeles has been prepared to be in compliance with the Program Plan for the DPM distributed by UMTA in May 1976. The DPM Project Schedule, placed at the end of this section of this proposal, is based upon the list of Project Milestones from the Program Plan. Adjustments to this schedule will be proposed as the project is developed. The total DPM project is shown in four phases starting with the award of the capital grant for the Preparation Phase (Preliminary Engineering) and ending with the continued operation of the people mover after federal participation is concluded. The phases are identified as:

- Preparation Phase
- Implementation Phase
- Operation Phase
- Continued Operations

The City of Los Angeles proposes to carry out the Preparation Phase of the DPM project in accordance with the schedule detailed by task on the lower portion of the Project Schedule. The Preparation Phase is scheduled for completion in seven months. The remaining phases of the program will be described and scheduled in detail during the preparation phase.

The current activities of the City of Los Angeles, directed toward implementation of the Los Angeles and Bunker Hill Circulation/Distribution System, are reflected in the proposed work plan. The results of these activities have been described in preceding sections of this proposal. The work scheduled for completion in the last half of calendar year 1976 are shown on the "Pre-award Schedule", Figure V-1, on the following page. This schedule reflects the advanced status of the project and establishes the context for the work proposed for the Preparation Phase.

- ▼ STATE AND LOCAL ACTIONS
- ◆ FEDERAL ACTIONS

PRE-AWARD SCHEDULE
PEOPLE-MOVER ELEMENT OF LOS ANGELES COLLECTION/DISTRIBUTION SYSTEM

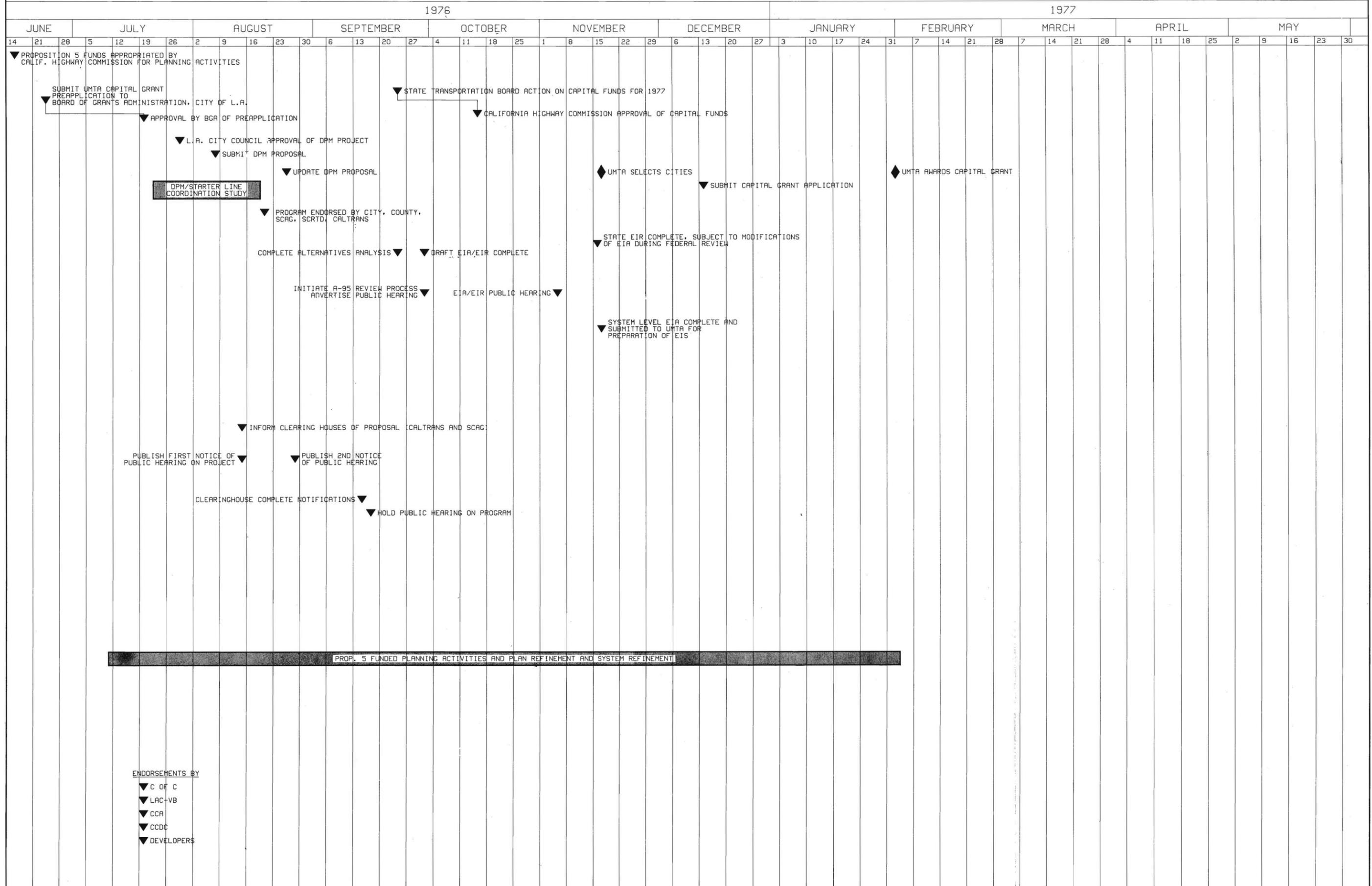


FIGURE V-1

The analysis of alternative modal choices as well as alternative AGT configurations suitable to the Los Angeles CBD is complete. This alternatives analysis is currently scheduled for formal completion in August with the preparation of the final report. The draft EIA at the macroscopic level is currently scheduled for public hearings in November. The preliminary plan and profile drawings for the initial segment, which this proposal addresses, are completed; and estimates of costs have been prepared on the basis of preliminary system specifications and descriptions.

The planning and design of the two intercept points, Union Station and the Convention Center, represent a most challenging technical problem and are currently the most critical elements for the success of the DPM project. These are the locations where the most patrons will arrive and depart, in buses and autos, during the a.m. and p.m. peak periods. System viability depends on developing the best designs for these locations.

In recognizing this situation, CALTRANS, in coordination with the City, has investigated the feasibility of direct ramp access to these nodes from the nearby freeways. Although feasibility has been established, much more definitive work needs to be done. In this context, it is planned to study various access alternatives and facilities arrangements during the pre-award period as part of the plan refinement and system refinement activities. To aid in this analysis, discussions with the railroads concerning the Union Station DPM facilities will continue. The preferred arrangement of these facilities will be selected during the pre-award period to permit an immediate start on the detailed design development effort at the beginning of the Preparation Phase.

Routing alternatives will also continue to be studied during

the pre-award period. For example, the question of using Figueroa or Flower Street for the route between Olympic Boulevard and Fifth Street will be examined further. By addressing this and other similar questions during the pre-award period, work during the preparation phase can concentrate on the development of preliminary engineering designs and plans.

A. Preparation Phase

Upon selection as one of the sites for the DPM, Los Angeles will utilize the Preparation Phase for the purpose of continuing plan and system refinement as well as for further detailed definition of the stations and intercept facilities. Additionally, locale-specific (on a block-by-block basis) impact analyses will be completed.

The principal deliverables deriving from the Preparation Phase will be the updated EIA document and the procurement bid packages. Finally, an Amendatory Capital Grant Application will be prepared and submitted to obtain approval for the initiation of the Implementation Phase.

The Preparation Phase will consist of the conduct of the following tasks and subtasks:

- 1.0 Continue the Public Involvement Program
- 2.0 Conduct Preliminary Engineering
 - 2.1 Refine System Routing
 - 2.2 Design Development of Stations
 - 2.3 Design Development of Intercept Terminals (includes Modifications of Regional Bus Service)
- 3.0 Update Environmental Impact Analysis
 - 3.1 Detail the Local Impacts
 - 3.2 Prepare EIA Document
 - 3.3 Initiate the A-95 Review Process
- 4.0 Prepare for Implementation
 - 4.1 Develop Turnkey Systems Manufacturer Selection Procedure
 - 4.2 Prepare Procurement Bid Package
- 5.0 Maintain and Update Existing Data Base
 - 5.1 Refine Patronage Forecast
 - 5.2 Revise Operating Plan
 - 5.3 Update Implementation Schedule

5.4 Capital and Operating Cost

5.5 Refine Financial Plan

5.6 Prepare Research Plan for Evaluation of System
Impacts

6.0 Prepare and Submit Amendatory Capital Grant Application

1. Task 1.0 - Continue Public Involvement Program

Involvement of the local citizens in the planning process has been and will continue to be an important policy and practice for the Los Angeles DPM project. The Citizens Advisory Panel (CAP) which has met over 60 times in the past 14 months will remain active as a forum before which planning developments will be aired to obtain community reactions and suggestions as the DPM project progresses and evolves. Additionally, public information will be disseminated via bulletins, announcements, and special meetings, as such practice is viewed as essential to the success of the project.

Local and state public bodies will be informed and advised concerning project developments on a continuing basis. It is recognized that their support, in addition to that of the community, is essential.

Public Hearings will be scheduled at appropriate project milestones. Particularly, at the time of completion of the updated EIA, extensive review with the community will be undertaken.

2. Task 2.0 - Conduct Preliminary Engineering

This task will involve the refinement and further definition of three major elements. These elements include the refinement of system routing, design development of stations, and design development of intercept terminals.

a. Subtask 2.1 Refinement of System Routing

The alignment and tentative column locations developed in the planning work will be analyzed and refined. Trade-off analyses will be conducted of both horizontal and vertical location of the route as well as of the specific column locations. Considerations in this process will include items such as impact on vehicular and pedestrian traffic (columns in the curb lane or in the sidewalk), utility relocations and building underpinning requirements, impact on adjacent businesses, guideway curvature and span length, noise and visual impact on adjacent structures, station locations, traffic control device locations and sight distances, and fire department and police department requirements. Plan and profile drawings of the refined alignment will be prepared indicating the column locations. Resultant impact of column locations on street vehicular capacity and sidewalk capacity will be estimated. Composite utility maps along the route will be prepared and utility relocation and maintenance plans developed. Right-of-way requirements, both purchase and easement, will be refined for both route and stations and preliminary acquisition plans developed. A geotechnical analysis will be conducted using existing data from the City of Los Angeles to define specific soil and geologic conditions along the route for use in the design of guideway and station foundations.

b. Subtask 2.2 Design Development of Stations

The station locations and tentative arrangements developed during the planning phase will be refined and finalized. Urban design considerations will also be refined and applied. Private sector involvement will include review of these station sites to maximize value capture potential. Each station location will be analyzed in light of the current and proposed development and activities surrounding it. Access and user studies will be conducted to identify the optimum orientation of station entrances as well as existing and potential future opportunities for direct interfaces with adjacent structures. Preliminary discussions will be held with developers and owners to determine the likelihood of integrating the stations with their buildings.

Once preferred locations are determined, site development drawings showing the general arrangement of the stations in relation to their surroundings, and station design drawings showing the arrangement of station elements in plan and section will be developed. The site development drawings will define the external interfaces of the station, and will be used along with the station design drawings in the procurement of the turnkey systems contractor.

c. Subtask 2.3 - Design Development of Intercepts
Terminals and Modifications of Regional Bus
Service

Design development of the intercept terminals at Union Station and Convention Center will involve detailed examination of the bus and auto interfaces with the DPM as well as the access facilities required for each site. Site development and intercept terminal design drawings will be prepared.

At the Union Station site, the results of on-going studies of ways and means of accessing the San Bernardino Freeway directly will be reviewed. Similarly, at the Convention Center site, the best way to connect with the freeways and bus will be examined. Auto access routes as well as parking facilities will also be examined.

The two locations (Union Station and Convention Center) will function as bus/auto intercepts. Alternative means of minimizing transfer time (ramps, stairs, elevators, escalators, etc.) to the DPM System will be investigated. This work will be close coordination with SCRTD, Caltrans and the owners of the site facilities.

In conjunction with the design of the intercepts, SCRTD will examine the potential rerouting of regional freeway and surface street bus service to take maximum advantage of the opportunities for efficiencies provided by the bus intercepts.

3. Task 3.0 - Update the Environmental Impact Analysis (EIA)

Impacts due to the preferred routing location and station placement will be determined and analyzed on block-by-block basis. These will be displayed graphically wherever possible. A route description will be provided and the alternatives considered will be summarized. Impacts will include: socioeconomic and cultural displacements; traffic and parking disruption and removal; neighborhood characteristics and functions disrupted; visual effects as to the form and fit of the system guideway and stations within the locale-specific urban setting; accessibility and mobility consequences; construction disruptions; and, potential air, noise, and water pollution.

The EIA results will be used to update the existing EIA report. This update will then provide the basis for initiating the CEQ and A-95 review process and scheduling public hearings.

Figure V - 2 illustrates the EIA process.

4. Task 4.0 - Prepare for Implementation

This task will involve preparation of a procurement bid package to be used as the basis for selection of a turnkey systems manufacturer. Prior to such preparation, a procedure for selection will be developed in coordination with UMTA. This work in this task will include two subtasks:

a. Subtask 4.1 - Selection Procedure Development

Evaluation criteria will be developed and weighting factors assigned in a joint effort with UMTA.

PREPARATION OF ENVIRONMENTAL DOCUMENTATION

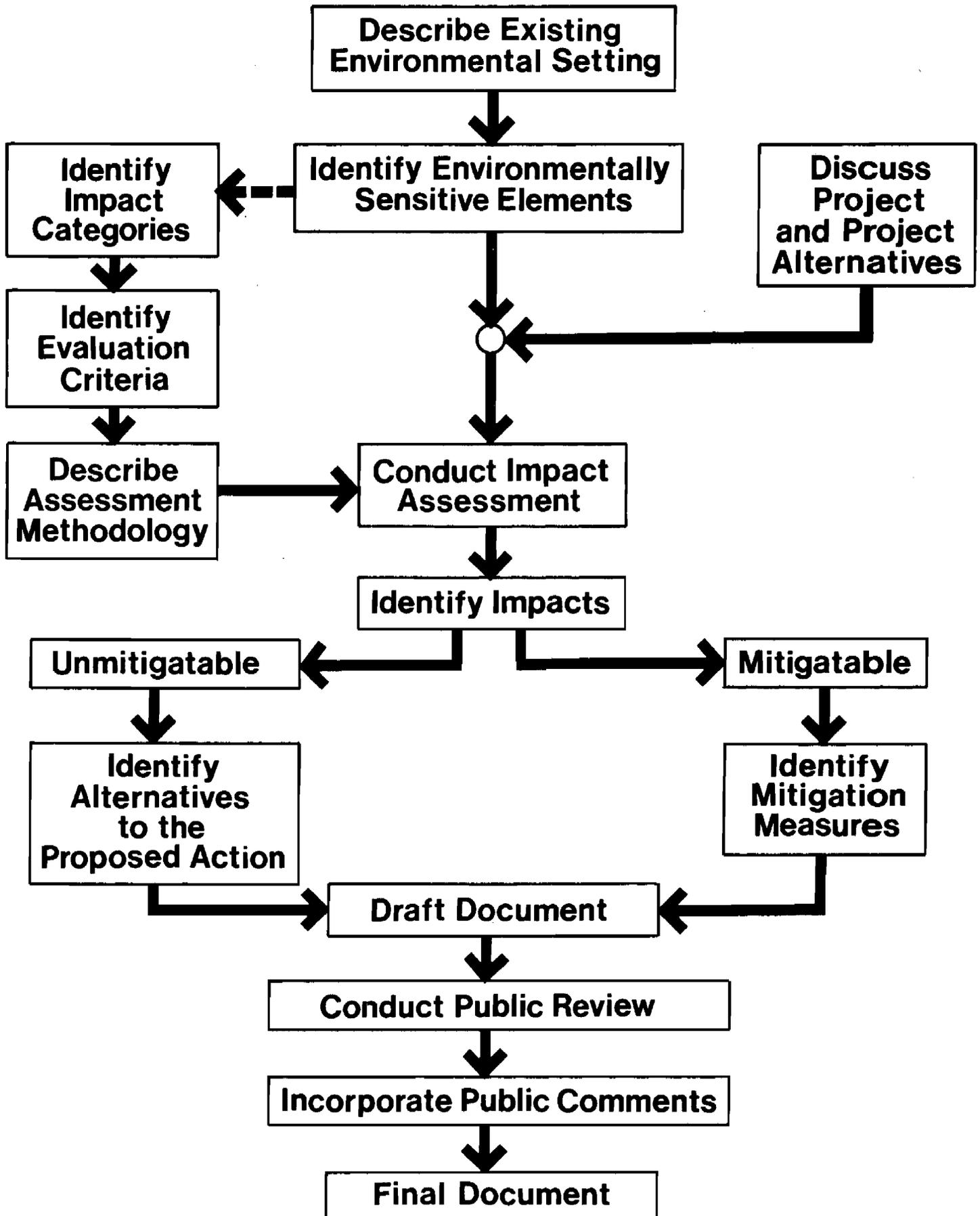


FIGURE V-2

Determination as to whether a one-step, two-step or other selection approaches are preferred will be made in close coordination with UMTA. Criteria relevant to selection may include: responsiveness to the requirements of the system; manufacturer's relative credibility and financial strength; state-of-development and in-service use of the manufacturer's system; extent of product improvements anticipated and/or identified; and the system assurance and safety characteristics of the manufacturer's system.

b. Subtask 4.2 - Procurement Bid Package Preparation

The bid package assembled will consist of the following:

Invitation to Bid

- Appendix A - EEO Provisions
- Appendix B - Labor Standards Provisions
- Appendix C - Minimum Wage Rates

Division SC: Special Conditions

- SC1 - Definitions and Abbreviations
- SC2 - Proposal Requirements and Conditions
- SC3 - Award and Execution of Contract
- SC4 - Scope of the Work
- SC5 - Control of the Work
- SC6 - Control of Materials
- SC7 - Legal Responsibilities
- SC8 - Prosecution and Progress
- SC9 - Measurement and Payment

Division A: General System Requirements

- A1 - Operations Requirements
- A2 - System Safety Requirements
- A3 - Reliability, Availability, and Maintainability Requirements

- A4 - Maintenance Program Requirements
- A5 - Testing Requirements
- A6 - Security Requirements

Division B: Fixed Facilities

- B1 - General Requirements for Fixed Facilities
- B2 - Structural Design Requirements for Fixed Facilities
- B3 - Foundations and Columns
- B4 - Guideway
- B5 - Stations
- B6 - Maintenance and Storage Facility
- B7 - Miscellaneous Facilities

Division C: Equipment

- C1 - Vehicles
- C2 - Vehicle Control
- C3 - Central Control
- C4 - Communications Subsystems
- C5 - Electric Power Distribution Subsystem
- C6 - Maintenance Equipment
- C7 - Fare Collection Equipment
- C8 - Elevators and Escalators

Exhibit A - Drawing Lists

Forms for Bid Submittal

- Proposal Form
- Operating Plan Forms
- Proposal Guaranty Form
- Designation of Subcontractors
- Subcontractor's Statement of Business Qualifications and References

Forms for Execution of Contract

- Performance Guaranty Form
- Payment Guaranty Form
- Form of Contract

Contract Drawings

City of Los Angeles General Specifications

- General Provisions
- Technical Provisions

5. Task 5.0 - Maintain and Update Existing Data Base

As results from local planning groups and from the above described tasks emerge, the existing data base will be updated on a continuing and parallel basis.

Patronage forecasts will be adjusted as results from the ongoing studies and regional planning activities, such as the Transportation System Management efforts, warrant. Attendantly, the system operations plan will be adjusted.

Also, preparation of a detailed research plan for eventual impact analysis of the Downtown People Mover will be initiated, and the necessary "before" data collection requirements will be identified. Methods of interfacing with existing and proposed land use, employment, and travel surveys in the region will be investigated and defined.

Adjustments to implementation schedules will be made as events require.

Order-of-magnitude costs estimates will be adjusted as influenced both by preliminary engineering results and schedule adjustments. Updates of cash flow requirements will be made to account for changes.

Variations to the financial plan will be explored. The plan will be changed consistent with improvements uncovered, if any, and to incorporate value capture, private and public funding commitments.

Reference drawings of the various eligible and potentially eligible systems will be assembled, to the extent permitted by system manufacturers. These will augment existing files which provide a basis for the requirements of these systems.

6. Task 6.0 - Preparation and Submittal of an Amendatory
Capital Grant Application

In accord with UMTA guidelines, an amended capital grant application will be prepared and submitted requesting approval and funds to proceed with the Implementation Phase of the Los Angeles Downtown People Mover Project. Appended to this application will be a final report reflecting the results of the Preparation Phase. The budget and cash needs information required will reflect as firm an estimate as can be developed without knowledge of the specific system to be implemented.

B. Implementation Phase

During this phase, the turnkey systems manufacturer will be selected subject to UMTA concurrence. The selection will be based on evaluation of responses to the procurement bid package using mutually agreed to procedures and criteria.

The City of Los Angeles will monitor the system manufacturer, secure the necessary rights-of-way and approvals for construction, and provide agency liaison for training operating and maintenance personnel.

The system manufacturer's responsibilities will be to develop bid packages for final A/E design and for construction, supervise design and construction upon advertising and award of contracts, and provide for installation of systems equipment, system integration, and acceptance testing. Site surveys will be conducted to establish pre-installation conditions. Training manuals and operating procedures will be developed and furnished by the system manufacturer.

C. Operations Phase

The City of Los Angeles will be responsible for the public passenger service of the system. System demonstration under UMTA-sponsorship will be continued for a minimum of one year during which time data for UMTA furnished impact categories will be collected and analyzed. Project findings will be documented in the form of guidelines and procedures to appraise results of the project and to provide an experience base which other urban areas might use.

Subsequent to this phase, continued service will be provided without further financial involvement by the Federal agencies.

VI. MANAGEMENT APPROACH

A. Overview

Success in achieving the goals desired by UMTA in the performance of this program depends a great deal upon the recognition and understanding of the magnitude, complexity and interrelationships of the tasks to be performed. Commitment to a strong management program, implemented by a team with proven capability, is essential to success of the project. The Los Angeles Downtown People Mover organization will include the technical and administrative disciplines necessary to carry out the technical and management functions required before and after selection of a system manufacturer. We recognize that preliminary engineering must be completed prior to system manufacturer selection.

The anticipated project requirements, both technical and administrative, form the basis of a Work Breakdown Structure (WBS) which will comprehensively identify the entire project. The Work Task Flow showing each of the major tasks to be performed, the relationship of the tasks and the major decision points of the program will be refined immediately after contract go ahead. The task flow will be utilized to develop the WBS and the master schedule required for developing the cost and technical information necessary for effective planning and management.

The organizational structure is designed to allow smooth transition from the preliminary engineering phase, which will be performed primarily by the project staff and consultants, to the design and construction phase which will be accomplished by the selected system manufacturer. Overall managerial control will be maintained throughout the program by the Project staff. Throughout the program maximum citizen participation will be solicited from those areas impacted by the DPM system.

Attaining the goal of a balanced transportation system for all sections of the downtown area will be enhanced by the citizen involvement in the total planning effort. The impact of the DPM upon the total Circulation/Distribution and re-development plans of the City of Los Angeles will be emphasized.

B. Project Organization

The Downtown People Mover Project will be controlled by the City of Los Angeles under direction of a Board of Control established to assure that all segments of the community are represented in the management and decision making process. The Board will consist of ten members; one appointed by the Mayor, three appointed by the city council, three from the private sector and one each from the Community Redevelopment Agency, the Southern California Rapid Transit District and the County of Los Angeles. This Board will be responsible for the policy decisions affecting the DPM Project.

The Director of the Circulation/Distribution System will be responsible for the DPM Project under direction of the Board of Control. The relationship of the DPM Project to city is as shown in Figure VI-1. Implementation of the DPM Project will be the responsibility of the DPM Project Manager who will report to the Director of the Circulation/Distribution System. The Project Manager will have responsibility for the technical and administrative functions of managing and coordinating the DPM program. The DPM project organizational structure will be as shown in Figures VI-2 and VI-3. This organizational structure provides the flexibility necessary to perform the detailed tasks required during the preliminary engineering and the more management oriented task required after the turnkey manufacturer is selected.

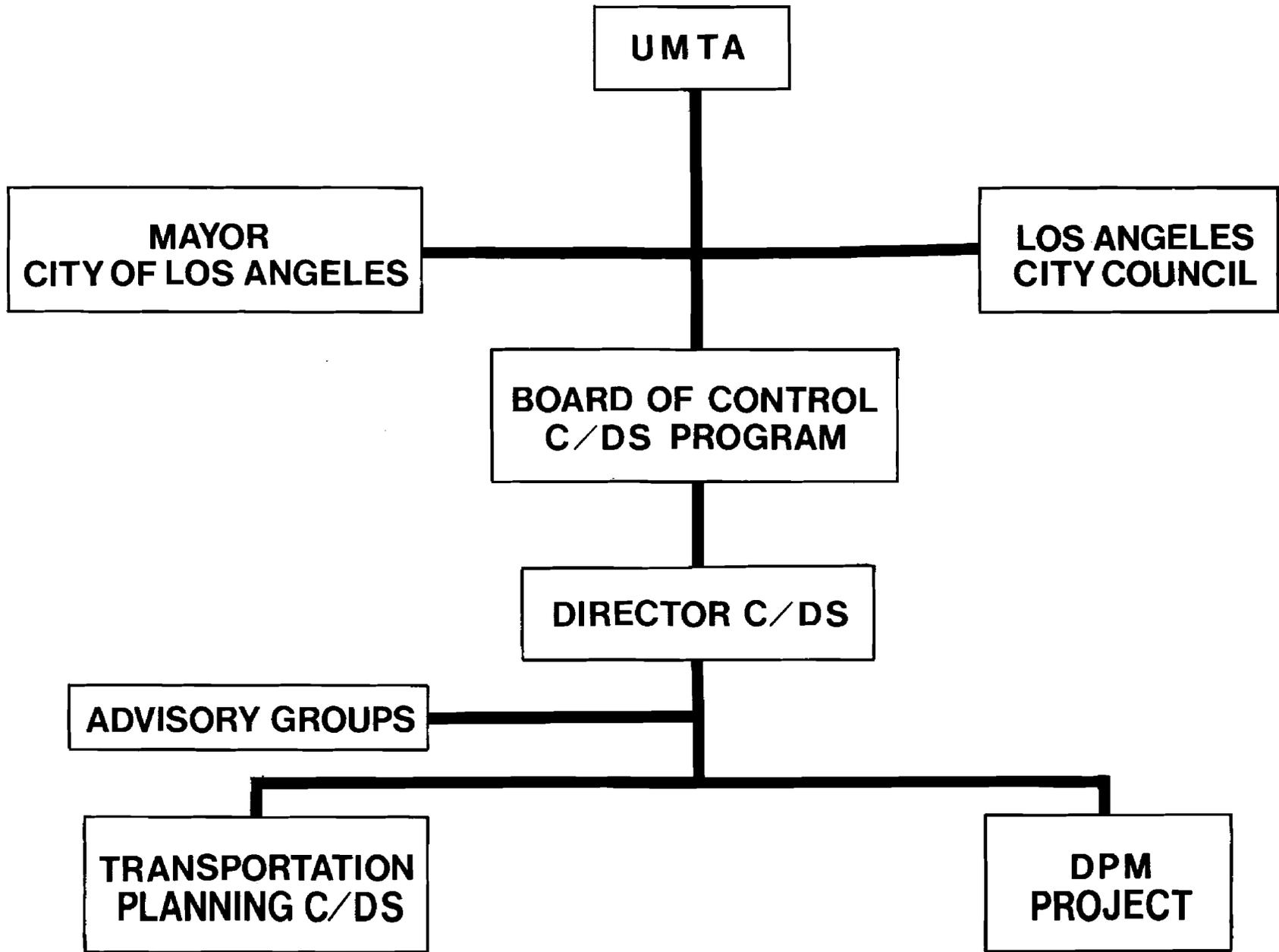
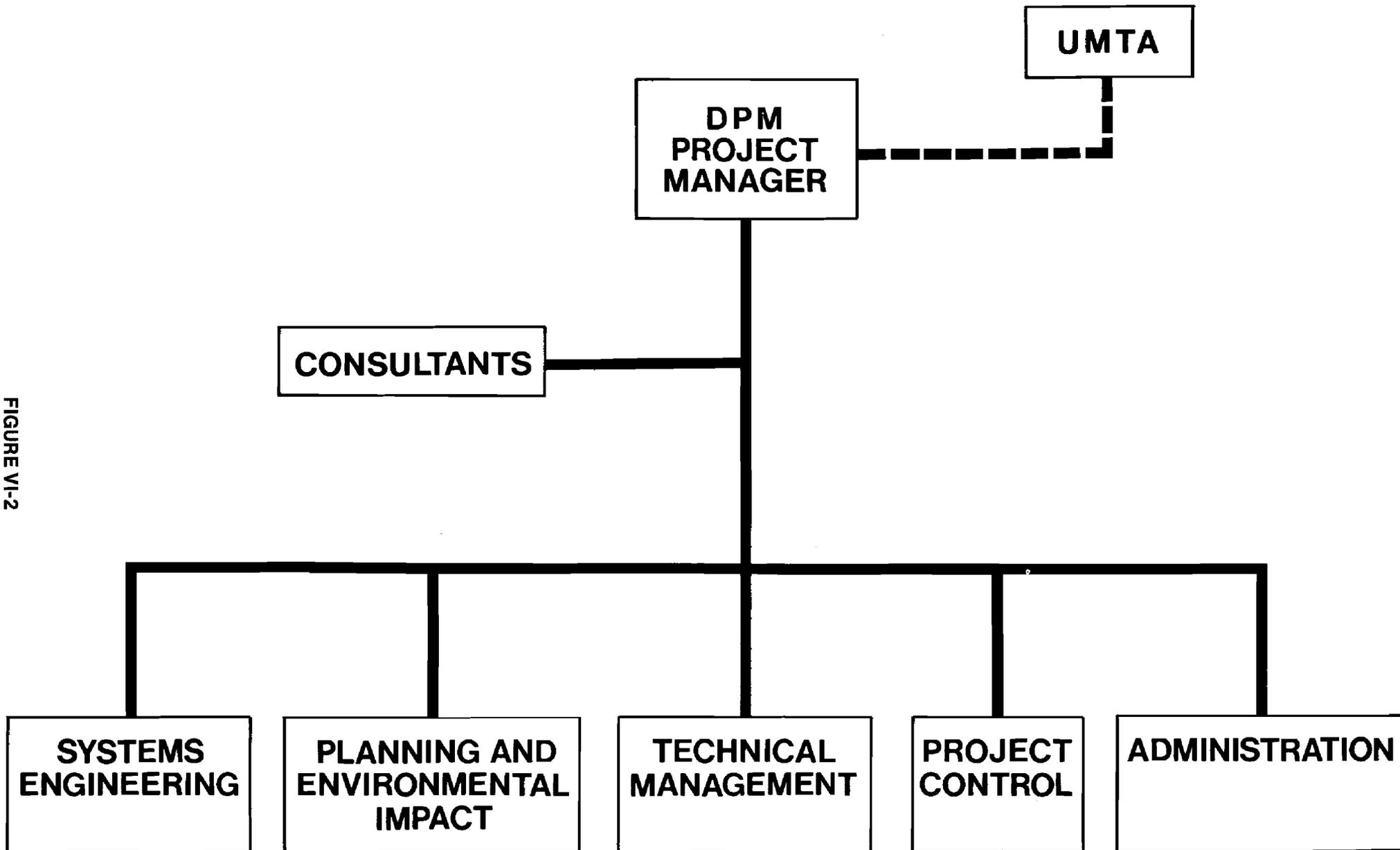


FIGURE VI-1

FIGURE VI-2



**TECHNICAL
MANAGEMENT**

**SYSTEM
MANUFACTURER**

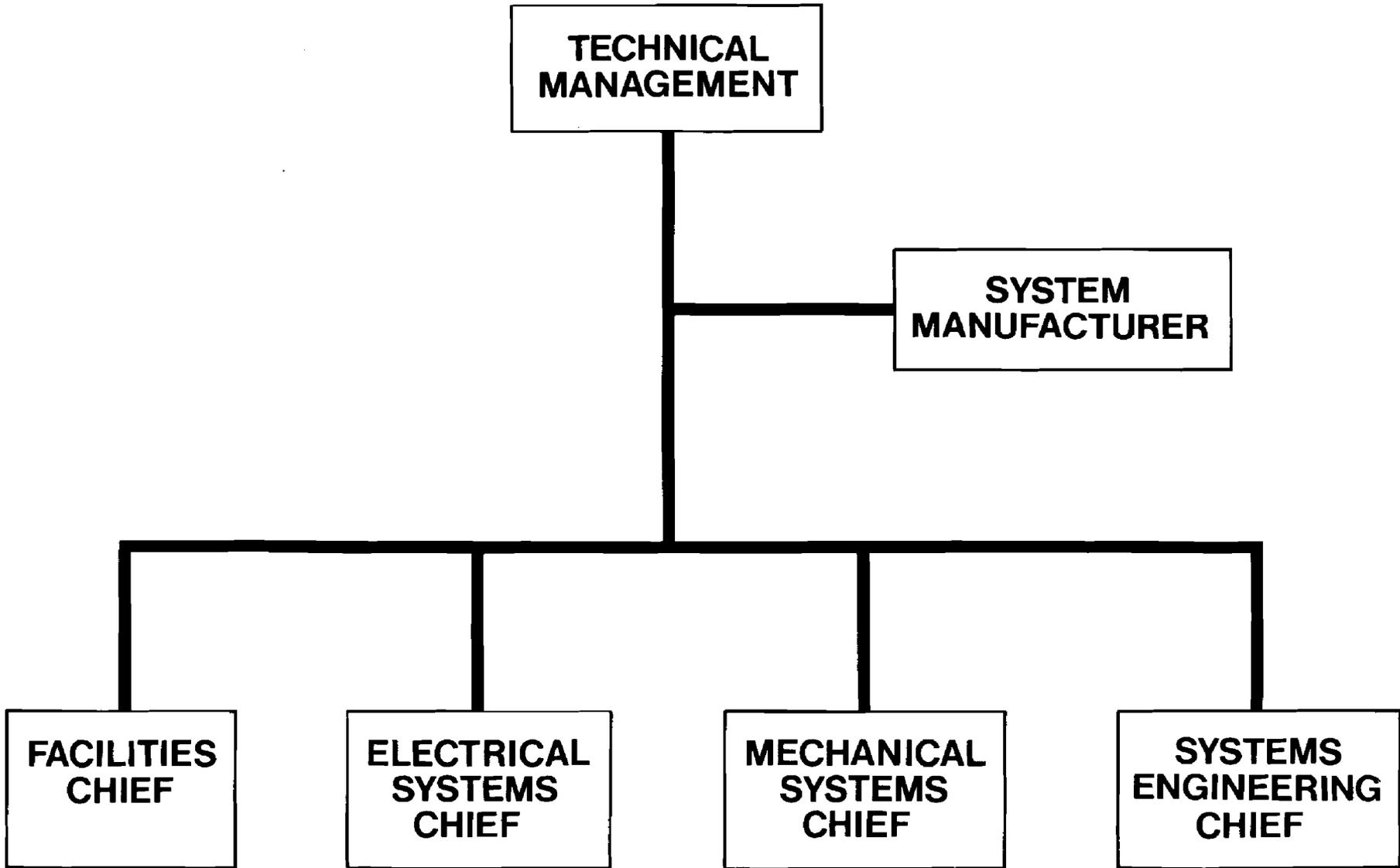
**FACILITIES
CHIEF**

**ELECTRICAL
SYSTEMS
CHIEF**

**MECHANICAL
SYSTEMS
CHIEF**

**SYSTEMS
ENGINEERING
CHIEF**

FIGURE VI-3



In addition to their role of overall project direction, shown in Figure VI-1, UMTA will also provide technical guidance and support to the DPM Project Manager. In addition, a qualified advanced technology agency, such as the Applied Physics Laboratory of the Johns Hopkins University, will be contracted as a consultant to assist in the evaluation of system manufacturers prior to their selection. A qualified engineering firm will also be contracted to perform the systems engineering tasks during the course of the project. They will assist the project staff in performing preliminary engineering, developing the procurement bid packages for system manufacturer selection and assist in performing technical management of the project.

A system manufacturer will be selected through a competitive procurement process. The system manufacturer shall be responsible for the system design and engineering and for the "turn key" installation of the system at the site. Prior to the award of a contract to the system manufacturer, UMTA and the project staff will jointly review the selected manufacturer's design and equipment status to determine the degree to which the Downtown People Mover Project requirements are met, the need for specific product improvements, and to determine the requirements for technological qualification of the system. The "turn key" responsibility of the system manufacturer shall include:

1. The completion of the final A&E design and the preparation of the construction bid packages required.
2. The subcontracting of the construction of the civil structures, the guideways and stations, through a competitive bidding process; and,

3. The construction, installation, integration and testing of the system and the training of the city's operation and maintenance personnel.

The DPM technical management staff will provide a one to one functional interface with the system manufacturers technical disciplines in order to maintain managerial control of day to day developments (see Figure VI-3).

As an alternative to selection of a single systems manufacturer, UMTA may wish to consider directing the City of Los Angeles to be the system integrator and contract directly with transportation hardware manufacturers for specific coordinated elements of the DPM system. This would allow maximum flexibility in the utilization of existing equipment and systems, and could result in an optimum total DPM system based on existing hardware and technology. The City of Los Angeles is prepared to take this approach, should UMTA decide it is preferable.

C. INTERNAL PROJECT MANAGEMENT

1. Contract Management

The effort for the DPM will be accomplished from various funding sources that will be made available through contract relationships. It will be the responsibility of the Director of the C/DS to accomplish the objectives of the project within the contractual framework of the funding sources. This will, of course, require the Director to extend contractual coverage to the internal organization as well as other participants, both public and private. The Director will establish, in the Administrative organization, a contract management section that will maintain a current record of all effort on contract, both from the funding sources and to the various project participants. The system will define the work to be accomplished,

the available funding, and the reporting requirements of project participants.

As contractual coverage is received from funding sources, it will be necessary to develop and maintain a WBS that will serve as the framework format for all contractual information. A work definition system that describes required effort in sufficient detail to ensure effective management control will be implemented for all elements of the WBS. Project participants will be required to expand the WBS and the related work definition and financial planning to a level specified by the Director. Formal contractual authorization will be the only authority to incur costs. As requirements change over time, the original work scope and funding must be revised to incorporate the changes.

In this manner, the Director will control the effort of all project participants.

2. Implementation Plan

To ensure that an effective Project Management System is functioning throughout the project, it will be necessary to plan for its orderly implementation during the proposal and initial planning stages. To this end, the Director of the C/DS has developed the design of a system that will satisfy the cost, schedule, and technical management requirements of the project as well as meet external reporting requirements.

The system includes specific requirements that each project participant must satisfy prior to being included in the project. Formal technical documentation must be provided by potential project participants that demonstrates their ability and willingness to meet project management requirements prior to commencement of effort.

The management system consists of several modules as described in the Overview. A key module is the project Work Breakdown Structure (WBS), which provides the framework and format for all information developed on the project. The key to effective implementation is the development and maintenance of a WBS that, at any time, represents the scope of work on the project. Project participants will have their effort identified to the elements of the WBS. The original WBS must be developed by Project Control and subsequent planning, scheduling and management activities will be accomplished within this framework.

Each project participant may be required to expand to a given level the WBS elements that relate to his effort. The level of detail required will be generally governed by the difficulty of the required effort, the magnitude of the effort, and the sensitivity and potential total project impact.

All information from planning through reporting will be related to WBS elements. The development of internal information will be accomplished through the internal management structure, and the requirements placed on other participants will become a part of the contractual relationship.

3. Budget Control

The budget represents the dollar resources available, at any time, for the accomplishment of project objectives. The basis of all budget dollars will be the funding from all sources available to the Board of Control for the DPM. It shall be the responsibility of the Director of the C/DS to develop and maintain a system to allocate and account for the total budget for all participants in the DPM Project.

As information on funding becomes available, the Director of the C/DS will direct the Project Control organization to develop plans that identify which participants will receive the resources and work with them to develop supporting plans consistent with the tasks to be accomplished and the schedule. Each project participant will develop more detailed plans consistent with the requirements established by the Director of the C/DS contract. These requirements will allow the Project Control organization to integrate the budget allocations into a total budget that is time phased and in sufficient detail to ensure adequate management.

This process will cover both anticipated and authorized funding. As the actual funds become available, the Director of the C/DS will authorize project participants by contract to incur expenditures against the plans in the accomplishment of project objectives. It shall be the responsibility of the Director of the C/DS working through Project Control to ensure that expenditures occur consistent with contractually authorized effort.

As expenditures are incurred, records will be kept and reports prepared by the C/DS organization and other project participants which will permit Project Control to monitor expenditures against established budget plans and to meet external project reporting requirements.

As changes occur in project requirements, the budget will be revised in a manner similar to that used to establish the original budget. As information is received on planned or approved expenditures, the Director of the C/DS will direct the Project Control organization to work with project participants to develop plans and work authorizations covering the revised scope of work and schedule. Subsequent reporting will reflect the revised work schedule.

4. Technical Reviews

One of the major problems experienced by recently implemented transit systems is meeting technical requirements. This has manifested itself in failures of such capabilities as automatic operations and reliability resulting in cost and schedule delays. Most project management systems under which these problems occurred dealt primarily with traditional cost and schedule data. In recognition of this problem, this project will develop a specific formal structured system that deals with the future probability of meeting technical performance requirements. This approach will allow for the early and comprehensive identification of factors that will ensure technical progress toward technical performance objectives.

The technical monitoring system will identify the functions and responsibilities performed by the various elements of the DPM project organization in satisfying the DPM technical performance requirements. Essentially, the major DPM technical requirements will be identified. The sequential steps necessary to accomplish these objectives will be determined and planned for all project participants. The overall project plan is a family of subordinate technical performance demonstration plans which indicate the method of demonstrating the incremental achievement of the total system performance objectives. This family of plans requires the allocation of system level technical performance requirements to successively lower levels of the WBS, the measurement of performance against prescribed technical plans, thus ensuring the ability to assess the impact on forecasted system performance of problems encountered at lower levels. Technical reviews will be scheduled at appropriate points in the program to assure that technical performance is progressing satisfactorily to meet the performance requirements. UMTA will be a part of all such reviews.

VII. FINANCING

The total DPM system cost is estimated at \$167,000,000, including escalation and contingency. It is expected that at least \$7,000,000 of this amount can be offset from lease revenue bonds issued for parking structures at the Convention Center and Union Station, leaving about \$160 million to be financed from transit related sources.

The initial operating cost has been estimated at \$2.6 million per year (1976 dollars), while the 1990 operating cost is estimated at \$2.8 million.

A. Local Governmental Funding Sources

Passage of State Constitutional Amendment 15 (SCA-15, known as Proposition 5) in 1974 authorized a portion of state highway user taxes up to 15% in FY 1976, 20% in FY 1977, and 25% thereafter, otherwise allocated for local highway improvements to be used for capital expenses of fixed guideway systems in counties that have approved highway fund diversion. Proposition 5 funds are allocated to both the state highway commission and to cities and counties.

The Southern California Association of Governments (SCAG) has estimated that from FY 1976 through FY 1980, about \$210 million dollars will be available from this source for use in Los Angeles County by the state, the county, and cities within the county. The City Council of Los Angeles had previously allocated \$31.2 million from this source for support of its share of the cost of the "starter line" of the regional transit system; the Council has since rescinded its 1976-77 allocation to the starter line.

The Transportation Development Act of 1971 (SB 325) extends

the state sales tax to gasoline purchases and apportions the revenue generated by a 1/4% out of the total tax for the purpose of transportation planning, capital improvements, and operations in the county in which such revenue is generated. Funding under this Act must be equally matched by local project funds in transit districts in operation for five or more years. As of FY 1976, up to 85% of the SB 325 funds may be used for the operations of transit systems, and the remaining 15% must be used to meet capital expenses.

SCAG has estimated that from FY 1976 through FY 1980, about \$330 million will be available from this source for use in Los Angeles County in support of the Southern California Rapid Transit District. Another \$112 million per year from the same source will be available for other transportation system purposes.

The City of Los Angeles appropriated \$770,000 in the past fiscal year from its General Fund as its 60% share of the costs of operating the Minibus system in the downtown area. The remaining 40% came from the Community Redevelopment Agency and Los Angeles County. The Minibus line has served as a forerunner of the downtown people mover that is the subject of this proposal.

The County of Los Angeles has used approximately \$36 million per year of its Special Revenue Sharing funds to support reduced fare operations of the Southern California Rapid Transit District.

B. Special Funding Sources

Over the history of the project's development, efforts have

been made to obtain private and public funding. Private revenue financing that is planned for the system will embody the value capture principal. Simply stated, the proposed system would increase the value of certain development opportunities to the extent that developers would be willing to pay for direct access to and reliance upon the system. This payment would take two forms:

1. Contribution to Station Development:

In four specific locations in the proposed system, stations can be developed as integral features of buildings that are to be erected on the selected sites. The inclusion of a direct linkage between a building and a transit system station can be expected to increase the market value assigned to the building. A developer can be expected to be willing to pay some portion of the anticipated increase in value in exchange for a direct linkage.

In the near term, two of the four sites are expected to be developed. Funds from the developers, which are expected to total about \$1,000,000, will be available to support capital costs. The remaining sites will be developed in the longer term. The value of transit interconnection, to be negotiated at that time, will be available to support operation and improvement of the system.

2. Contribution to the Peripheral Parking Program:

For office buildings that will be constructed on the currently vacant parcels in the Bunker Hill Redevelopment Area, the proposed transit system offers a way to cut parking costs. At present, developers face the need to provide parking in new office structures in order to attract tenants. By making use of the direct linkage provided by the system to peripheral parking garages, developers will be able to reduce the amount of parking space that is necessary to be provided, and therefore reduce the cost of new office

projects. Developers can be expected to contribute some portion of this cost saving in exchange for guaranteed space in the garages on an annual basis. This revenue estimate, which is related to long run estimates of overall CBD growth, is expected to be \$1.1 million per year by 1990 (in 1976 dollars).

In addition, other possible sources - assessment districts and voluntary contributions from major corporations - will be explored.

C. System Revenues

The system operational revenues are derived from passenger fares and miscellaneous revenue sources such as the development of intercept retail, parking garage retail sales, and advertising revenues. These sources are estimated to amount to \$2.3 million by 1990 (in 1976 dollars).

D. Capital Cost Financing Program

Of the \$167,000,000 in capital funds required, \$160,000,000 is estimated to be required from public transit sources. Of this amount, it is expected that 80 percent, or \$131,200,000, could be obtained as a result of favorable review of a DPM proposal. It is expected that 10 percent, or \$16,400,000, could be derived from State Proposition 5 funds. The State Highway Commission recently approved the expenditure of State Proposition 5 funds for planning and system refinement. The remaining \$16,400,000 required would be City and County Proposition 5 monies between the County and City of Los Angeles. These sources would provide 5 percent, or \$8,200,000, each. It is estimated that \$1,000,000 of the City and County amounts might be

derived from value capture accruing to individual station developers and County/City land contributions (value-in-kind). In approving the submission of this proposal, the City has recognized the potential need of approximately \$7.5 million of the City Proposition 5 monies.

Capital Cost Sources

UMTA Capital Grant	\$131,200,000
State Proposition 5	16,400,000
City of Los Angeles Proposition 5	7,700,000
County of Los Angeles Proposition 5	7,700,000
Value Capture from Station Developers and City/County Land Contributions	1,000,000
Total	<u>\$167,000,000</u>

E. Operation Financial Program

The operating costs and anticipated revenues for the initial year and 1990 are shown in the following table. As can be seen, the system revenues and special funding sources are estimated to provide sufficient funds for operation of the DPM in 1990. As a result, because the DPM replaces some Minibus and SCRTD bus service in the CBD, operating cost reductions for CBD transit service will occur for both the City and SCRTD.

TABLE VII-1

OPERATING FINANCIAL PLAN

LOS ANGELES CENTRAL BUSINESS DISTRICT
CIRCULATION/DISTRIBUTION SYSTEM

(1976 dollars)

	<u>Initial</u>	<u>1990</u>
	(18 million annual trips)	(25 million annual trips)
----- OPERATING COSTS -----		
Operating	\$2,600,000	\$2,800,000
----- REVENUES -----		
<u>System Revenue</u>		
Fares	1,360,000	2,000,000
Misc	200,000	300,000
<u>Special Revenue Sources</u>	430,000	1,200,000
	<u>1,990,000</u>	<u>3,500,000</u>
----- SURPLUS (Deficit) -----		
	(not including Mini Bus saving)	
	\$ (610,000)	\$ 700,000
	excluding Mini Bus savings	excluding Mini Bus savings
	\$ 140,000	\$1,750,000
	including Mini Bus savings	including Mini Bus savings

APPENDIX A
BACKGROUND TRANSPORTATION STUDIES LEADING TO THE
DEVELOPMENT OF THE PEOPLE MOVER PROGRAM FOR BUNKER HILL

BACKGROUND TRANSPORTATION STUDIES LEADING TO THE
DEVELOPMENT OF THE PEOPLE MOVER PROGRAM
FOR BUNKER HILL

Detailed planning studies for a distribution system, originally designed to connect peripheral parking garages with the Bunker Hill Redevelopment Project, have been carried out since 1969. These studies, outlined below, are in addition to the broader area-wide planning studies discussed in Section III above.

Bunker Hill Illustrative Design Plan

Design study for the Bunker Hill Project (1969-1970) that produced a design and development master plan for the Bunker Hill Project setting forth land use, circulation and urban form objectives and recommendations.

Redevelopment Plan Amendment

Adopted amendment of the "Redevelopment Plan" for the Bunker Hill Redevelopment Project providing the ordinance governing the redevelopment actions for the Bunker Hill Project.

Design For Development Amendment

The Design for Development is a statement of the Agency's development policies, objectives and design criteria, the substance of which derives directly from the Redevelopment Plan for the Bunker Hill Project. It is a guide to means of orderly disposition and development of land according to definite design objectives as part of the Central City Plan, for an improved urban environment.

Transportation And Parking Study

The report sets forth a recommended street system, parking plan and transportation system for Bunker Hill. The transportation System includes provisions for a people mover.

Peripheral Parking And People Mover Study

The purpose included design and space requirements of a 4000 space parking structure, people mover passenger terminal, maintenance and storage facility and people mover alignment with provisions for future extension, landscaping areas and other uses on the site.

Peripheral Parking Program Study

This study provided updated information on the potential for developing peripheral parking in Los Angeles. 1972 parking supply, usage and demand were determined. Downtown office workers were interviewed to determine specific parking behavior patterns. Parking surpluses and deficiencies were evaluated, (with projections made to 1980) and the effect of alternative parking policies was analyzed.

This study concluded that a peripheral parking and people mover concept is not only financially feasible, but that it would also alleviate parking deficiencies, and is necessary for achievement of planned growth in the CBD.

Bunker Hill East Station Design and North-South Route Alignment Study

Preliminary route alignment studies in the East Hill area of the Bunker Hill Project and station concept design studies showing the integration of proposed routes. The study has also helped to establish and maintain people mover route right-of-way easements which must be respected by any developer who constructs buildings in the East Hill area.

West Leg Guideway Route Alignments Including Pacific Electric Tunnel

Several alignments were analyzed including 1st and 2nd Street surface routes, in addition to the Pacific Electric Tunnel segment.

People Mover Easements Within The Bunker Hill Project

This study led to reservation of right-of-way easements for the people mover guideway and stations within the Bunker Hill Redevelopment Project.

Coordination With Associated Downtown Studies

This study provided information needed for the coordination of peripheral parking and people mover studies with "Central City Los Angeles Preliminary General Development Plan", "Central City Los Angeles 1972/1990 Preliminary Plan", and "Central City Los Angeles Peripheral Parking Program."

West Site Analysis and Conceptual Design

Site analysis and conceptual design for west peripheral parking and people mover terminal complex included analysis of the location, adequacy and design of the proposed site to accommodate the space needs of the complex, and integration with adjacent streets and surrounding land uses.

Traffic and Site Locations

Studies of traffic and street capabilities were performed for both east and west peripheral sites. The impact on the city streets and freeways was assessed and recommendations were made for improvements and garage site locations.

Patronage and Revenue Study - Peripheral Parking

This study relates Bunker Hill and commercial core floor area growth to expected parking demand. The projected shortage of long-term parking in the study area was quantified. The study concluded that (1) peripheral parking will be attractive on a free market basis but that (2) diversion to peripheral facilities is highly sensitive to downtown parking costs, and demand/supply relationships.

Bunker Hill West Station Schematic Design

A schematic station design study for the west station within the Bunker Hill Project was undertaken to prepare schematic plans for a people mover station which will be physically, structurally and aesthetically integrated with the development under design and construction on this site.

Comprehensive Plan

This is a package of tract maps and rights-of-way, collected together for ease of review by all affected City, County or State departments.

Developed by the Agency, this technique allows review of a single package by all technical disciplines. Included in the plan are:

- Rights-of-way and roadway widths
- How land will be held legally
- Easements
- Conformance to comprehensive zoning and special codes required
- Street grades
- New or special tracts
- Future streets or vacated streets

Bunker Hill Redevelopment Plan Environmental Impact Report

In December, 1973, the State approved the EIR for Bunker Hill. The main issue of the plan was the extensive use of peripheral parking structures connected through Bunker Hill by People Movers.

Westlake Community Plan

City of Los Angeles "Westlake Community Plan" was adopted in March, 1974, by City Council. Development of peripheral parking facilities to serve LA/CBD commuters was proposed.

Central City Community Plan

City of Los Angeles "Central City Community Plan" was adopted in May, 1974, by City Council. An extensive people mover and peripheral parking plan was recommended for early implementation.

City Council Committee Action

In March, 1974, the Council's Ad Hoc Committee on Rapid Transit recommended that the City support further studies on the use of PRT in Los Angeles and encouraged UMTA to develop a full-scale system.

APPENDIX B
ADDITIONAL REFERENCES

ADDITIONAL REFERENCES

(Available on request)

1. Pre-Application
2. Preliminary EIA of the Initial Increment of DPM
3. Analysis of Alternatives
4. Comparative Evaluation of Alternate DPM Segments
5. DPM System Description
6. Evaluation of Bus Improvements
7. Comparative Evaluation of Bus and Bus/DPM Alternatives
8. Los Angeles Central City Community Plan
9. Analysis of Future Downtown Parking Requirements
10. The Null Alternative

APPENDIX C

CONSTRUCTION PLANNING AND STAGING PROGRAM

CONSTRUCTION PLANNING AND STAGING PROGRAM

1. Construction Planning and Staging Program for Aerial Portion

The aerial portions of the AGT route will be on guideway structures located along the edge of streets or on off-street locations.

The use of street right-of-way minimizes the acquisition costs of system real estate but imposes disruptive activities on the community. Maintenance of normal movements is a vital issue in the planning of construction program. Restriction of traffic must be considered at several critical stages of construction, but proper phasing of detours will allow movement at near normal levels.

This staging program outlines the construction procedures and sequence and the resulting restraints upon the community's economic and physical environment. The staging program is covered in two sections: Program Procedures and Construction Sequence/Activity Restraints. Basic construction operations will be described for aerial structures. Variations in procedure and restraints will be described where aerial structure is located, on the edge of streets and off-street.

A. Program Procedures

A number of factors must be considered in order to maintain satisfactory access to wayside establishments and public activities, and avoid disruption of traffic movements.

- o Construction activities for the contract segment covering the aerial structure will cover a period of approximately two years, starting with preparatory work and proceeding through foundation superstructure and guideway erection.

- o Bus system operations will be coordinated with RTD to provide bypass movements of vehicles during critical stages of street closures.
- o Contractors will be required by the project team to employ procedures and equipment to minimize dust, noise and confusion elements. In certain areas, work will be restricted to day and evening hours, e.g., 8:00 am. - 9:00 pm, for welfare of adjacent residents.
- o A reasonable degree of tolerance will be required of the area's inhabitants. Project team surveillance will monitor contractor activities for excessive delays, but the magnitude of construction activities will still require public indulgence.

B. Construction Sequences/Public Activity Restraints

The construction sequence activities described are based on concepts developed after consideration of the following methods and factors:

- o Aerial structure will consist of guideway girders supported by columns every 70 to 100 feet. Construction activity on the site will be reduced by the precasting of guideway girders at remote plants and transporting the precast units by truck to the site on city streets during reduced traffic periods.
- o On-site activity will consist of construction of guideway foundations and columns which must be adapted at the site for weight and stability reasons.

- o A series of contracts will be placed to accomplish the construction of all elements of the system, and phased to an appropriate sequence in the time frame of the total system schedule.
- o Contracts will be sized to permit an optimum rate of work consistent with environmental restraints and work production.

The following procedures will be used to develop smooth transitions during construction disruptions and promote harmonious contractor/community relations. A key element for implementing these procedures will be the formation of a project team composed of CRA and their consultants which would coordinate contractor/public/institutional/private/utility activities as construction tasks proceed through the various sequences.

- o Protective measures in maintaining traffic and access throughout the contract schedule will be required of the contractor by the project team.
- o The project team will coordinate with the traffic and police staffs to establish street closure procedures.
- o Traffic barriers will be erected in streets and fencing will be installed around the work areas to protect motorists and pedestrians.
- o Close liaison will be maintained with the fire department by the project team to maintain access to establishments along the route.
- o Liaison with utility owners will be established by the project team to minimize disruption of service to occupants of adjacent facilities.

The following sequences cover construction activity and public activity restraints. Variations in routing or restraints will be described for situations where aerial structures are built along the edge of streets or in off-street locations.

UTILITY RELOCATION

o Construction Sequence

For route segments at the edge of streets, a moderate construction activity begins in localized areas along the route at column locations and in adjacent streets, involving trenching, removing and relocating affected utility lines to new positions. Underground space must be cleared to permit the placement of the foundations and columns. The foundation for the guideway will require drilling and casting concrete caissons of varying lengths. Although each street has its own peculiar utility characteristics, in downtown the utilities will be more prevalent along the edge than in the middle of the streets, and care must be taken in locating the columns to minimize the utility disruption and relocation. Work is carried on by crews from water, gas, power and telephone companies, usually consisting of small groups of men and equipment. Utility relocation for off-street locations would be much reduced over street locations.

o Public Activity Restraint

Some inconvenience to street traffic, with little or no restraint on pedestrian or vehicle access to area inhabitants, or business community.

STREET MODIFICATIONS AND DEMOLITION

o Construction Sequence

Shortly after utility relocation gets underway, those streets to be used for aerial routes will undergo modifications to provide the space required for the guideway. If required, right-of-way for widening will have been purchased, sidewalks will be moved back, those building appurtenances encroaching will be removed, and temporary paving will be installed after necessary drainage and earthwork is accomplished.

These segments of aerial structure through private right-of-way will generally require demolition of structures, capping of utilities and preparation of the site. Wherever feasible, existing trees will be maintained to be integrated later into the landscaping plan for the route.

o Public Activity Restraint

The inconvenience and disruption will be of moderate magnitude. Contractor forces will work alongside moving traffic with some delays to the public caused by trucks. Access will in general be maintained to adjacent property driveways while curb parking is eliminated.

FOUNDATION EXCAVATION AND PILING

o Construction Sequence

A moderately sized activity begins for foundation excavation and piling operations involving pile drilling/

driving equipment and incurring closure of one or two lanes and sidewalk detours for segments in streets. Small crews with large pieces of equipment are spaced at each column location along the route excavating and pile driving for street footings. Crews will be working in the sidewalk area for street edge locations. Off-street alignments will require no street closing of any appreciable length.

- o Public Activity Restraints

Piling installation and excavation work will create considerable confusion in those segments with a street location. Street traffic will be restricted and detoured to accommodate equipment and trucks hauling long piles. Street widening carried out in the previous phase will help alleviate traffic disruption. Pedestrian access will be fairly normal. Construction activity in off-street segments will create little disruption to area inhabitants, although construction noise and truck movement will take place.

FOUNDATION CONCRETE CASTING

- o Construction Sequence

Surface activity will remain at pretty much the same level as the previous tasks of excavation and piling as concrete work begins--forms and reinforcing steel will be stacked, stored and distributed to the footing locations--crews will begin installing rebar cages in the holes as piling crews move on. Ready-mix concrete trucks will be moved in and crews will begin pouring the concrete footings. Activity will be periodic as activity moves from footing to footing.

- o Public Activity Restraints

Moderate sized activity will occur in this phase as concrete and supply trucks move in and out of the construction area. For in-street segments, disruptions will be common but of short duration as footings will be spaced fairly well apart. For off-street locations, disruptions will be generally insignificant to area inhabitants.

COLUMN CONSTRUCTION

- o Construction Sequence

The construction operations for this phase of work will be generally an extension of the previous concrete work for foundations. Columns would very likely be cast in three sequential stages for the barrel and the cap portions. Crews would move along the route setting rebar cages, installing forms, pouring concrete and stripping forms after sufficient hardening.

- o Public Activity Restraints

Disruption and inconvenience will not be significant, as the spaced-out construction and modular techniques will minimize confusion. Small crews with moderate supply activity will be the usual procedure, both at on and off street locations.

STREET RESTORATION

- o Construction Sequence

Following closely after the column casting sequence, construction activity will be concerned with the

restoration of travel ways along street segments of the route. Crews will begin backfilling around column bases, installing roadway base courses and temporary paving. Final street improvements will be deferred until guideway girders have been placed. In off-street segments, preparations will begin for landscaping and environmental design improvements.

o Public Activity Restraints

Considerable disruption occurs in street segments during this operation as roadway building equipment crews tie up street traffic. The street will be restored in sections so that disruptions will be localized at any one time.

GUIDEWAY GIRDER PLACEMENT

o Construction Sequence

Setting of guideway girders gets underway as precast concrete units are hauled into position along the route. A moderate sized activity is involved as small crews with large equipment move sequentially along the column intervals, transferring girders by cranes from trucks to prepared seats on column caps. Girders are fastened into place, and operations proceed. Each girder forms a guideway section, so for double guideways two girders per span will be erected.

o Public Activity Restraint

Some delay and detouring of traffic in street segments will occur as trucks transporting girders move in and out of position and when lift cranes are operating. These interruptions occurring at regular intervals with short

duration will allow auto and bus traffic to flow fairly smoothly. Deliveries and pedestrian access to business establishments will be disrupted only when the section immediately adjacent is being erected.

STREET AND ALIGNMENT IMPROVEMENTS

o Construction Sequence

After guideway structures are in place, improvements for streets and route alignments can be undertaken. Contractor crews involved in street improvements (for in-street segments) will be placing curb and gutter for medians, turn lanes and sidewalk edges, new lighting and conduit, traffic signal system changes, and landscaping.

Crews for route alignment improvements in off-street segments will be involved in carrying out landscaping, lighting and amenities for proposed linear parks, or standard landscaping in non-park segments.

Concurrent activities on station construction will be approaching completion in phase with aerial structure segments.

o Public Activity Restraint

Some restraint is imposed on street activity as traffic is partially detoured around street improvement sections. The relatively short duration of this phase and the pending completion of construction creates a rejuvenation process in public activity.

GUIDEWAY FINISHING

o Construction Sequence

After the guideway girders are erected and fastened, several activities will occur involving work on the guideway itself and beneath the guideway. If a separate running surface is required for smoothness, it will be poured in place. If guidewalls or guiderails are required, they will be installed. The electrical power distribution system will be installed and connected to substations located intermittently along the route normally beneath the structure. The control and communication systems will also be installed.

o Public Activity Restraints

Some of these functions will require some street disrupting activities such as trucks bringing in materials and cranes hoisting them up into the guideway. These activities will not all occur simultaneously and could extend beyond the end on actual guideway construction. With good planning, many of the activities can be accomplished with minimal street or sidewalk disruption.

2. Construction Planning For The Subway Portion

The subway portions of the AGT route are located primarily within Bunker Hill. The construction of the cut-and-cover station at 3rd and Olive will have little disruptive affect at present because the land above the station is currently cleared and vacant. The cut-and-cover section on the east side of the station will require decking Olive Street during construction and will case some minor traffic disruption on Olive. The cut-and-cover section west of the station will not disrupt any street traffic or other activities as the Grand

Street Viaduct carries traffic over this area permitting construction activities to proceed without traffic maintenance problems. The tunnel section under Hope Street may require some utility relocation which would cause portions of the street to be blocked off for short periods. However, Hope Street is a dead end in this area and traffic is very light, so the disruption should be minimal.

APPENDIX D
EVALUATION OF SYSTEM IMPACTS

APPENDIX D
EVALUATION OF SYSTEM IMPACTS

The Downtown People Mover Project in Los Angeles will afford an excellent opportunity to determine the real consequences of making a major transportation investment in the CBD. Analysis of the impacts of the DPM project can also provide a very useful check on the transportation planning techniques and procedures used to determine the needs for the project and estimate its potential benefits.

Following is a list of the system attributes to be evaluated during the DPM project, the expected impacts, and research methods proposed to study the impacts.

1. DPM Attribute Transportation Service.
 Affected System Person and Goods Movement System.
 Direct Impact The DPM and its related bus improvements provide a novel transportation service, that will affect regional and internal trip-making behavior.

 Research Methods Travel behavior studies, including home interviews, employee surveys, pedestrian and transit rider surveys, traffic counts, pedestrian counts; use of models to compile, analyze, and interpret data.

2. DPM Attribute Organization.
 Affected System Political System.
 Direct Impact The organization assigned to imple-

ment the DPM project becomes an additional participant in the complex system of inter-governmental relations in the Los Angeles area. The organization makes requests of other governmental units and sets an example for them; it may affect the attributes of citizens.

Research Methods

Review of public documents and media reports; interviews with decision-makers, affected citizens, and observers.

4. DPM Attribute
Affected System
Direct Impact

Intra-regional Funds Flows.
Finance System, Political System.
Application of local, state, and federal funds toward capital and operating costs of the DPM diverts funds from other uses.

Research Methods

Quantitative analysis of levels of taxation and expenditures by local and state governments, and interviews with government officials and observers.

5. DPM Attribute
Affected System
Direct Impact

Manpower Utilization.
Political System, Transportation System.
The DPM organization will be a public employer of transit personnel,

and may effect the labor relations of other public agencies.

Research Methods

Interviews with labor relations experts in government agencies and in labor unions.

6. DPM Attribute
Affected System
Direct Impact

Land Use.
Location System.
The DPM guideway, stations and maintenance facility will occupy urban land, withdrawing it from other uses.

Research Methods

Description and measurement of prior land uses and the DPM land occupancy.

7. DPM Attributes
Affected System
Direct Impact

Publicity.
Mass Communication System.
The DPM organization will engage in publicity and promotion, which will be carried, amplified, and perhaps modified by the mass media. This will affect expectations and decisions in the real estate and commercial markets.

Research Methods

Review of media reports, interviews with media personnel and observers of real estate and business markets.

8. DPM Attribute Construction Process.
Affected System Physical Environment.
Direct Impact The DPM construction process will produce environmental disturbances affecting life and the conduct of business in the vicinity.

Research Methods Review of documents and media reports of problems during the construction period, interviews of affected persons.

In addition to the direct impact, many secondary, indirect impacts will be generated by the DPM:

9. Direct Impact Travel Behavior.
Affected System Social System.
Indirect Impact Changes in life style enabled by new travel opportunities and more convenient and comfortable travel; changes in amounts and kinds of participation in social institutions.

Research Methods Comprehensive studies of the behavior of families that are potential users of the DPM; examination of selected social organizations by observation and interviews.

10. Direct Impact Travel Behavior.
Affected System Location System.
Indirect Impact Changes in patterns of accessibility lead organizations to relocate activity sites, and individuals to conduct their transactions at new locations. This in turn stimulate shifts in the location of new construction and renewal, and change in the distribution of property values.

Research Methods Study of locational decision by household and business firm surveys; study of resulting spatial redistribution by analysis of aggregate data on land use, population, employment, sales, and other variables; time series analysis of real property values.

11. Direct Impact Travel Behavior.
Affected System Economic System.
Indirect Impact Improved access to employment opportunities brings better matching of jobs and workers, and enhanced economic productivity. Improved travel conditions for persons making business calls also increases productivity. The Los Angeles CBD is enabled to attract or retain more business firms.

Research Methods Analysis of accessibility and home-to-work travel; interviews with personnel officers and managers of organizations dependent on downtown travel; interviews with experts on business location.

12. Direct Impact Travel Behavior.
 Affected System Physical Environment.
 Indirect Impact Shift of travellers from auto to transit reduces overall traffic congestion, air pollution, energy consumption; some localized increase may occur near transit stations.

Research Methods Estimation of emission and energy consumption reductions due to reduction in vehicle-miles traveled; measurement of carbon monoxide levels, accident rates, and congestion near stations and parking facilities.

13. Direct Impact Spatial Distribution of Activities.
 Affected System Movement System.
 Indirect Impact Relocation of establishments and transaction brings changes in the pattern of travel.

Research Methods Travel behavior studies; origin/destination interviews.

The above list represents most of the major impacts of a guideway transit system; however, many other kinds of impacts will also be identified and analyzed.

Much work has already been done in defining the base-line data for evaluation of a DPM system in Los Angeles, both in the comprehensive Circulation/Distribution System Program now being completed by the Community Redevelopment Agency, and in the extensive environmental analysis of downtown Los Angeles carried out during development of major downtown redevelopment plans. The Los Angeles Area Regional Transportation Study (LARTS) has recently conducted a home interview travel survey to update regional travel behavior estimates. Los Angeles Department of Traffic and the Southern California Rapid Transit District conduct frequent traffic and transit ridership surveys in downtown Los Angeles; both agencies are also conducting major studies of traffic and transit improvements in the CBD.

The Southern California Association of Governments is currently coordinating an inter-agency study to analyze funding sources for transit in Los Angeles. Los Angeles City Planning, Los Angeles County Regional Planning, the California Department of Economic Development, and other agencies are all developing useful data on land use, economic activities, employment, and travel in downtown Los Angeles. Caltrans, L. A. City Traffic, and CRA have all developed and calibrated transportation planning computer models for various aspects of the regional transportation system. Thus, all of the necessary data, procedures for collecting and compiling additional data, and models for analyzing the data and evaluating the effects of the transit improvements are readily available in Los Angeles.