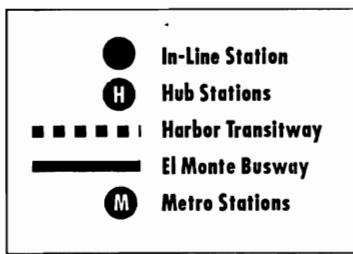
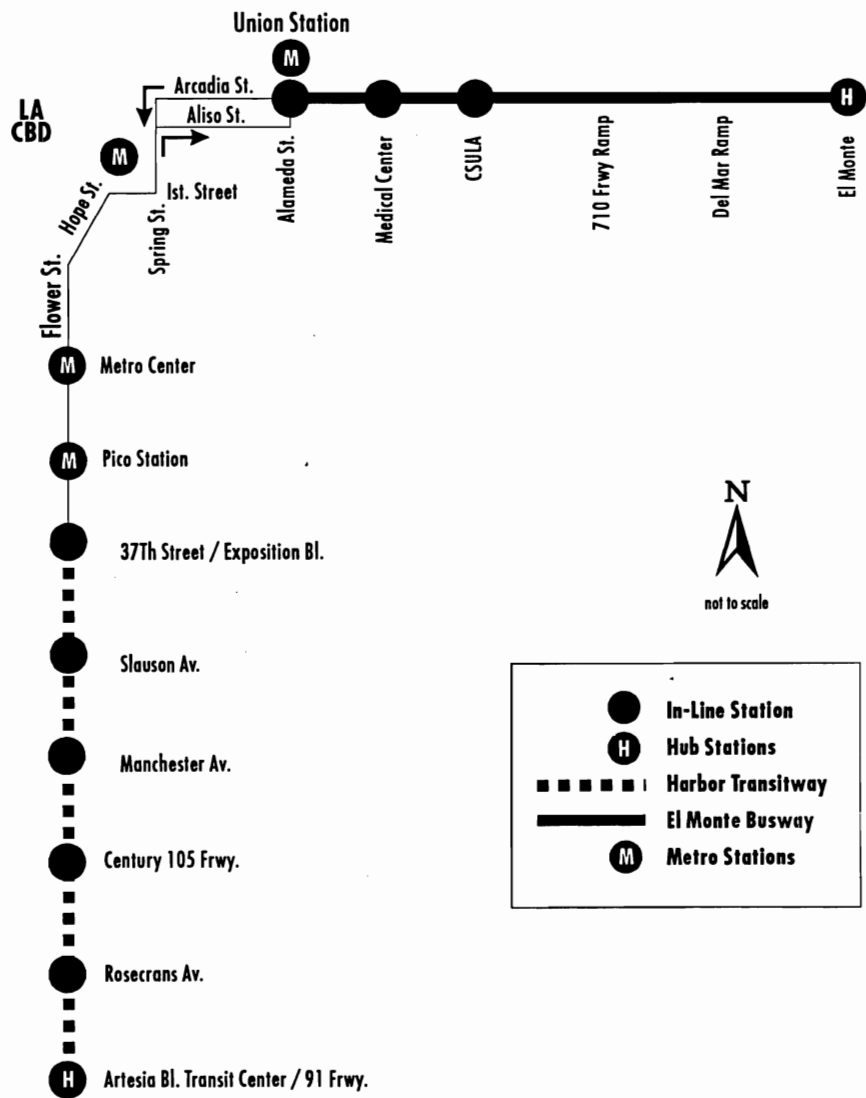


Dual Hub High Occupancy Vehicle Transitway

R E P O R T



Prepared by MTA
Scheduling and Operations Planning Staff
August 1993

EXECUTIVE SUMMARY

In 1987, after nearly a decade of intense review, CALTRANS announced that the Harbor -110- Freeway had been selected for the construction of a transitway that will ultimately link San Pedro with Downtown Los Angeles. Construction began soon after, concurrent with the building of the Glen Anderson -105- Freeway and Metro Green Line. In 1995, the centerpiece of the Harbor Transitway, the 10.3 mile section stretching between the Artesia -91- Freeway and Downtown Los Angeles, will open for use.

Many area residents and visitors have had an opportunity to witness the construction of the Harbor Transitway. Probably the most visually striking and exciting features are the elevated structures nearly three miles in length. Upon completion, the Harbor Transitway will undoubtedly rank as one of the premier dedicated transit facilities in the country.

The Transitway is far more than merely an interesting example of guideway architecture. As documented in the attached report, it brings with it an opportunity to establish another world-class transit system in Los Angeles. Just as important, through an innovative routing and service concept, this system can be implemented at no additional cost to the region.

SERVICE CONCEPTS

The opportunity provided by this new facility is coupled with the challenge that no operating funds were identified to provide the expanded transit service that this corridor warrants. The MTA, spearheaded by the Scheduling and Operations Planning Department, began an exhaustive alternatives analysis for the Transitway with the following guidelines in mind.

- Service design to take full advantage of the Transitway features;
- Service design to provide for anticipated growth in demand; and
- Service design to be as nearly cost neutral as possible since additional monies have not been earmarked for operation.

Several operating scenarios were developed, and after careful review, three concepts emerged for further study. They are:

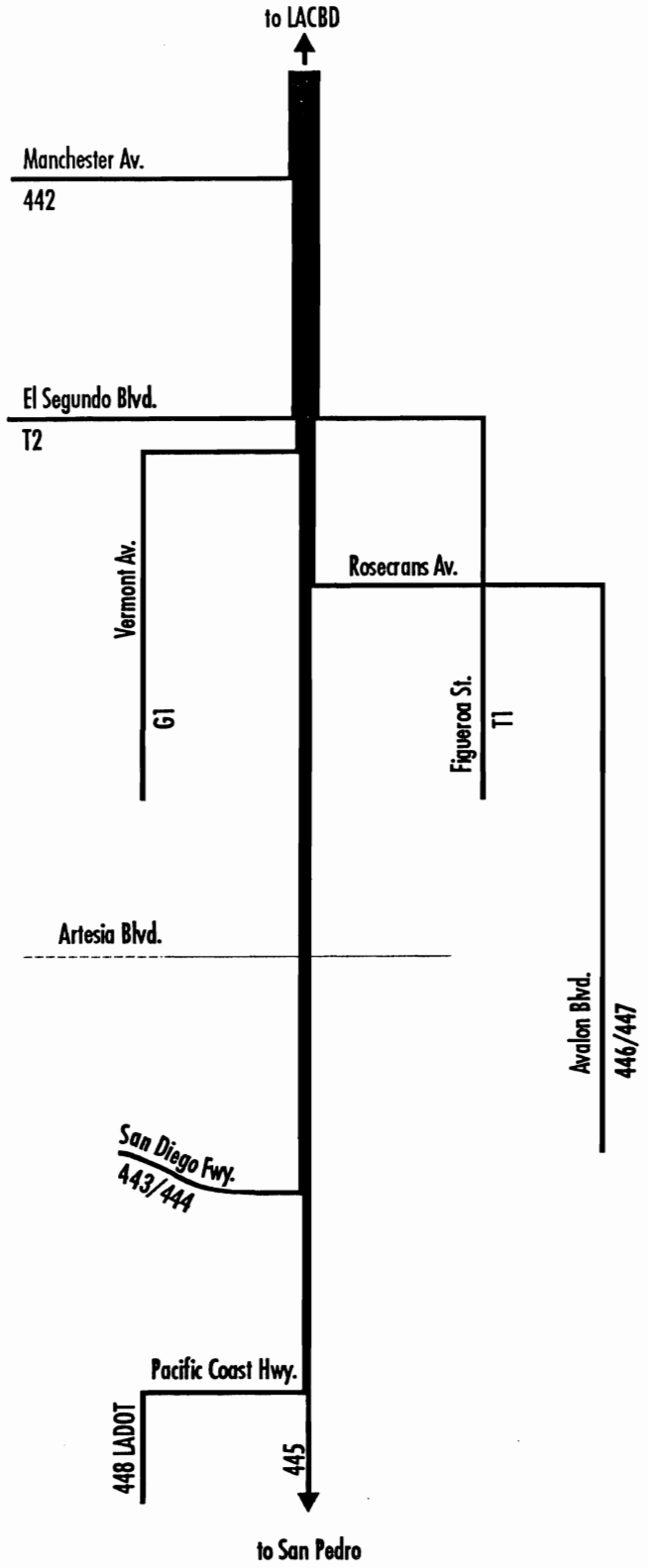
- Concept A: Simply operate existing Harbor Freeway express routes along the Transitway, and modify local surface street routes to connect at stations. Map A illustrates the existing Harbor Freeway service operation which would basically be transposed to the Transitway;

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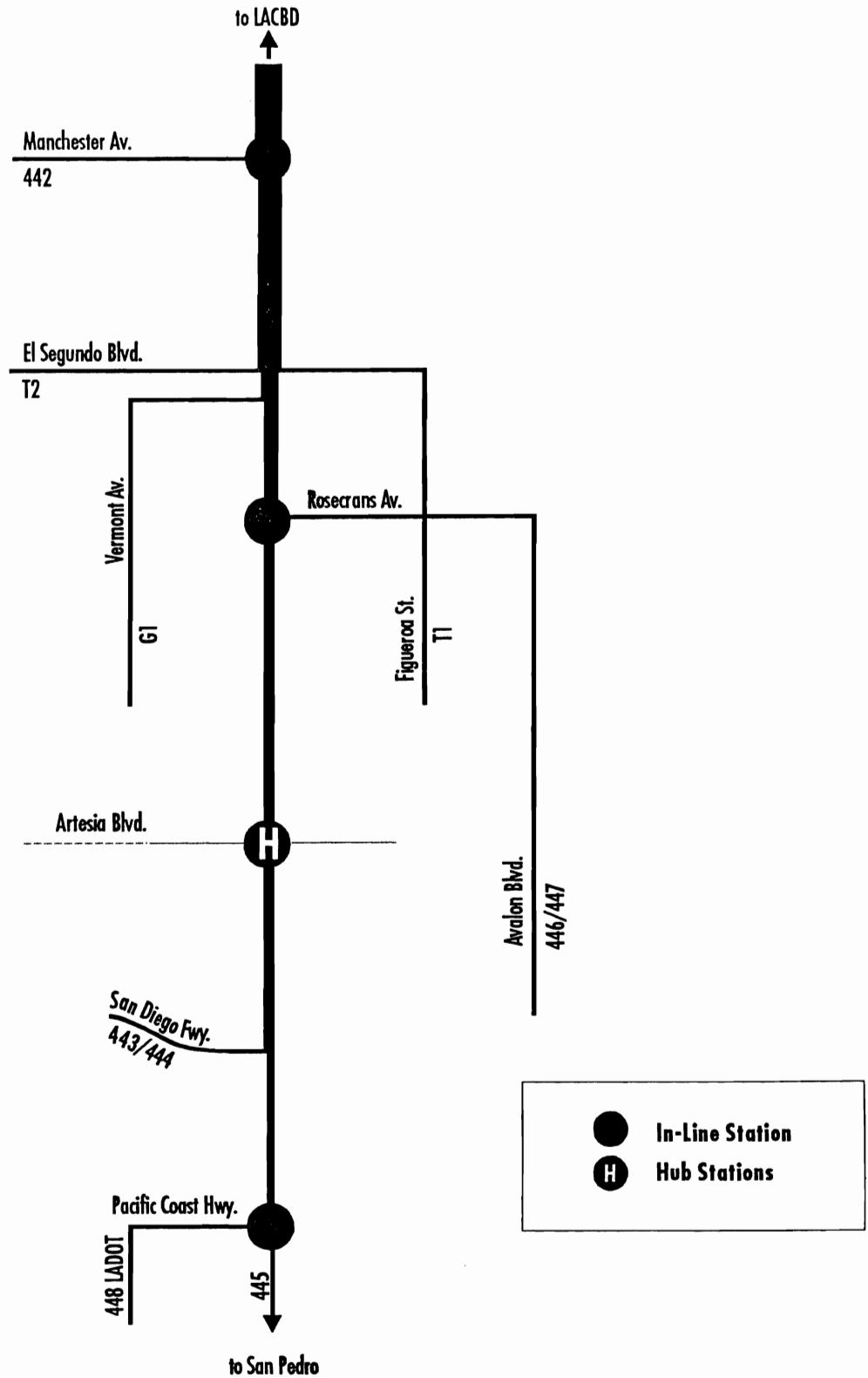
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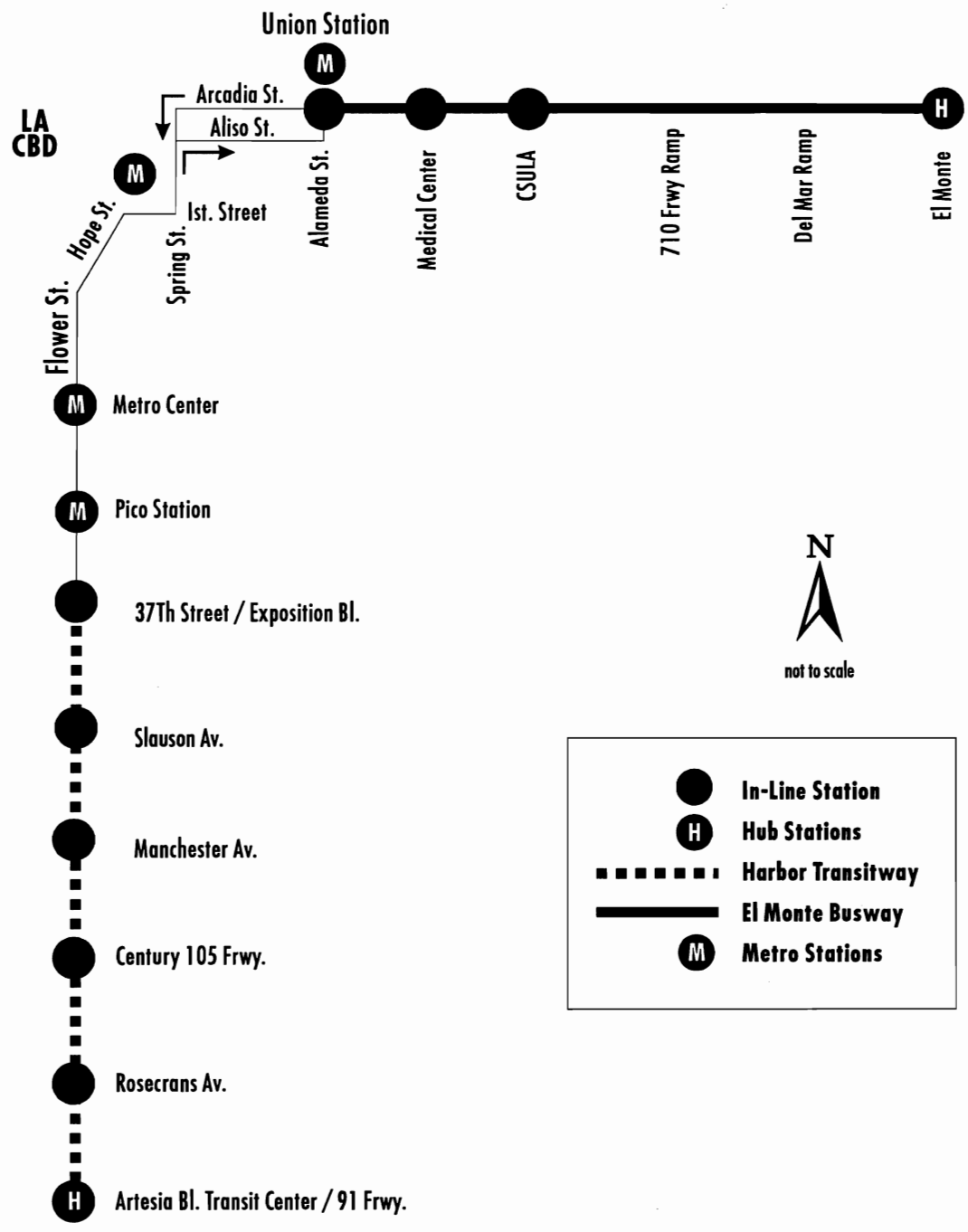
Existing Harbor Freeway Bus Service



Single Hub HOV Harbor Transitway Bus Service



Harbor Transitway/El Monte Busway Dual Hub HOV Operation



Scheduling & Operations Planning
August 1993

Dual Hub High Occupancy Vehicle Transitway

R E P O R T



Prepared by MTA
Scheduling and Operations Planning Staff
August 1993

DUAL HUB - HIGH OCCUPANCY VEHICLE TRANSITWAY

TABLE OF CONTENTS

Section	Page
1.0 PURPOSE OF STUDY.....	1
1.1 Existing Transit Service on Harbor Freeway.....	1
2.0 HARBOR TRANSITWAY DESIGN.....	2
2.1 Future Improvements.....	4
3.0 TRANSITWAY SERVICE CONCEPTS.....	4
3.1 Artesia Station to LACBD Using Existing Lines...	5
3.2 Artesia Station to LACBD Single Trunk Concept...	5
3.3 Harbor Transitway - El Monte Busway Dual Hub Hov Transitway.....	5
4.0 LOCAL LINE SERVICE CONCEPTS.....	7
5.0 LACBD ROUTING CONCEPTS.....	10
6.0 CURRENT AND PROJECTED EL MONTE AND HARBOR BUS TRANSITWAY BUS REQUIREMENTS.....	11
6.1 Standard Bus Headway Projections.....	12
6.2 Articulated Bus Headway Projections.....	12
7.0 MULTI-MODAL INTERFACE OPPORTUNITIES.....	13
8.0 OUTSTANDING ISSUES.....	13
8.1 Municipal operators.....	13
8.2 El Monte Station Capacity Issues.....	14
8.3 Articulated Bus Issues.....	14
8.4 Barrier Free Fare Structure Issues.....	15
8.5 Competitive Procurement Issues.....	15
9.0 CONCLUSION.....	15

1.0 PURPOSE OF STUDY

In approximately two years, construction on the Harbor Transitway will be completed. A high capacity, high speed HOV facility similar in concept to the El Monte Busway, the Transitway will begin in San Pedro and end at 37th Street near Downtown Los Angeles. The facility is 19.6 miles in length, and will have nine stations. While this is a new transit installation, additional operating funds needed to take advantage of its capabilities have not been identified.

The purpose of this study is to plan for new and modified express services, as well as route adjustments for local surface street lines to serve the Transitway. A companion goal is to develop and evaluate innovative ways to expand transit service while either maintaining or even reducing operating costs. Staff has developed three concepts that could be implemented when the Transitway begins operations, which are further detailed in this report.

1.1 Existing Transit Service on the Harbor -110- Freeway

Following is a list of existing providers of service on the Harbor -110- Freeway by carrier, including the MTA and municipal operators.

Harbor-110-Freeway Transit Services

<u>Line No.</u>	<u>Name</u>	<u>Service Type</u>
442	Hawthorne-Union Station Express	M-F Peak Hours/Direction only
443	Torrance-Redondo Beach-Palos Verdes Express	M-F Peak Hours Only/Both Directions
444	L.A.-West Torrance Rolling Hills Express	S-S both directions, 5 a.m. to 8 p.m.
445	San Pedro Park-Ride Express	M-F Peak Hours/Direction Only
446/ 447	L.A.-Carson-Wilmington-San Pedro Express	S-S 24 Hour Service
Torrance T1	Torrance-Los Angeles via Gardena	S-S 5:00 a.m. to 10:00 p.m.
Torrance T2	Torrance-Los Angeles via South Bay Galleria	S-S 5:30 a.m. to 8:00 p.m.
Gardena G1	Gardena to Los Angeles	S-S 5:00 a.m. to Midnight
LADOT 448	L.A.-Rancho Palos Verdes Express	M-F Peak Hours/direction only

The six MTA lines have a combined patronage of over 9,300 daily riders. About 3,000 use the freeway portion of these routes while the remaining passengers use the local route portion. The two current on-line Harbor -110- Freeway stops located at Manchester and Slauson Avenues generate approximately 130 combined daily boardings. Because there are no park-ride facilities at these stops, they currently serve primarily as transfer locations between local surface street lines and the Harbor Freeway bus services.

Existing east/west local lines crossing at or near proposed Transitway station locations generate approximately 2,800 daily transfers to and from parallel north/south lines on either Figueroa Street or Broadway. Table A shows in detail the passenger activity at the Transitway station locations.

Table A

Existing Passenger Activity at Proposed Station Locations

<u>Transitway Station</u>	<u>Ons</u>	<u>Offs</u>
37th Street	46	29
Slauson Avenue	67	89
Manchester Avenue	667	586
Century 105 Freeway	1,234	1,281
Rosecrans Avenue	456	400
Artesia Boulevard	154	178
Pacific Coast Hwy.	30	27
San Pedro	77	77
	<u>Ons</u>	<u>Offs</u>
Total Passenger Activity	2,731	2,667

2.0 HARBOR TRANSITWAY DESIGN

The Transitway is being constructed in the median of the Harbor -110- Freeway. The 10.3 mile section from 37th Street south to the Artesia -91- Freeway will be separated from the regular freeway and will be operated exclusively as an independent guideway. The guideway will feature 2.6 miles of elevated structure and 7.7 miles at-grade. South of the Artesia -91- Freeway, the Harbor Freeway

will be widened from six to eight lanes to allow for a mixed-flow HOV lane, where buses will operate on the freeway proper. When completed, the Transitway will have nine stations between San Pedro and the southern edge of Downtown Los Angeles.

Scheduled to open in 1995, the Transitway will feature separate bus-carpool HOV lanes, with two travel lanes in either direction. There will be six on-line transit stations with park-ride lots located at Slauson Avenue, Manchester Avenue, the Glen Anderson -105- Freeway, Rosecrans Avenue, and Artesia Boulevard. These stations will be located in the median of the Transitway.

Between Artesia Boulevard and San Pedro, buses will operate in mixed-flow in each direction. Stations are planned at Carson Street, Pacific Coast Highway and on Beacon Street in the City of San Pedro. These stations will be located on the right shoulder of the freeway. **Table B** shows the Transitway station locations, projected parking spaces and bus interface opportunities. At this time, only MTA Operations are indicated; pending the outcome of discussions with the municipal operators, their services will be indicated in the final report.

Table B

HARBOR FREEWAY TRANSITWAY STATION LOCATIONS

<u>Station Location</u>	<u>Number of Parking Spaces</u>	<u>Transit Interface</u>
37th Street	None	USC Shuttle - Line 102
Slauson Avenue	193	Transfer - Lines 107, 108, 110
Manchester Avenue	127	Transfer - Lines 115, 442
Glen Anderson -105- Freeway	341	Transfer - Lines 45, 48, 119, 120, 254, Metro Green Line
Rosecrans Avenue	343	Transfer - Lines 45, 125, 127, 128, 206
Artesia Boulevard	1,015	Transfer/Terminal Lines 51, 130, 443, 444, 445, 446-447
Carson Street	121	Transfer/Terminal Line 205
Pacific Coast Highway	245	Transfer - Lines 202, 232
San Pedro Park-Ride	400 (est.)	Transfer/Terminal Lines 205, 445, 446-447
<u>Total Parking Spaces</u>	<u>2,785</u>	

Northbound buses exiting the Transitway at Adams Boulevard will be able to turn either east or west on Adams Boulevard. Currently, Harbor Freeway buses travel via Flower and Figueroa Streets. It is anticipated that buses and other HOV's will turn west onto Adams Boulevard and turn immediately right onto a proposed HOV lane linking Adams Boulevard and Figueroa Street. This will eliminate the need to traverse the intersection of Adams Boulevard and Figueroa Street, in-turn eliminating two time consuming turns and a heavily congested intersection.

Southbound buses will enter the Transitway from Figueroa Street just south of 28th Street.

CALTRANS anticipates that operating conditions on the Transitway will be free flowing, with a maximum speed of 55 miles per hour. Buses and carpools of two-persons or more will be permitted on the Transitway. Experience with the El Monte Busway, which has an average speed of about 45 miles per hour, suggest that actual speeds will fluctuate as traffic volumes change.

2.1 Future Improvements

It has been proposed to CALTRANS that the Transitway be extended from its terminal at 37th Street to connect more directly with Downtown Los Angeles and the surrounding freeways. Additionally, a connection between the Transitway with the El Monte Busway is being investigated. A Transitway-Busway link would greatly reduce traffic on Aliso and Alameda Streets on the approach to the current eastbound Busway entrance.

Finally, although the Transitway is being constructed as a fixed guideway facility for buses, conversion to light rail is possible as a future project.

3.0 TRANSITWAY SERVICE CONCEPTS

Three service concepts have been developed for the Transitway. The first concept is to operate the bus lines as they currently are routed on the Harbor Freeway but at higher frequencies. The second concept is to operate only the Harbor Transitway as a trunk, with existing routes terminating at transit stations. The third and recommended concept is a dual hub HOV operation linking both the Harbor Transitway and the El Monte Busway. Maps A and B show existing services operating on the Harbor Freeway and the El Monte Busway. It is proposed that the Artesia Station on the Harbor Transitway and the El Monte Busway Station become hubs, similar in use to the airline industry concept where shorter distance and less frequent lines feed a common location. Passengers then transfer to a common line that provides frequent service. This concept is also utilized by integrated bus and rail systems. In this case, the

Harbor/El Monte Transitway would operate like a regional high capacity transit system that is fed by numerous local and community bus routes.

The following describes these service concepts in detail. Map C shows station locations for both the Harbor Transitway and the El Monte Busway.

3.1 Artesia Station to Downtown Los Angeles Using Existing Lines

Under this alternative, existing Harbor Freeway express lines would operate independently as they do today, but with increased service levels to accommodate the increase in passenger demand caused by the speed improvements offered by the Transitway. Route modifications would be made to serve the Transitway stations; they are described further in Section 4. It is estimated that about 20 additional peak period buses would need to be added to the present system.

3.2 Artesia Station to Downtown Single Trunk Concept

Under this concept, a single Transitway line would operate between Artesia Station and Downtown Los Angeles. Since MTA Line 445 begins in San Pedro and ends in Downtown Los Angeles, it would become the basis for the trunk operation. Other express lines currently using the Harbor Freeway would operate along their surface street routes and terminate at a Transitway station. Passengers would transfer from the local portion of the former express routes to the trunk operation on the Transitway. Local lines would be rerouted to serve specific Transitway stations, as described further in Section 4. It is estimated that about 10 additional peak period buses would be needed to accommodate the increased passenger demand. The difference in vehicle projections compared to the previous concept is a result of savings that would be realized by a single coordinated service on the Transitway, and a reduction in Downtown Los Angeles route miles.

3.3 Artesia Station to El Monte Station Dual Hub HOV Linked Transitway

The Transitway and the existing El Monte Busway will share similar operating characteristics. Both feature dedicated HOV lanes, in-line stations, and a major hub transit station at the far end of the dedicated HOV lanes. These similarities offer opportunities to provide more efficient service by linking the two operations to form a high frequency HOV line linking the Artesia Transitway Station with the El Monte Busway Station. The attached CALTRANS site plan shows how the Artesia Transitway station will be constructed. Both stations will become

important hubs, with numerous local and community bus lines terminating at each location.

This concept proposes implementing a high speed, high capacity service to be operated through these important corridors. Service would operate every two to three minutes providing over 1,300 seats in the peak hour. Currently, the Metro Blue Line provides slightly over 1,500 seats in the peak hour and travels at the same top speed as buses will operate on the Transitway.

The two corridors could be linked along Figueroa/Flower Streets, and First Street in the LACBD thereby providing high speed, high capacity service to the Bunker Hill high density employment area. For trips that are not required on either leg of the linked operation, terminals would be established in the vicinity of the Convention Center for El Monte buses, and the proposed Union Station Gateway Plaza for Transitway buses.

This Transitway-Busway dual hub concept is the least expensive alternative for several reasons. First, the duplication of routes in Downtown Los Angeles is eliminated. In essence, one bus does the work of two by discharging passengers coming into Downtown on one leg while picking up riders destined to the other leg. This would reduce operations on the Downtown surface street segment, the slowest and most expensive route segment for this line.

Second, savings are achieved by eliminating most recovery time on the Downtown Los Angeles portion of each existing route segment. Such routing combinations have been done to local lines in Los Angeles with great success, such as Line 27/28/328 which was recently combined with Lines 83 and 84/85.

Third, by operating one major service on the Transitway in place of 20 independent routes, more consistent service levels on the Transitway can be scheduled and operated. This allows for a more precise matching of service levels to actual demand.

As part of this concept, it is also suggested that existing Park-Ride lines continue to operate independently on the El Monte Busway (MTA Line 497, and Foothill Transit Lines 495 and 498). All other lines would intercept the Transitway-Busway linked operation at the nearest station. Existing lines that would truncate have been analyzed to determine estimated vehicle savings and are explained further in Section 6. In most cases, the bus lines that are modified to terminate at the hub stations would be rescheduled to provide a higher frequency of service to improve their attractiveness as feeders, and to accommodate the anticipated increase in ridership.

4.0 LOCAL LINE SERVICE CONCEPTS

Under all three service concepts, local lines operating near the Transitway would be modified to serve the in-line stations. The only exception is the station at Exposition Boulevard, where street configuration problems preclude an effective bus route interface. Staff is investigating possible modifications to the LADOT DASH Route C, which presently serves the USC/Exposition Park area.

It is expected that in some cases, lines not directly adjacent to a station may require an additional bus to be added to the schedule due to an increase in travel time. As an example, Line 107 will be routed from 54th Street down to Slauson Avenue to serve the Transitway, and return back to 54th Street to resume its regular route.

The following provides a station-by-station description of existing lines and proposed lines that will interface with each Transitway station. The attached maps reflect the proposed routings to individual bus stations as described in the following.

Slauson Avenue

Line 107 (54th Street-Fairview Boulevard-Santa Ana Street) - Operates on 54th Street; proposed to reroute south to Slauson Avenue station via 54th Street, Figueroa Street, Slauson Avenue, Broadway, and returning to 54th Street.

Line 108 (Slauson Avenue) - Currently operates on Slauson Avenue; provides direct access to the station.

Line 110 (Gage Avenue-Centinela Avenue-Fox Hills Mall) - Operates on Gage Avenue; proposed to reroute north to Slauson Station via Gage Avenue, Figueroa Street, Slauson Avenue, Broadway, and return to Gage Avenue.

Manchester Avenue

Line 115 (Manchester Avenue-Firestone Boulevard) - Currently operates on Manchester Avenue; provides direct access to station.

Line 442 (Los Angeles-Hawthorne-Express branch of Line 40) - Currently an express line, it is proposed to operate this service as a limited stop line on Manchester Avenue.

Metro Green Line (Century Freeway) - Metro Green Line light rail service will start in 1995. An interface will be available with the Transitway.

Line 48 (Maple Avenue-So. Main Street branch of Line 10) - Operates on San Pedro Street; proposed to extend west from current terminal at San Pedro Street at Imperial Highway via San Pedro Street, Imperial Highway, Broadway, 117th Street terminating at Figueroa Street and the station. Buses will layover on 117th Street. Buses will then return via Figueroa Street, Imperial Highway to San Pedro Street.

Line 119 (108th Street-Fernwood Avenue) - Operates on 108th Street; proposed reroute via 108th Street, Figueroa Street, 117th Street, Broadway and return to 108th Street.

Line 120 (Imperial Highway) - Operates on Imperial Highway; proposed reroute via Figueroa Street, 117th Street, Broadway and return to 108th Street.

Line 254 (120th Street-Huntington Park-Lorena Street) - Operates on 120th Street; proposed reroute via 120th Street, Figueroa Street, 117th Street, Broadway and return to 120th Street.

Torrance Transit Lines T1 and T2 and Gardena Line G1 - While these lines currently enter the Harbor Freeway at El Segundo Boulevard, it is anticipated that they could be routed to the Century -105-Freeway (Green Line) Station thus providing direct connecting service to both the Transitway and the light rail line.

Rosecrans Avenue

Line 45 (Broadway-Mercury Avenue) - Extend west from current terminal on Main Street at Rosecrans Avenue.

Line 81 (Figueroa Street) - Extend west from current terminal on Figueroa Street at Rosecrans Avenue.

Line 125 (Rosecrans Avenue) - Currently operates on Rosecrans Avenue; provides direct access to the station.

Lines 127 (Compton Boulevard-Bellflower Boulevard) and **Line 128** (Alondra Boulevard) - Both lines operate to the Compton Transit Center via Willowbrook Avenue from Compton Boulevard; Line 127 reroute replaces Line 51 (see Artesia Station Line 51 description) on Compton Boulevard east of Willowbrook to the Rosecrans Station via Compton Boulevard, Redondo Beach Boulevard, Main Street, Rosecrans Avenue to the station. Line 128 would be rerouted from Compton Transit Center to replace the existing Line 127 link to Cal State Dominguez Hills.

Line 206 (Normandie Avenue) - Operates on Normandie Avenue to Rosecrans Avenue terminal; extend east via Rosecrans Avenue, Figueroa Street, 135th Street, Broadway terminating at Rosecrans Avenue.

Artesia Boulevard Hub Station

Line 51 (W. 7th-San Pedro Streets-Avalon-Compton Boulevards branch of Line 26) - Currently operates to Compton Transit Center; reroute from Avalon and Compton Boulevards via Avalon Boulevard, Albertoni Street, 182nd Street to Artesia Station. (Note: service on Compton Boulevard from Avalon Boulevard will be operated by Line 127- see Rosecrans Avenue station reroute descriptions.)

Line 130 (Artesia Boulevard) - Currently operates on Artesia Boulevard to Vermont Avenue continuing to Victoria Street; proposed reroute would be via Vermont Avenue, 182nd Street, Figueroa Street and return to Victoria Street.

Line 443 (Los Angeles-North Torrance-Redondo Beach-Palos Verdes-Express) and **Line 444** (Los Angeles-West Torrance-Rolling Hill-Express) - It is proposed to replace both lines with a local service from the current south terminals. Service would be removed from the San Diego -405-Freeway, and extended further east on Artesia Boulevard, terminating at the Artesia Station.

Line 445 (Los Angeles-Alpine Village-San Pedro-Express) - Current service would become the base routing for the trunk operation. Service would exit the Transitway in both directions to serve the Artesia Station, then re-enter the mixed flow HOV lanes and continue to/from San Pedro and Downtown Los Angeles.

Line 446/447 (Los Angeles-Carson-Wilmington-San Pedro-Seventh Street-Express) - These lines would operate as currently routed from their southern terminals to Avalon Boulevard and Albertoni Street, then via Albertoni Street, 182nd Street continuing to and terminating at the station.

The cities of Torrance, Gardena, and Carson may also wish to modify their bus systems to serve this important hub station.

Carson Street

Line 205 (Willowbrook-Harbor City-San Pedro) - Currently operates on Vermont Avenue past Carson Street; no reroute is planned, as it passes within one block of the Carson Station on Vermont.

Pacific Coast Highway

Line 202 (Willowbrook-Compton-Wilmington) - This line would be rerouted from its terminal in Wilmington to provide service to the Transitway station and Harbor College.

Line 232 (Long Beach-LAX) - Currently operates on Pacific Coast Highway; provides direct access to the station.

LADOT Line 448 - This line currently enters the Harbor Freeway at Pacific Coast Highway. It is proposed that this line would serve this station, and operate to the Artesia Station.

San Pedro Transit Center/Transitway Station (on Beacon Street at Harbor Boulevard)

Line 205 (Willowbrook-Harbor City-San Pedro) - When the proposed San Pedro Transit Center opens, this line would be rerouted by the new center on Beacon Street at Harbor Boulevard via First and Beacon Streets.

Line 445 (Los Angeles-Alpine Village-San Pedro-Express) - When the proposed San Pedro Transit Center opens, the line would be rerouted by the new center on Beacon Street at Harbor Boulevard which will also replace the current park-ride lot at Battery and Gaffey Streets. Because this is the only existing line that will serve all stations from beginning to end, it would become the basis for the Transitway trunk operation.

Line 447 (San Pedro-Seventh Street) - Currently operates on Harbor Boulevard; service would be rerouted via Harbor Boulevard, First Street, Beacon Street, and return to Harbor Boulevard.

LADOT 142 and 147 both currently operate in the vicinity of the proposed San Pedro Transit Station. It is proposed that these lines be modified to directly serve this facility.

Regardless of the Transitway concept adopted, new local route segments could be improved by providing more frequent service, while former express buses could operate as limited stop services to their respective Transitway stations.

5.0 LACBD ROUTING CONCEPTS

Routes have been developed for the two trunk concepts to route the buses through Downtown and connect with Union Station services. Based on employment density analysis performed for the LACBD Study, service on the Flower and Figueroa Streets couplet to First Street would benefit the largest number of potential riders. Figure 1 shows employment density in selected areas as identified by the Community Redevelopment Agency. An additional benefit of using Flower and Figueroa Streets is the opportunity to provide a needed connection linking Bunker Hill and the Financial District with Union Station, 7th Street Metro Center, and the Convention Center.

Alternatively, using the Olive Street and Grand Avenue couplet would provide access to the center of the Downtown business core but this would not directly serve Bunker Hill nor the Seventh Street/Metro Center.

There are potential negative impacts to existing patrons, as some may prefer the existing Grand Avenue/Olive Street routing. However, experience with previous route changes from this corridor to the Figueroa/Flower Streets couplet indicates that passenger demand to Figueroa/Flower is significantly higher than that of the Grand Avenue/Olive Street alternative.

If the status quo concept is implemented, lines operating as currently routed on the Harbor -110- Freeway would also operate in Downtown Los Angeles the same as today. While this provides access to a wide variety of streets (Main, Hill, Grand/Olive, Flower/Figueroa), it is also accompanied by a reduction in the frequency of service. Because the service is spread over four major streets, each one receives much less service than if only one street were served. Thus patrons have to wait longer in Downtown for their bus.

Finally, operations under any of the concepts discussed could be facilitated through preferential treatments extended in the Downtown area. MTA staff will work with the City of Los Angeles to identify those opportunities for improving travel along the street network selected in the CBD.

6.0 CURRENT AND PROJECTED EL MONTE BUSWAY AND HARBOR FREEWAY BUS REQUIREMENTS

The Harbor Transitway will allow buses to operate between Artesia Station and Downtown Los Angeles in about 25 minutes, an improvement of up to 50% compared to present service, similar to the improvement experienced along the San Bernardino Freeway when the El Monte Busway opened.

The estimated one-way travel time is approximately 60 minutes between the Artesia Station and El Monte. The estimated average headways and vehicle requirements for each link and direction, based on a projected ridership for both the Harbor Transitway and El Monte Busway, have been calculated for both standard and articulated buses for the Year 2000, as shown below:

6.1 Standard Bus Headway Projections

Year 2000

	<u>AM Peak</u>	<u>Base</u>	<u>PM Peak</u>
	(Minutes)		
Artesia to Downtown	2	10	4
Downtown to El Monte	4	10	2
El Monte to Downtown	2	10	4
Downtown to Artesia	4	10	2
Maximum Trips per Service Hour	30	6	30

Standard Bus Equipment Projections

Peak = 56 vehicles (+spares)

Base = 14 vehicles (+spares)

6.2 Articulated Bus Headway Projections

Year 2000

	<u>AM Peak</u>	<u>Base</u>	<u>PM Peak</u>
	(Minutes)		
Artesia to Downtown	3	15	6
Downtown to El Monte	6	15	3
El Monte to Downtown	3	15	6
Downtown to Artesia	6	15	3
Maximum Trips per Service Hour	20	4	20

Articulated Bus Equipment Projections

Peak = 38 vehicles (+spares)

Base = 9 vehicles (+spares)

Currently, a total of 14 peak hour trips are provided by the four transit operations on the Harbor Freeway . During the midday, only three trips per hour are operated.

A comparison of existing providers and their current and projected Year 2000 bus requirements is shown in Figures 2A, 2B and 2C. Total bus requirements have been calculated for two scheduling scenarios. Data presented in the first Year 2000 column assume that routes will remain status-quo, and that ridership will increase up to the year 2000. The second Year 2000 column assumes routes will feed stations and patrons will transfer to a Harbor Transitway/El Monte Busway linked operation.

Savings from a linked dual hub operation are shown in Figure 3, presented as either a standard bus or articulated bus operation. As a combined linked operation, savings of up to 23 peak buses can be achieved if existing express routes terminate at a Transitway or Busway hub. A high speed, high capacity service would transport patrons to their final destination.

7.0 MULTI-MODAL INTERFACE OPPORTUNITIES

The Harbor Transitway/El Monte Busway Dual Hub HOV Concept will provide patrons from the San Gabriel Valley, East Los Angeles South Central Los Angeles and the South Bay area with convenient interfaces to new and existing bus lines, the Metro Green, Metro Blue and Metro Red Lines, Metrolink, Union Station, and Gateway Transit Plaza.

Bus-to-Bus Interface: Transitway Stations

Artesia Station will serve as an off-line transit hub much like El Monte Station. The Artesia Station is designed with 12 bus bays (accommodating up to six articulated buses), additional curb space for bus layover zones, and a driver lounge. The transit hub will allow for the staging of local buses and provide a convenient transfer between Transitway bus services. All buses will exit the Transitway at this station to serve the transit hub. This station will have 1,015 parking spaces and a kiss-n-ride drop-off location.

Other bus-to-bus interface will take place at stations where MTA lines intersect the Transitway, as described in Section 4.0, Local Line Routing Concepts. These stations will be located at Slauson Avenue, Manchester Avenue, the Glen Anderson -105- Freeway, Rosecrans Avenue, Artesia Boulevard, Pacific Coast Highway and the San Pedro Park-Ride.

8.0 OUTSTANDING ISSUES

The Harbor Freeway Transitway presents a number of concepts and alternatives to the existing service structure. As a fixed guideway between the 37th Street and Artesia Stations, the linked hub operation could be viewed as similar to a rubber-wheeled rail line. As with any complex multi-modal project, there are important issues that need to be resolved in advance of system start-up. These include capacity issues at existing terminals, bus types for the operation, fare structures, service integration with municipal operators and privatization.

8.1 Municipal Operators

Presently, three municipal operators utilize the El Monte Busway and the Harbor Freeway, along with MTA buses. These mixed

operations, if they were to continue, would make the dual hub HOV operation inefficient and difficult to operate and use. Central to the proposed dual hub operation described earlier, operators would turn their buses back at the hubs or transit stations and transfer riders to the linked operation. Doing so will permit the region to realize potentially significant savings, which may then be used to provide much needed capacity.

It is recommended that with the approval of this report, staff begin working with the municipal operators to assist them in providing services that will enhance the selected concept.

8.2 El Monte Station Capacity Issues

Currently, the El Monte Busway Station accommodates ten bus bays. One bay has been modified to accept a double-deck bus. In addition, a small four bus layover zone is located on the northeast corner of the station. Due to existing size constraints, all MTA buses with a layover in excess of six minutes must proceed to MTA Division 9.

A significant element of the proposal to link the operation of the El Monte Busway with the Harbor Transitway is the use of articulated buses to provide as much capacity at the least expense possible. The existing bay sizes at El Monte Station would need to be modified to accommodate articulated buses without reducing the total number of bays. Major modifications to the station would be needed.

8.3 Articulated Bus Issues

The Harbor Transitway has been designed for the use of articulated buses. The California Department of Transportation (CALTRANS) is seeking state monies that could possibly be used to purchase alternative fuel articulated buses for use on the Transitway. If alternative fuel buses are used, both Divisions 9 and 18 may have to accommodate the required fuels. It is possible that a mixed fuel fleet of articulated buses could be operated. Those operating out of Division 18 could use LNG while those assigned to Division 9 could use another alternate or conventional fuel.

If articulated buses are not used, it is proposed that a suburban, express-type bus be deployed to service the linked operation. Buses of this type should be equipped with high-backed cloth seats and other features not currently utilized on city-service type buses. The mixing of articulated and standard size buses is not recommended due to the complexity of the schedule that would be required to match patronage loads with specific bus capacity.

8.4 Barrier Free Fare Structure

Existing fare structures for both the Harbor Freeway and the El Monte Busway are based on the freeway zone system, whereby patrons pay for the distance they travel. Today, the fare from the site of the Artesia Station on the Harbor Freeway to Downtown Los Angeles is \$2.30, (three freeway zones), \$1.90 from Manchester (two freeway zones), and \$1.10 from Martin Luther King Jr. Boulevard.

The El Monte Busway also utilizes a fare zone structure based on distance travelled. Today, the fare from El Monte Station to Downtown Los Angeles is \$2.30 (three freeway zones) on MTA services. The fare from the two in-line stations has been set at the base fare which is \$1.10.

The proposed dual hub operation of the Harbor Transitway and the El Monte Busway would provide through service between hubs in the South Bay and the San Gabriel Valley. The fare structure should mirror this convenience, providing a fare that is equitable when compared to current services and distances traversed.

Recently, the opening of the Metro Blue and Metro Red Lines introduced a barrier-free fare system to MTA patrons. Because the proposed linking of the Harbor Transitway and El Monte Busway would create a dedicated bus route similar to a rail line, it is possible that a barrier-free fare type could be utilized. Fare machines would have to be installed at each station and in the Downtown area where the Transitway buses would be operating on-street.

8.5 Competitive Procurement

The proposed Transitway-Busway linked operation would involve instituting a new bus route. According to the Federal Transportation Act, the new route must be evaluated relative to the potential use of private carriers selected through the competitive bidding process. It may also be possible to subcontract the operation of this line to another agency while the MTA would retain the management, scheduling and oversight authority.

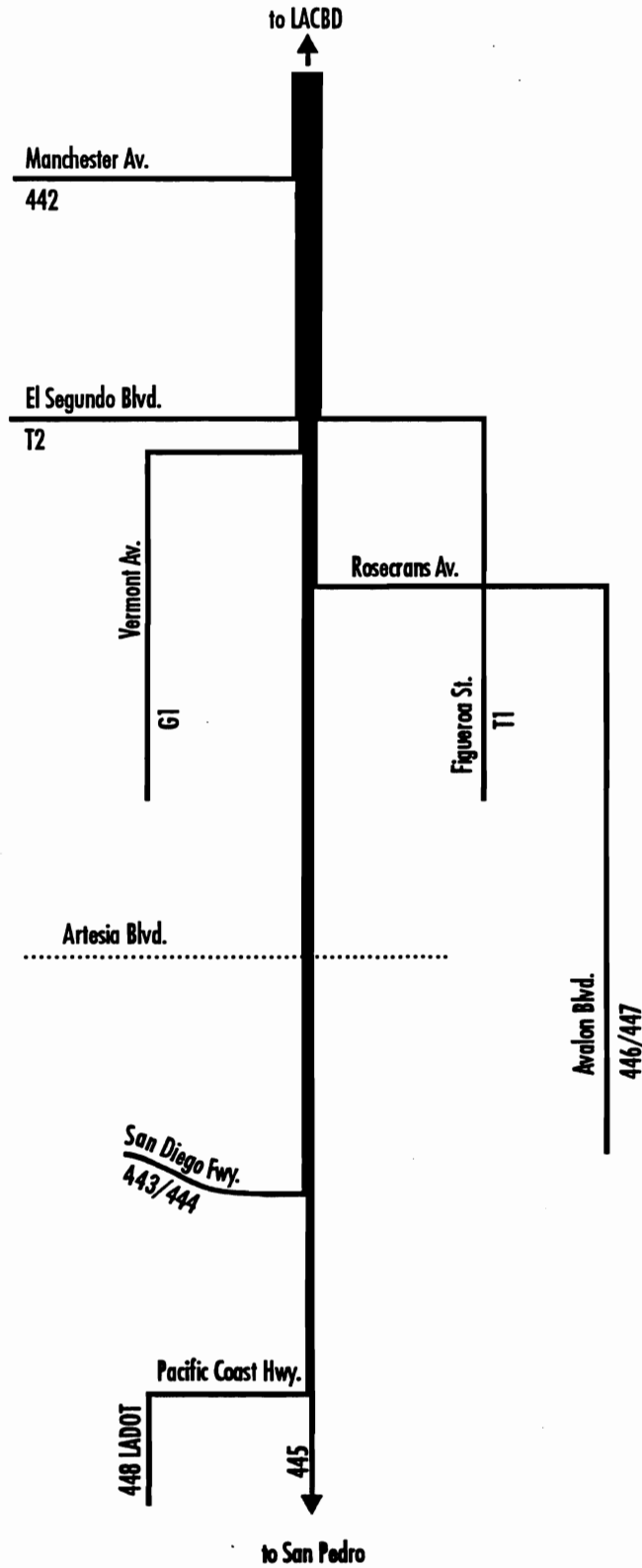
9.0 CONCLUSION

Three alternative service concepts have been presented for the operation of the Harbor Transitway. A concept should be adopted so that related work can proceed. Due to the scarcity of operating monies, the preferred concept is to join the El Monte Busway with the Transitway, providing a dual hub HOV line that is the most

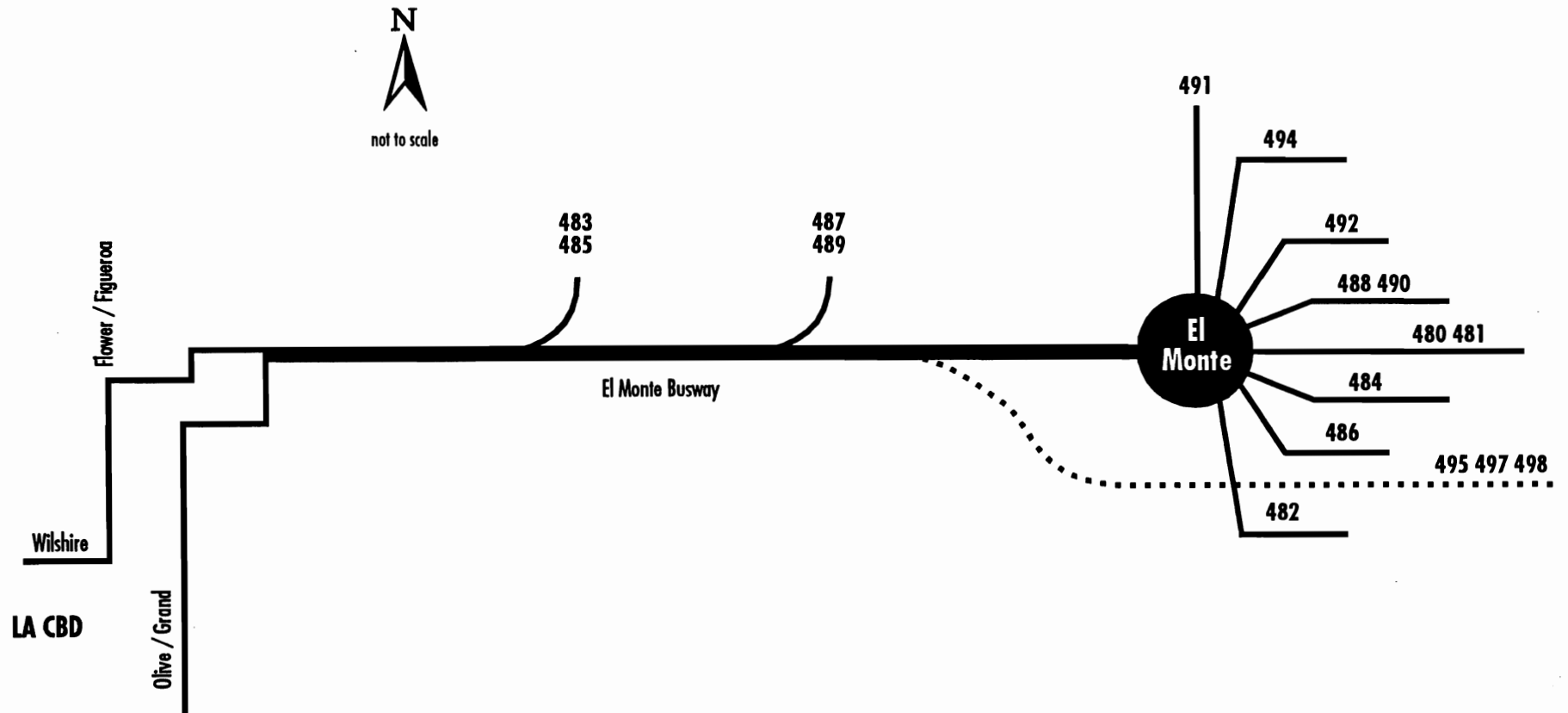
economical to operate.

Upon adoption of a service concept, an interagency task force will be created to assist in addressing the important issues outlined in this report. Work will begin to coordinate services with the municipal operators; to identify improvements to streets with LADOT for the Downtown routing concept; to identify bus types (articulated versus standard type); to review operations at El Monte Station, Divisions 9 and 18; and to establish an equitable fare structure.

Existing Harbor Freeway Bus Service

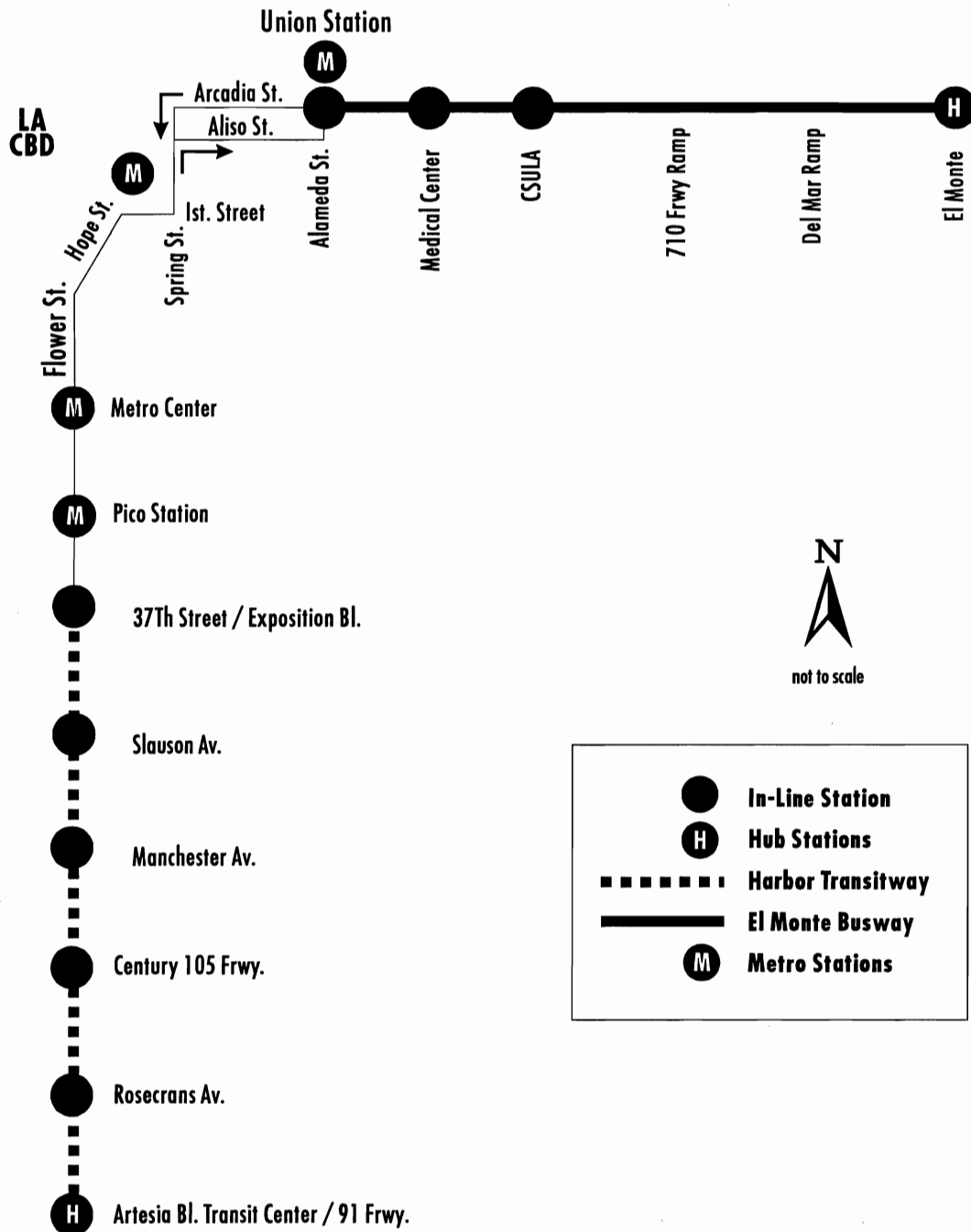


Existing El Monte Busway Service



Operations Planning
July 1993

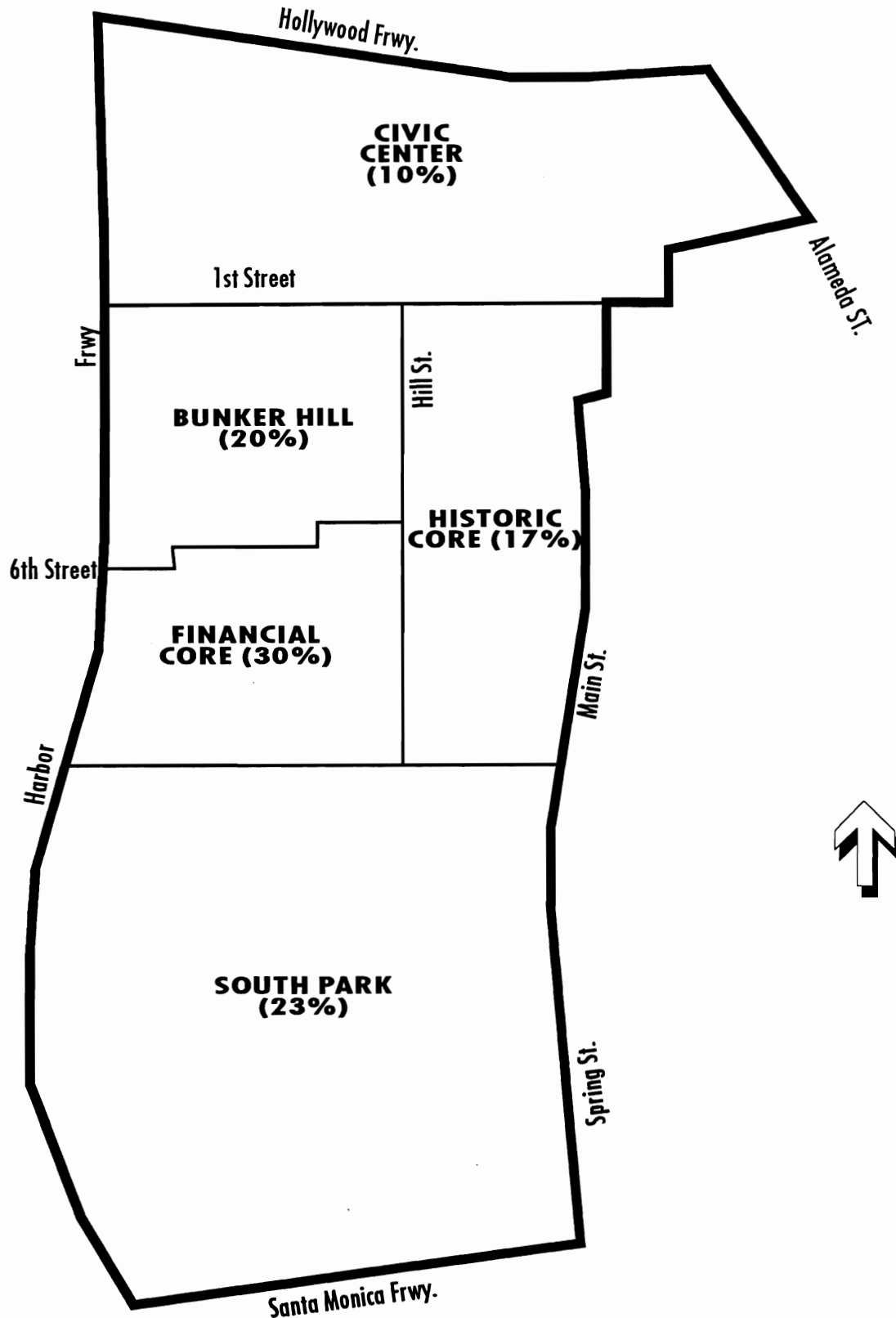
Harbor Transitway / El Monte Busway Dual Hub HOV Operation



Scheduling &
Operations Planning
August 1993

Figure 1

EXISTING DOWNTOWN LOS ANGELES DEVELOPMENT DENSITY



SOURCE: Downtown Core FactBook, 1990

EQUIPMENT COMPARISON
ALTERNATIVE A
CURRENT ROUTE STRUCTURE

HARBOR TRANSITWAY

CURRENT BUS REQUIREMENTS				ESTIMATED YEAR 2000 BUS NEEDS			DIFFERENCES		
LINE #	AM	BASE	PM	AM	BASE	PM	AM	BASE	PM
442	5	-	5	8	-	8			
443	4	-	4	6	-	6			
444	11	4	8	17	6	12			
445	5	-	4	8	-	6			
446	13	9	14	20	14	21			
T-1	6	3	6	9	5	9			
T-2	3	3	3	5	5	5			
G-1	8	6	8	12	9	12			
SUB TOTAL	55	25	52	83	38	78	+28	+13	+26

EL MONTE

CURRENT BUS REQUIREMENTS				ESTIMATED YEAR 2000 BUS NEEDS			DIFFERENCES		
LINE #	AM	BASE	PM	AM	BASE	PM	AM	BASE	PM
F480	27	11	26	32	13	31			
F482	9	4	11	11	5	13			
484	20	12	21	24	14	25			
F486	11	2	9	13	2	11			
F488	10	3	9	12	4	11			
490	12	9	13	14	11	16			
491	19	4	20	23	5	24			
F492	7	4	7	8	5	8			
F494	3	-	3	4	-	4			
SUB TOTAL	118	49	119	142	59	143	+24	+10	+24

COMBINE TOTAL	173	74	171	224	96	221	+52	+23	+50
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EQUIPMENT COMPARISON
ALTERNATIVE B
HARBOR TRANSITWAY TRUNK

HARBOR TRANSITWAY

CURRENT BUS REQUIREMENTS				ESTIMATED YEAR 2000 WITH HARBOR TRUNK				DIFFERENCES		
LINE #	AM	BASE	PM	AM	BASE	PM	AM	BASE	PM	
442	5	-	5	HARBOR TRANSITWAY TRUNK						
443	4	-	4	28	6	28				
444	11	4	8	HARBOR TRANSITWAY FEEDERS						
445	5	-	4	35	15	34				
446	13	9	14							
T-1	6	3	6							
T-2	3	3	3							
G-1	8	6	8							
SUB TOTAL	55	25	52	63	21	62	+8	-4	+10	

EL MONTE

CURRENT BUS REQUIREMENTS				ESTIMATED YEAR 2000 BUS NEEDS				DIFFERENCES		
LINE #	AM	BASE	PM	AM	BASE	PM	AM	BASE	PM	
F480	27	11	26	32	13	31				
F482	9	4	11	11	5	13				
484	20	12	21	24	14	25				
F486	11	2	9	13	2	11				
F488	10	3	9	12	4	11				
490	12	9	13	14	11	16				
491	19	4	20	23	5	24				
F492	7	4	7	8	5	8				
F494	3	-	3	4	-	4				
SUB TOTAL	118	49	119	142	59	143	+24	+10	+24	

COMBINE TOTAL	173	74	171	205	80	205	+32	+6	+34
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Scheduling and Operations Planning

EQUIPMENT COMPARISON
ALTERNATIVE C
DUAL HUB HOV

HARBOR TRANSITWAY

CURRENT BUS
REQUIREMENTS

LINE #	AM	BASE	PM
442	5	-	5
443	4	-	4
444	11	4	8
445	5	-	4
446	13	9	14
T-1	6	3	6
T-2	3	3	3
G-1	8	6	8
SUB TOTAL	55	25	52

ESTIMATED YEAR 2000
EL MONTE/HARBOR
TRANSITWAY

AM	BASE	PM
38	9	38
EL MONTE/HARBOR TRANSITWAY (ARTICULATED BUSES)		

DIFFERENCES

AM	BASE	PM
+8	-4	+10

LOCAL FEEDER SERVICE
112 55 115

EL MONTE

CURRENT BUS
REQUIREMENTS

LINE #	AM	BASE	PM
F480	27	11	26
F482	9	4	11
484	20	12	21
F486	11	2	9
F488	10	3	9
490	12	9	13
491	19	4	20
F492	7	4	7
F494	3	-	3
SUB TOTAL	118	49	119

DIFFERENCES

AM	BASE	PM
+24	+10	+24

COMBINE TOTAL 173 74 171 150 64 153

-23 -10 -18

EQUIPMENT COMPARISON
SUMMARY

ALTERNATIVE A (Current Route Structure)

	CURRENT BUS REQUIREMENTS			ESTIMATED YEAR 2000 BUS NEEDS			DIFFERENCES		
	AM	BASE	PM	AM	BASE	PM	AM	BASE	PM
Harbor Transitway	55	25	52	83	38	78			
El Monte Busway	118	49	119	142	59	143			
TOTAL	173	74	171	224	96	221	+52	+23	+50

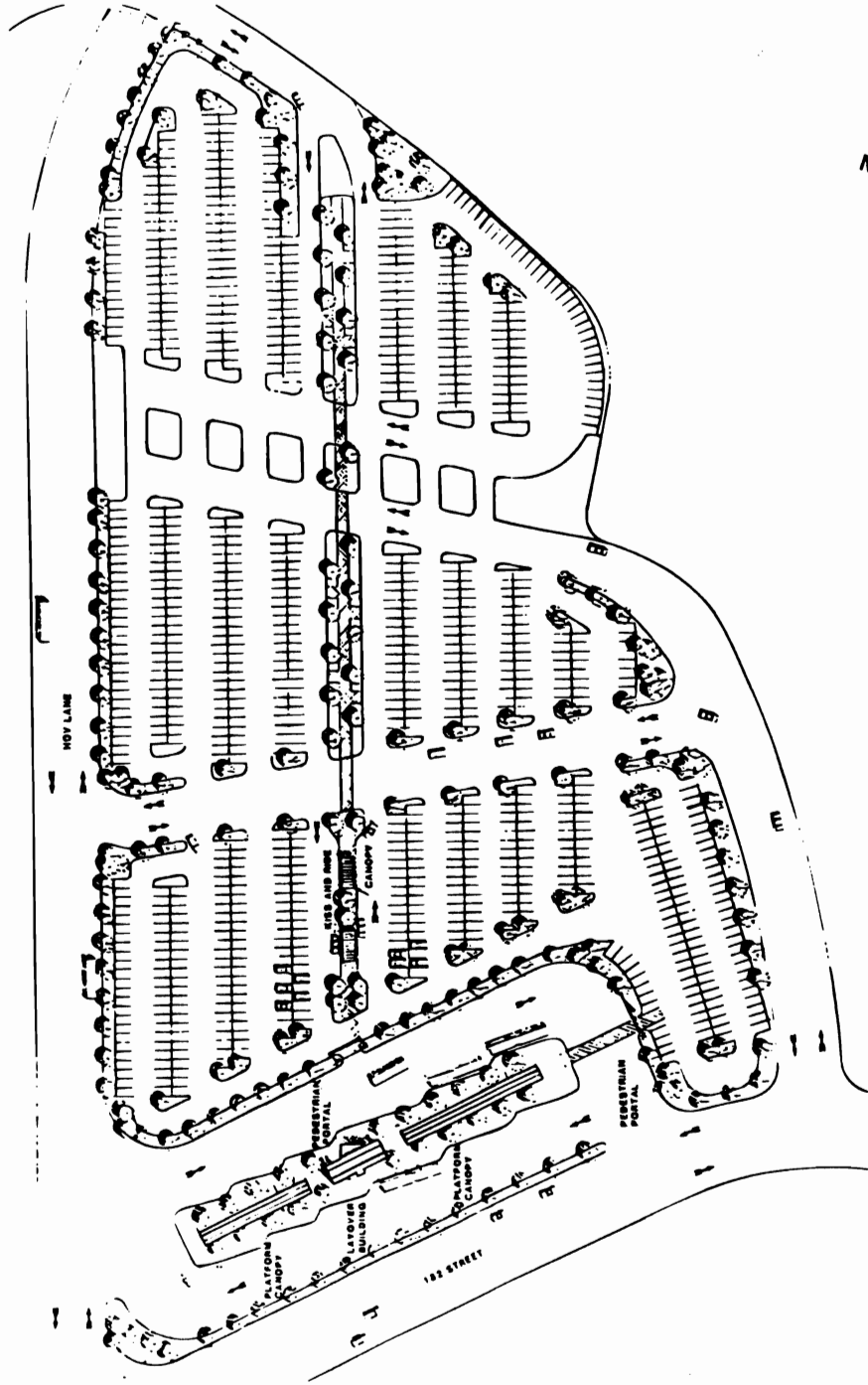
ALTERNATIVE B (Harbor Transitway Trunk)

	ESTIMATED YEAR 2000 BUS NEEDS			DIFFERENCES		
	AM	BASE	PM	AM	BASE	PM
Harbor Transitway Trunk	28	6	28			
Harbor Transitway Feeders	35	15	34			
El Monte Busway	142	59	143			
TOTAL	205	80	205	+32	+6	+34

ALTERNATIVE C (Dual Hub HOV)

	ESTIMATED YEAR 2000 BUS NEEDS			DIFFERENCES		
	AM	BASE	PM	AM	BASE	PM
Harbor/El Monte Transitway	38	9	38			
Local Feeder Service	112	55	115			
TOTAL	150	64	153	-23	-10	-18

Artesia Station

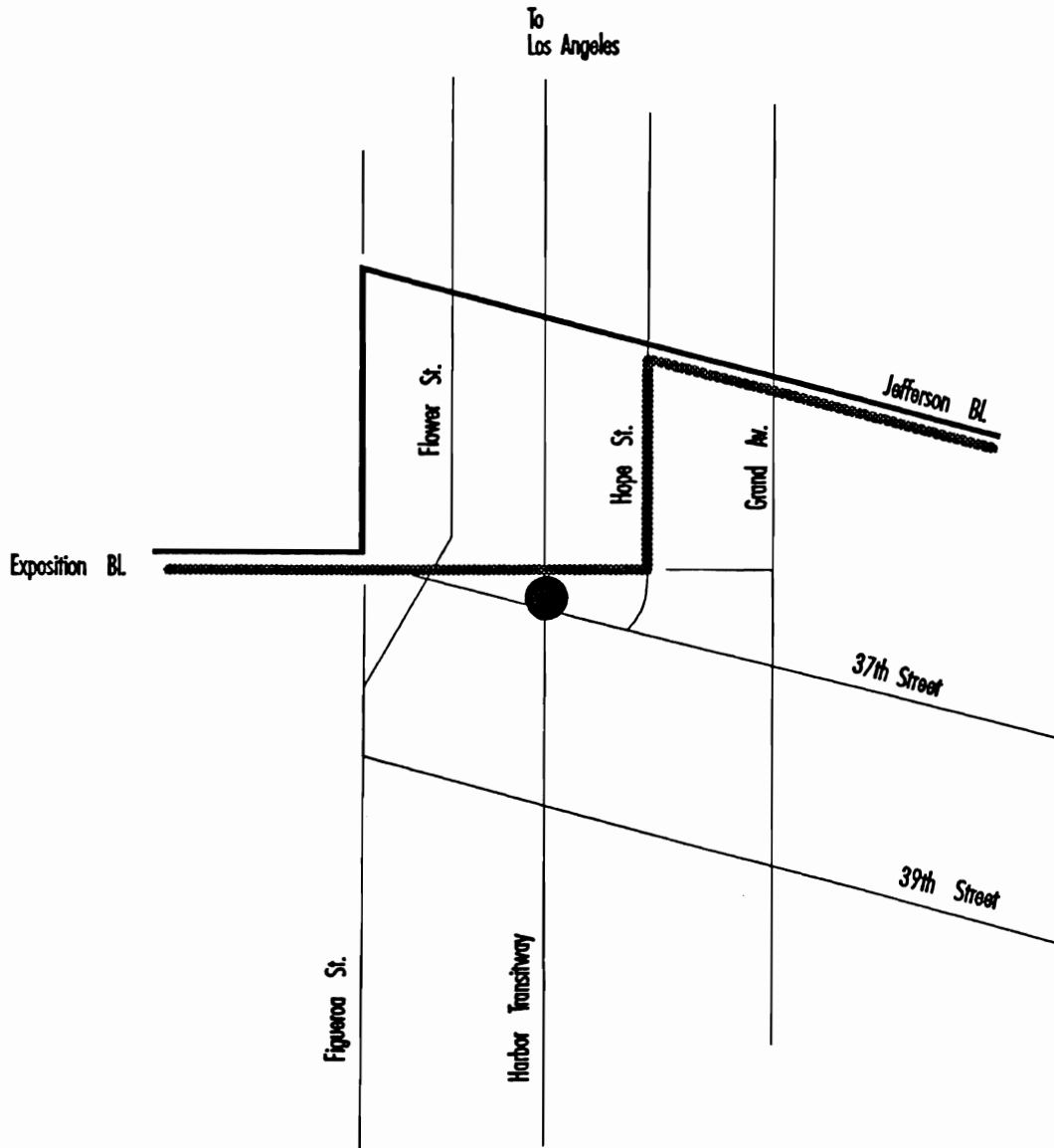



Map not to Scale



Scheduling & Operations Planning
July, 1993

37th Street Station Line 102 Proposed Routing

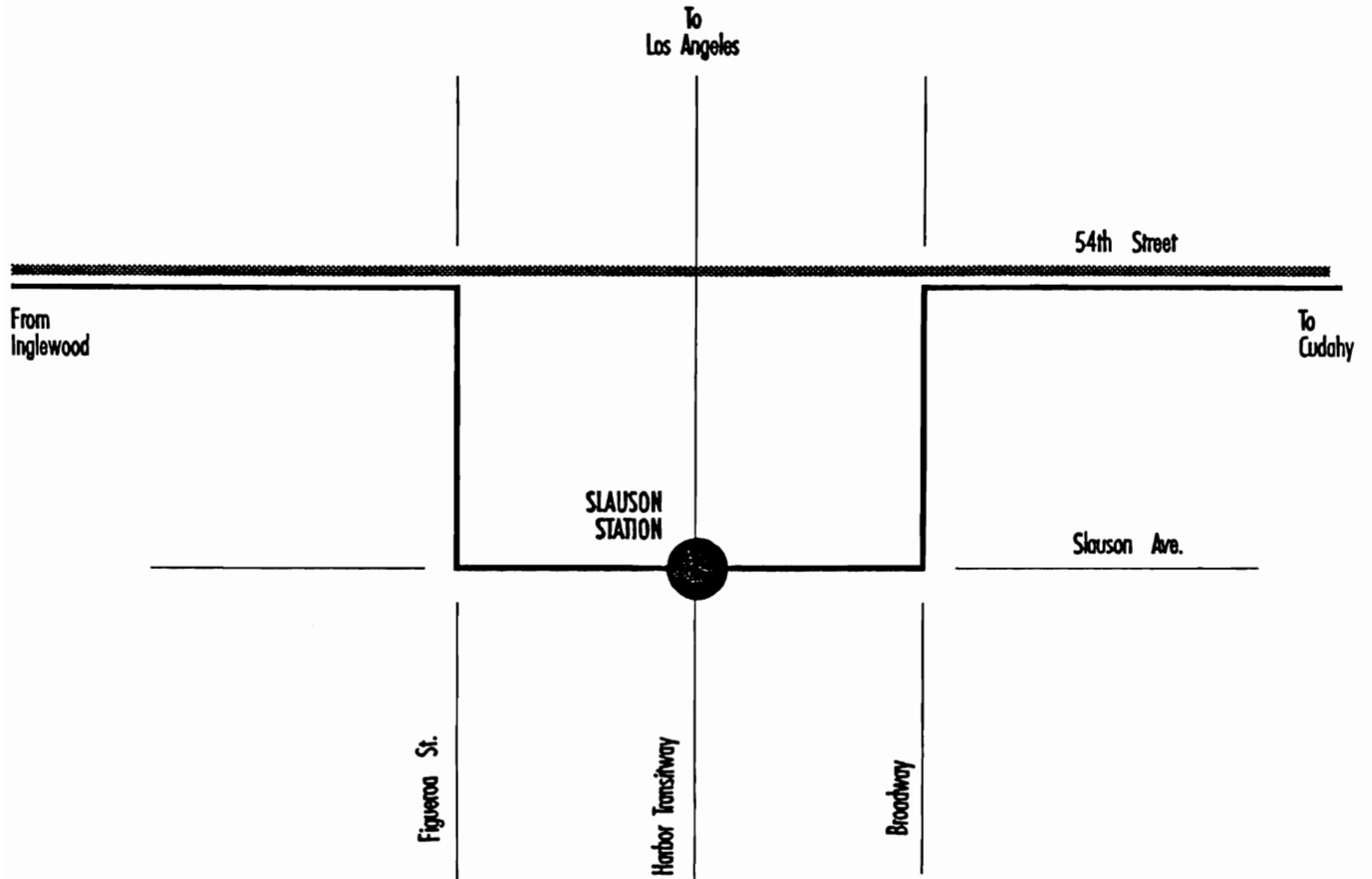


———— EXISTING ROUTE
———— PROPOSED ROUTE



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Slauson Avenue Station Line 107 Proposed Routing

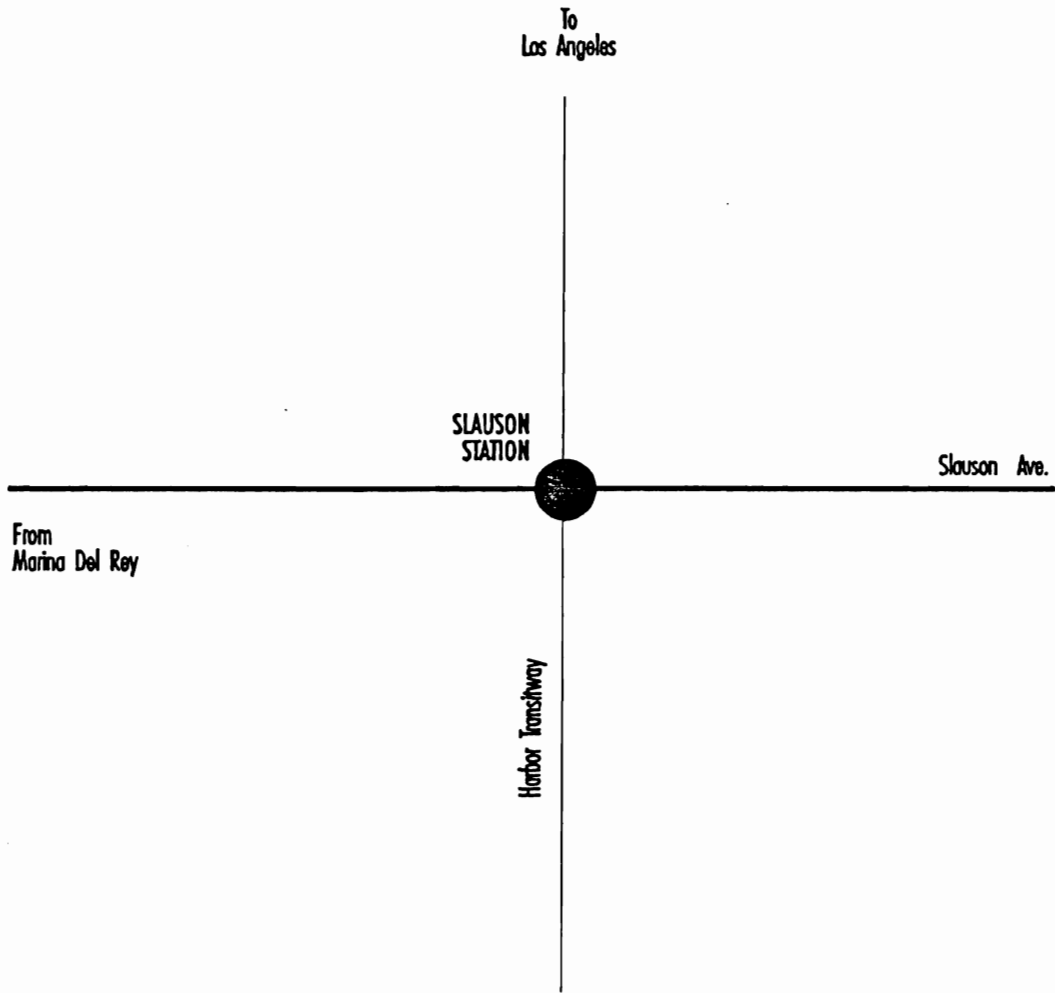


————— EXISTING ROUTE
————— PROPOSED ROUTE



map not to scale

Slauson Avenue Station Line 108 Proposed Routing

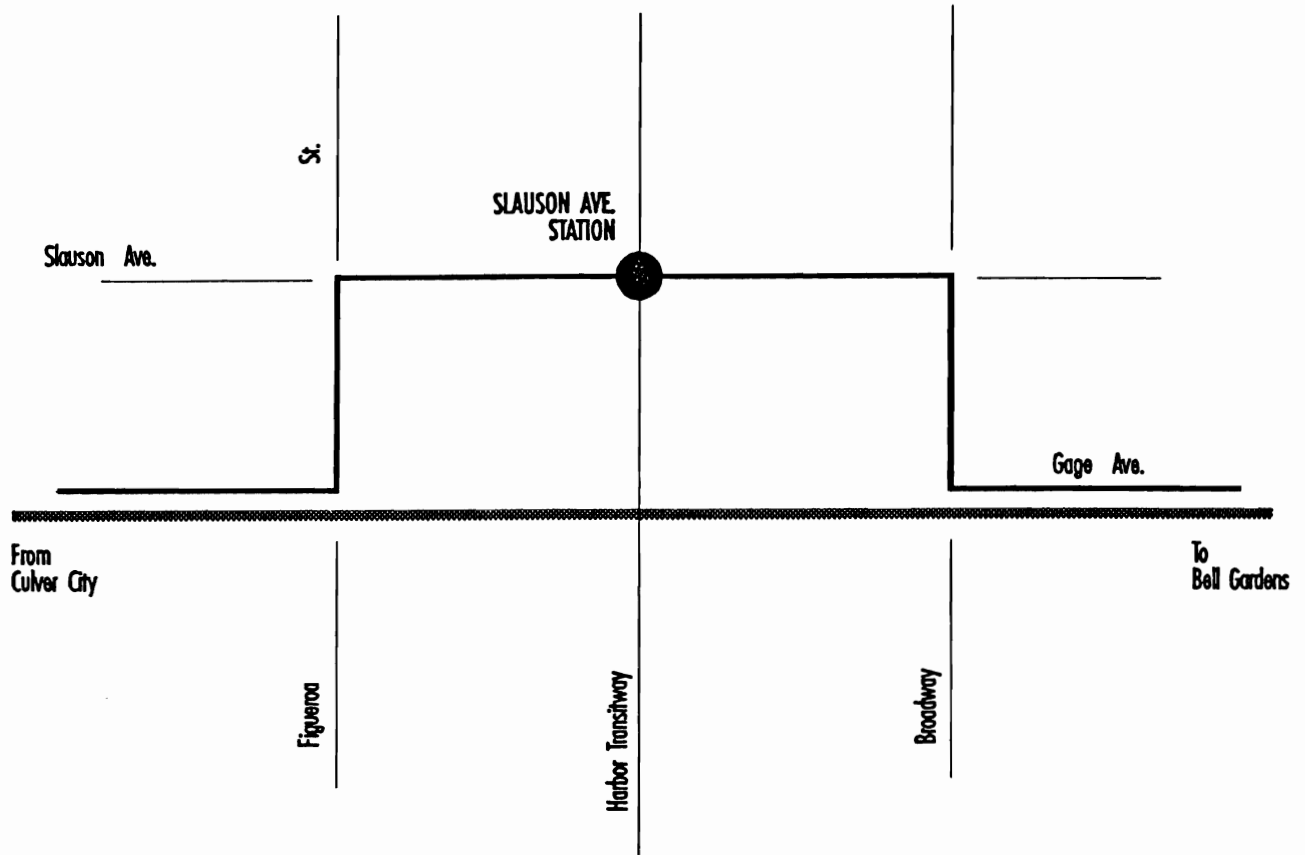


— NO CHANGE TO
EXISTING ROUTE



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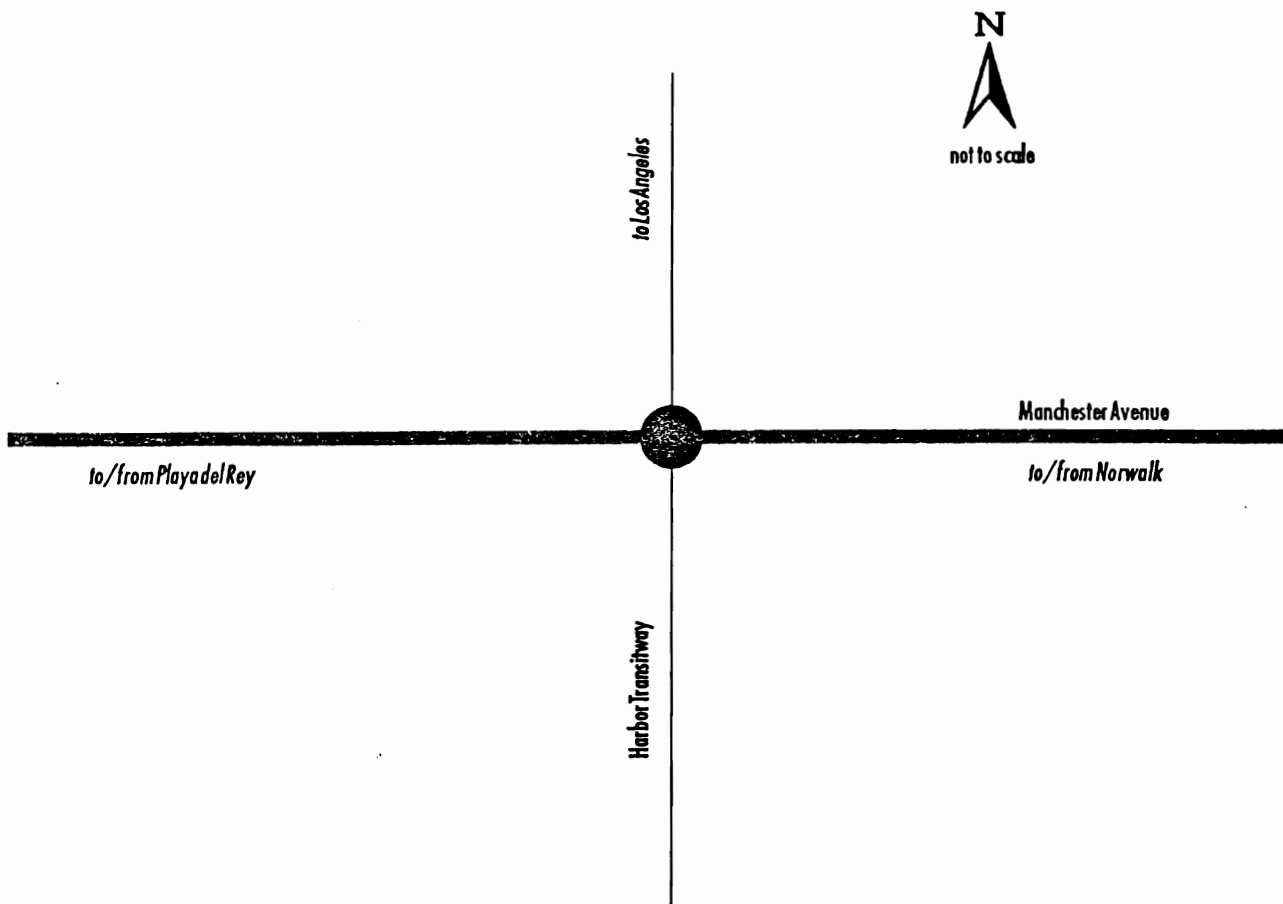
Slauson Avenue Station Line 110 Proposed Routing




 EXISTING ROUTE
 PROPOSED ROUTE

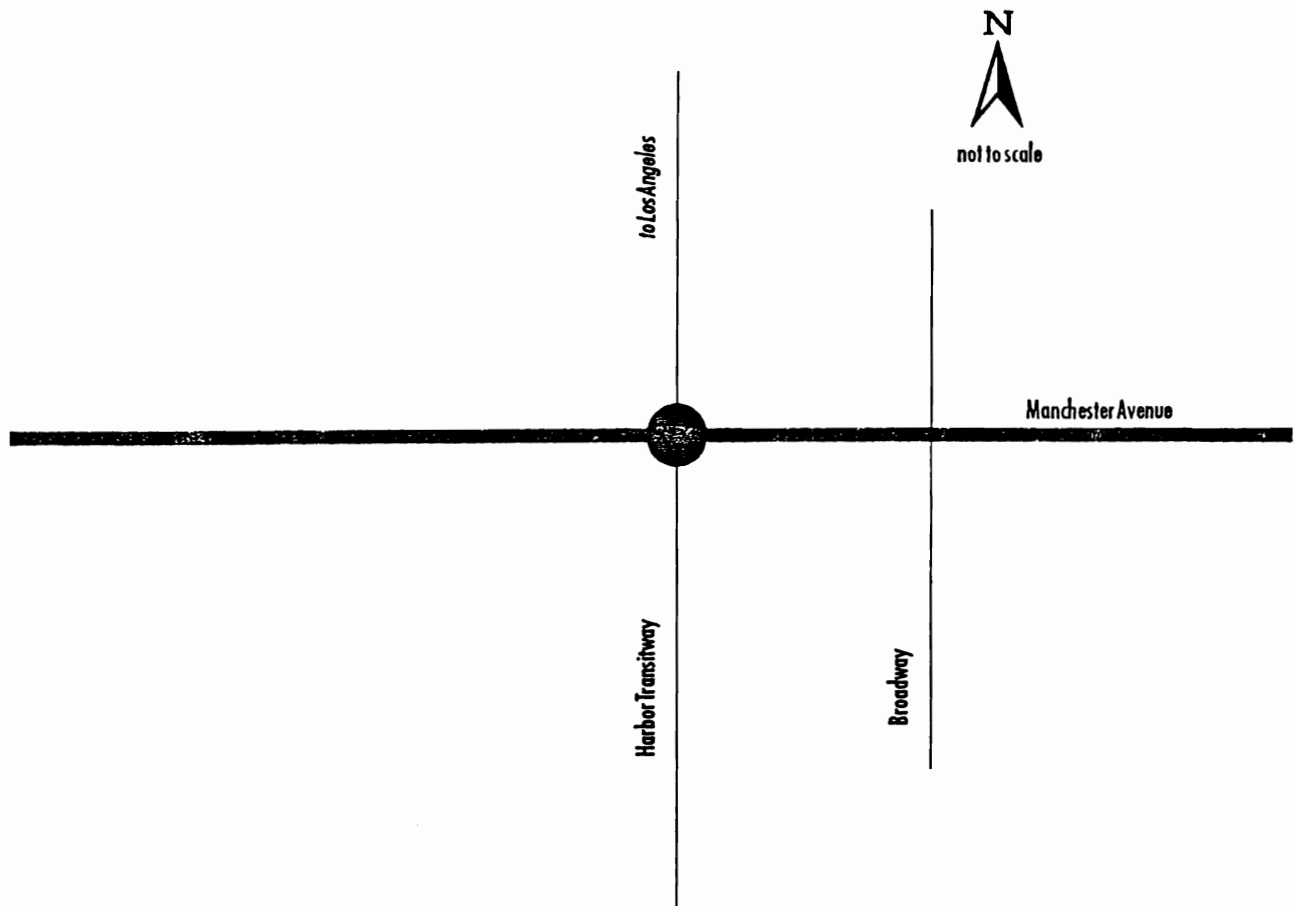


Manchester Avenue Station Line 115 Proposed Routing

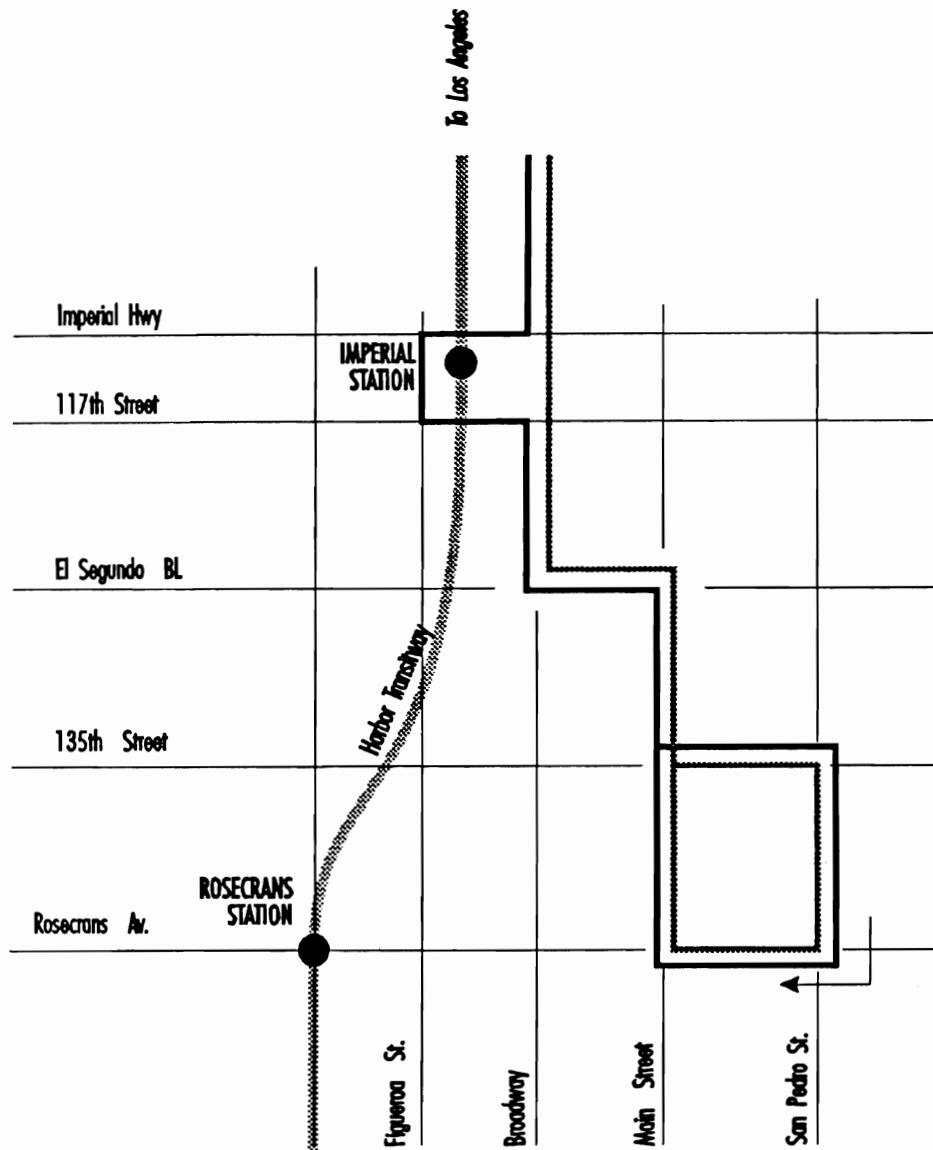




 No change to existing route

Manchester Avenue Station Line 442 Proposed Routing



Century 105 Freeway Station (Imperial Highway) Line 45 Proposed Routing

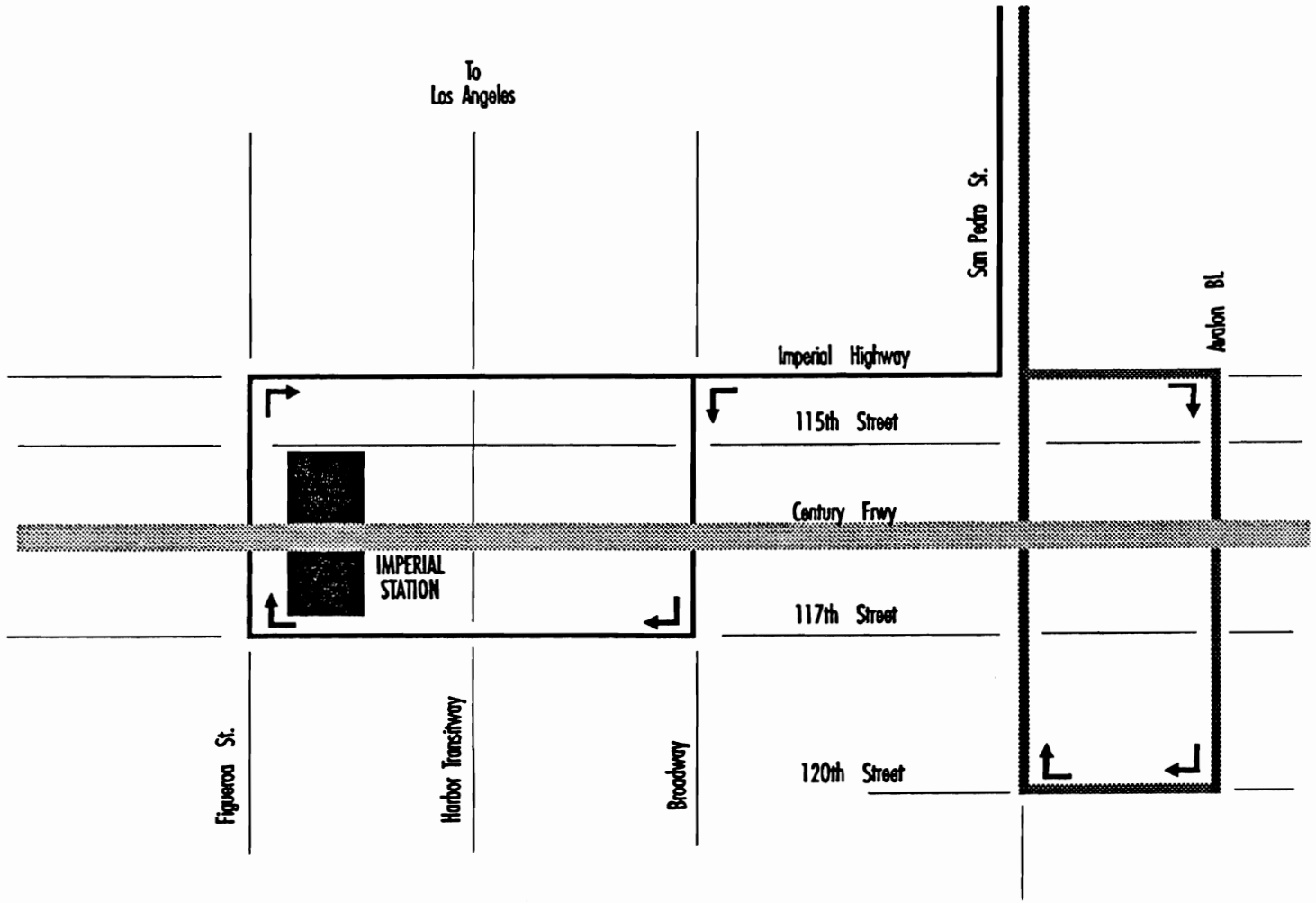


 EXISTING ROUTE
 PROPOSED ROUTE
 EXTENSION & TERMINAL

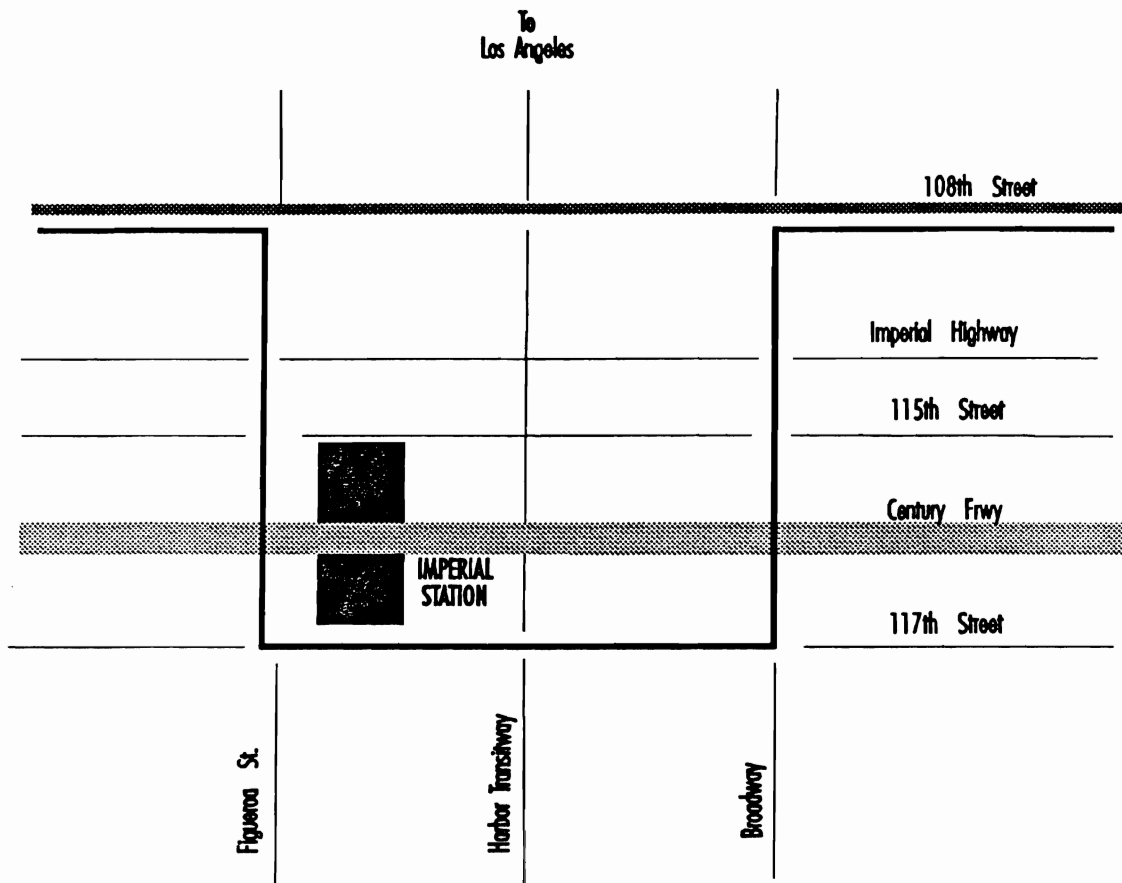


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Century 105 Freeway Station (Imperial Highway) Line 48 Proposed Routing



Century 105 Freeway Station (Imperial Highway) Line 119 Proposed Routing



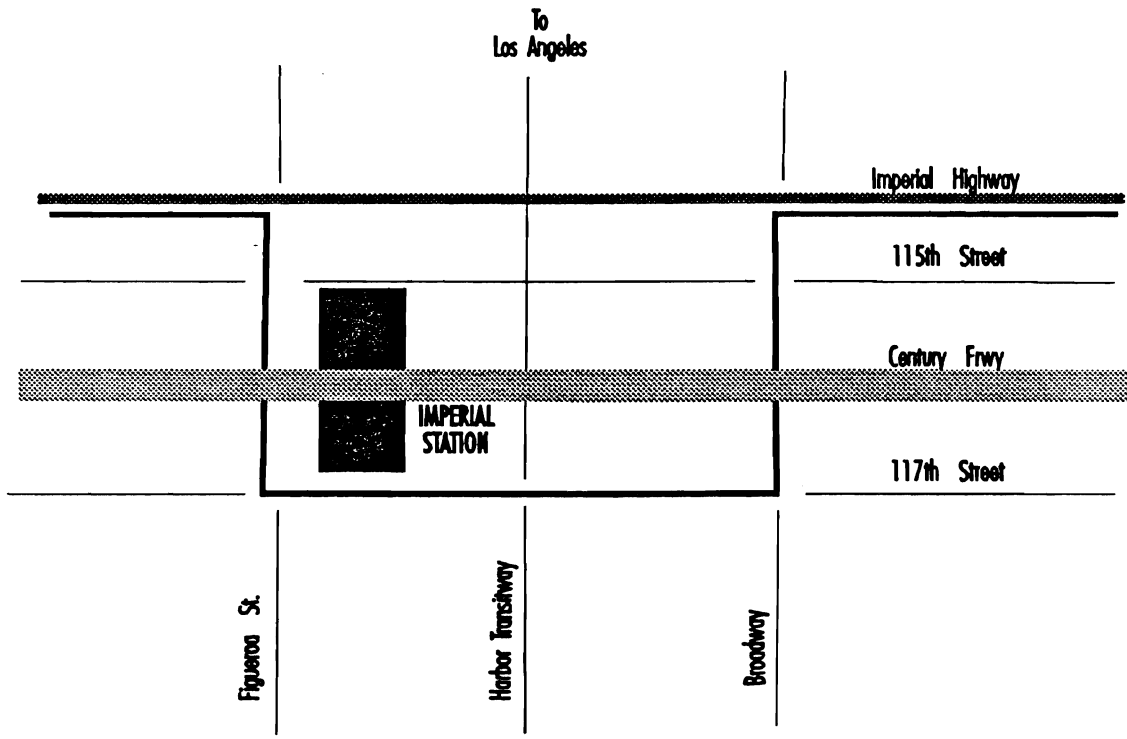
EXISTING ROUTE

PROPOSED ROUTE
EXTENSION & TERMINAL



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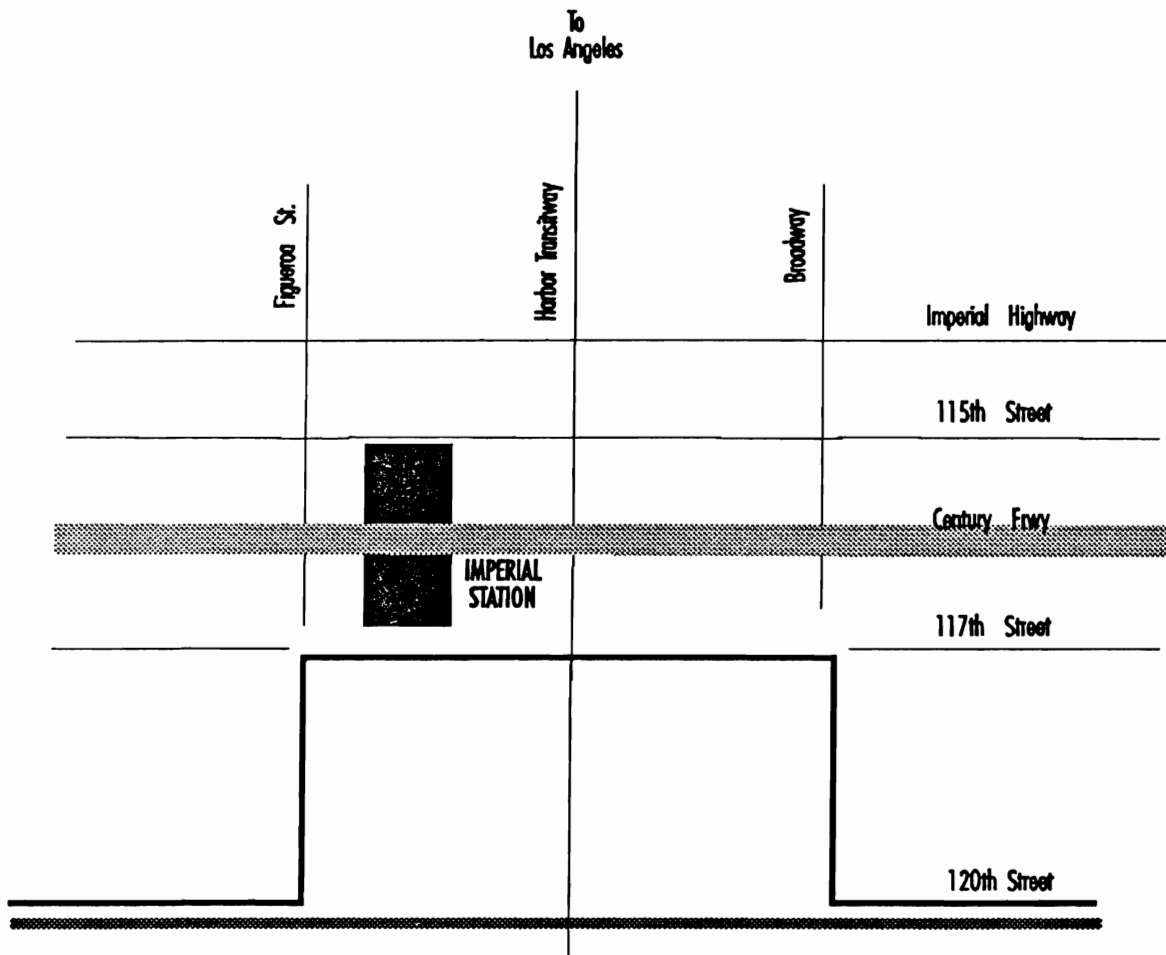
Century 105 Freeway Station (Imperial Highway) Line 120 Proposed Routing



————— EXISTING ROUTE
————— PROPOSED ROUTE



Century 105 Freeway Station (Imperial Highway) Line 254 Proposed Routing

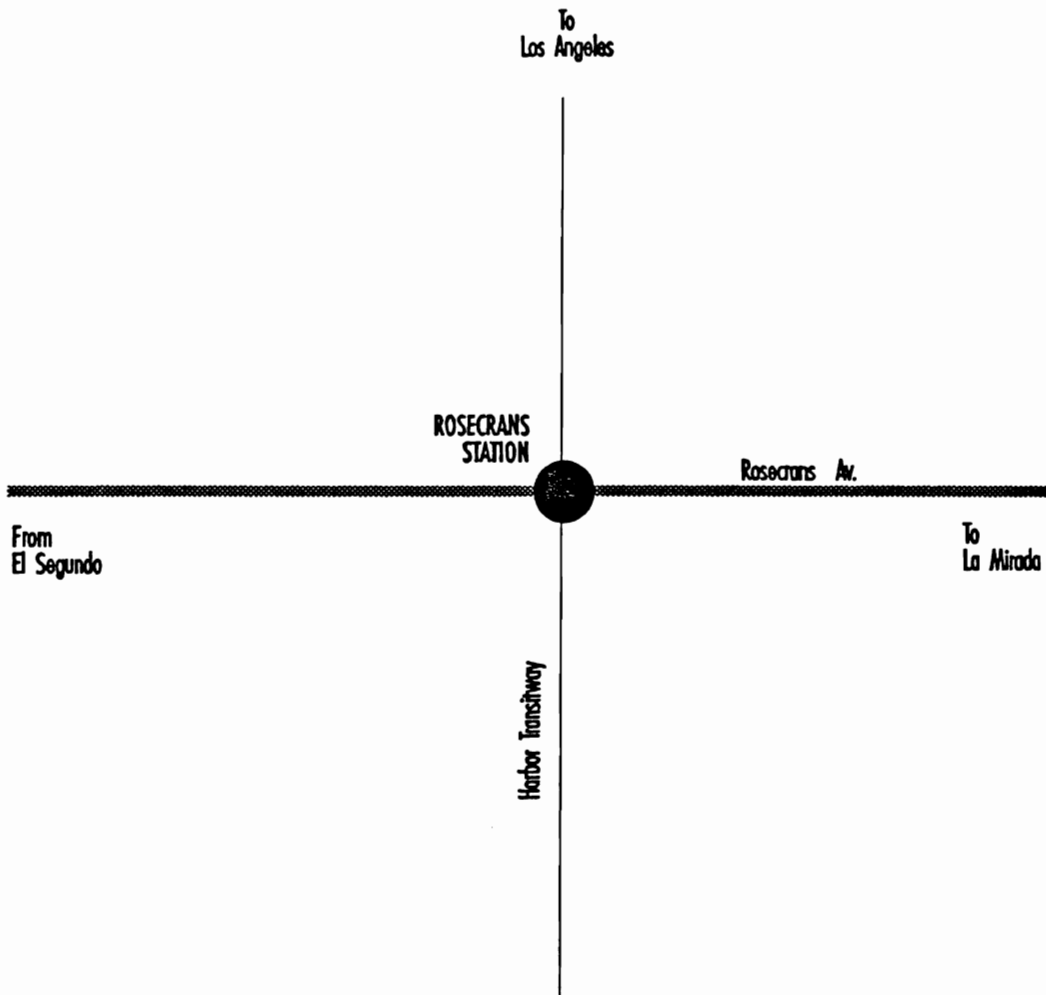


————— EXISTING ROUTE
————— PROPOSED ROUTE



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Rosecrans Avenue Station Line 125 Proposed Routing

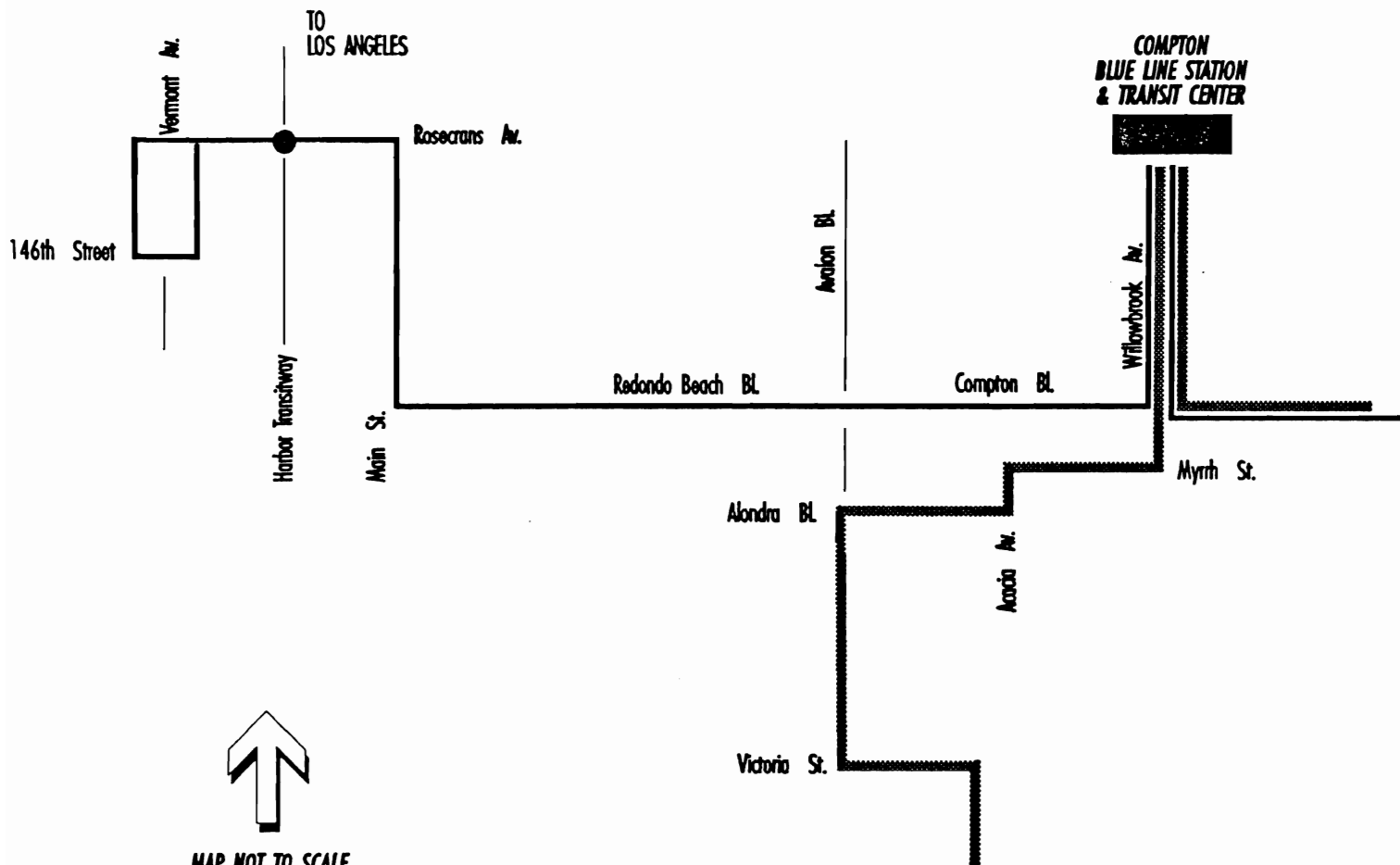


 NO CHANGE TO
EXISTING ROUTE



map not to scale

Rosecrans Avenue Station Lines 127 and 128 Proposed Routes

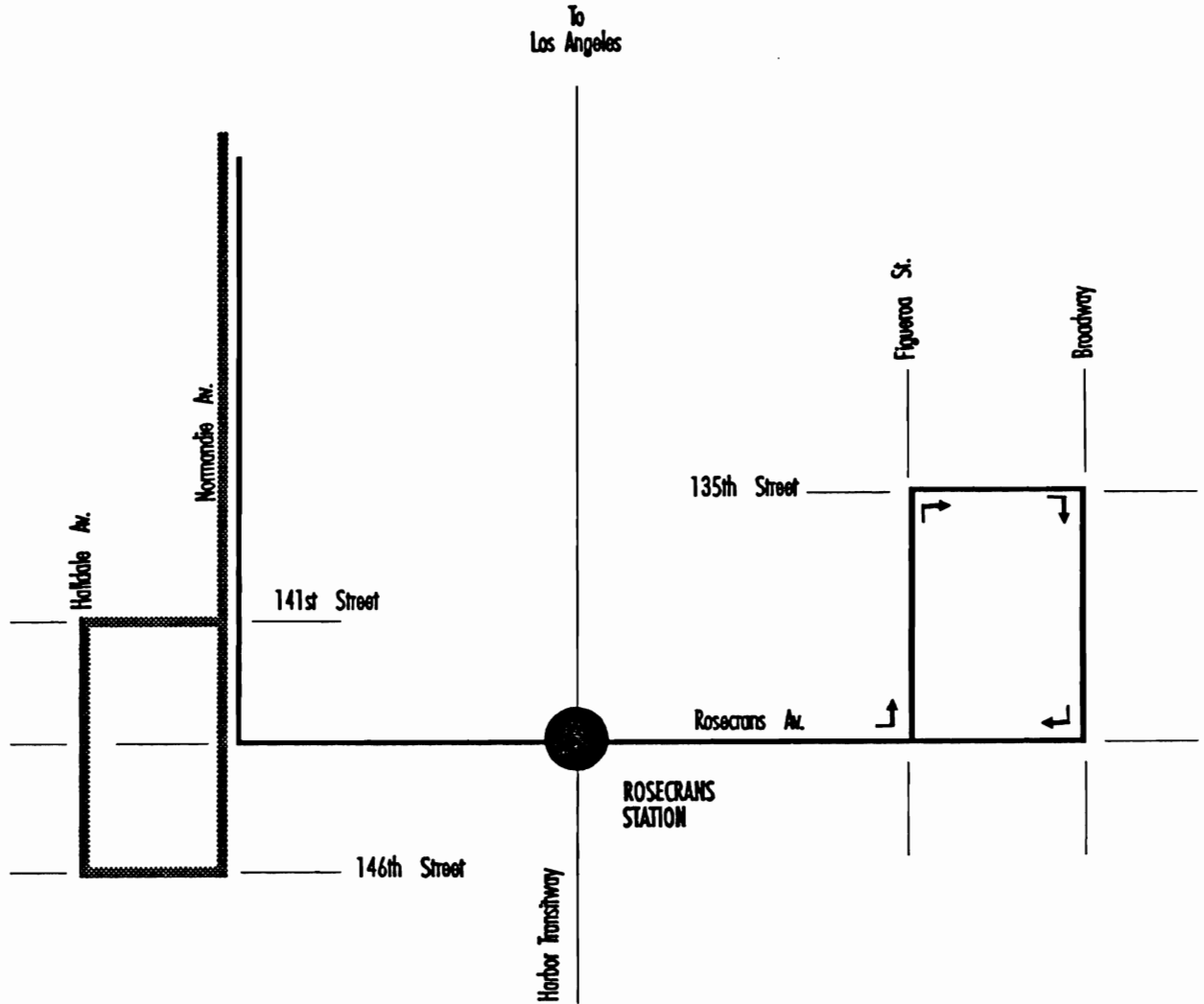


MAP NOT TO SCALE

CAL STATE
DOMINGUEZ HILLS

- Line 127 Re-route replaces Line 51-351 on Compton Bl. from Blue Line Station.
- Line 128 Re-route replaces Line 127 Service to Dominguez Hills.

Rosecrans Avenue Station Line 206 Proposed Routing

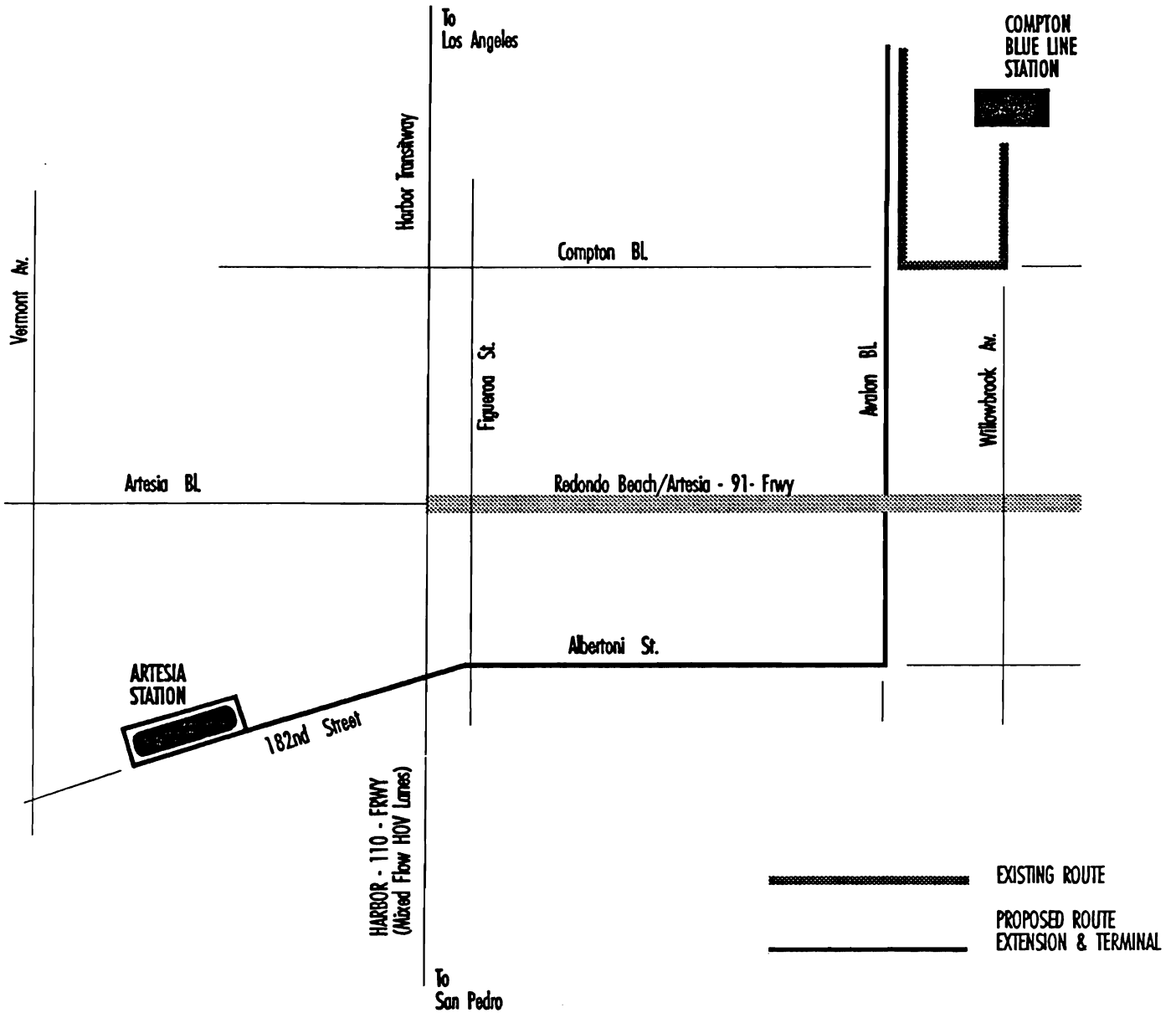


 EXISTING ROUTE
 PROPOSED ROUTE
EXTENTION & TERMINAL

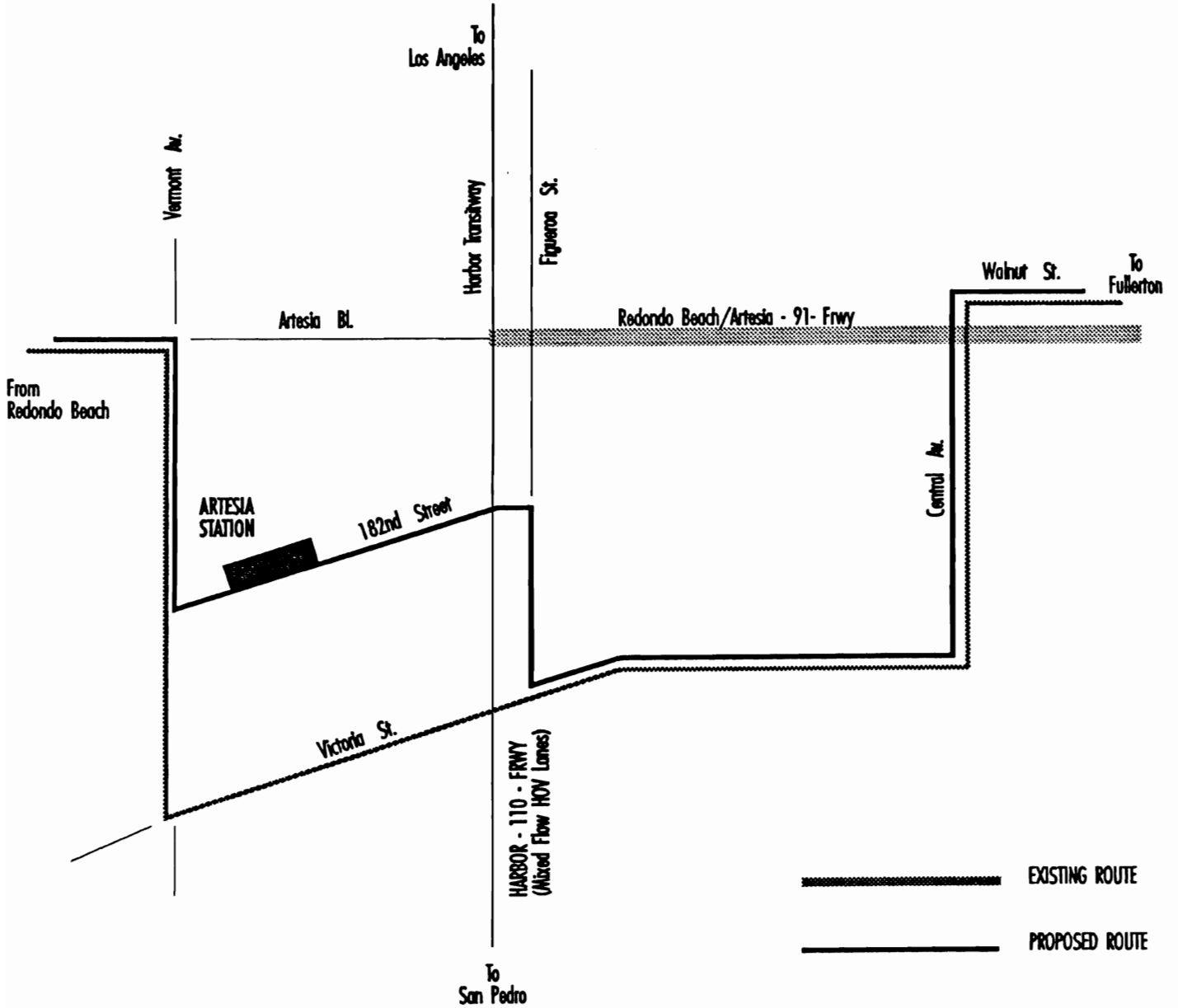


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Artesia Boulevard Station Line 51 Proposed Routing

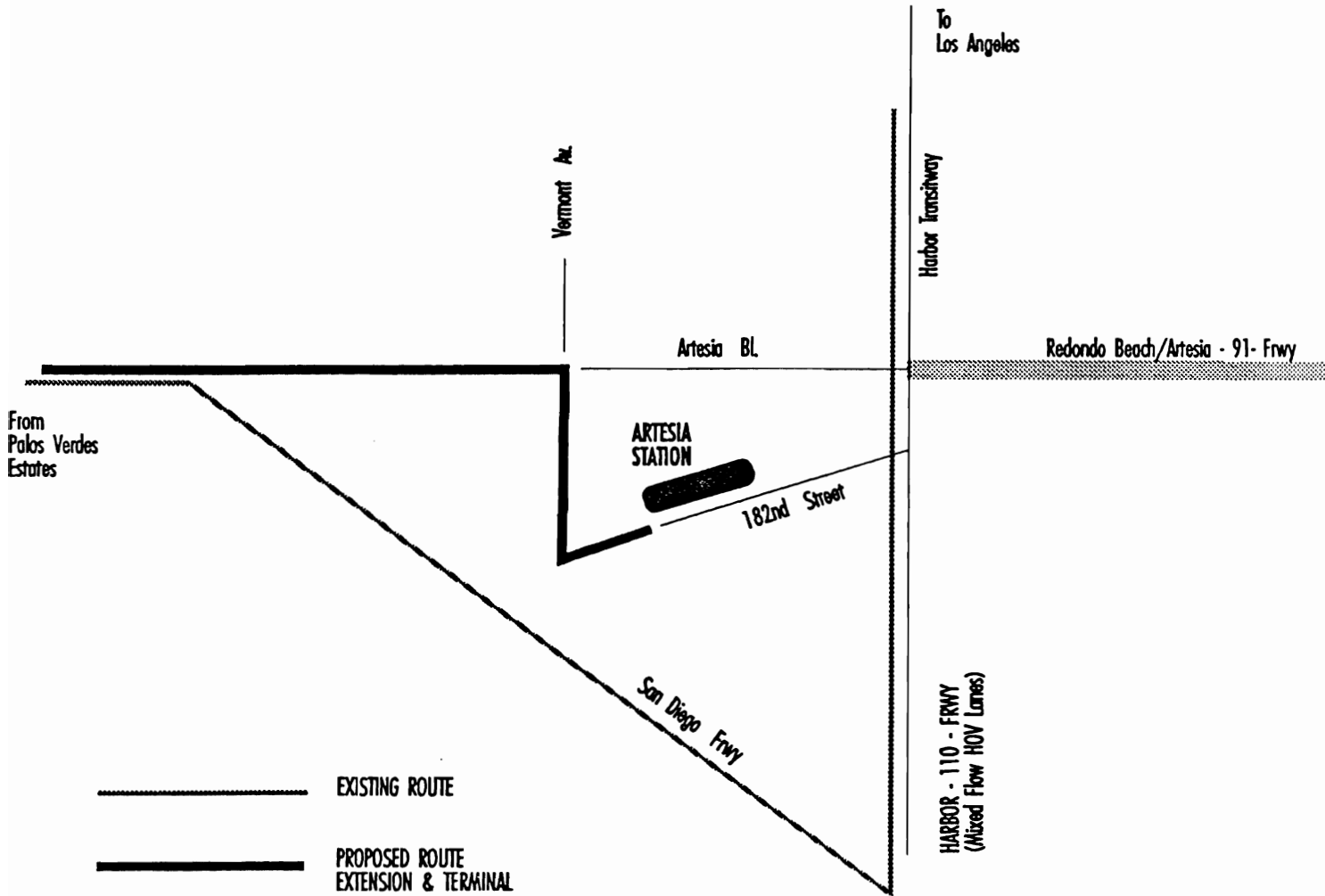


Artesia Boulevard Station Line 130 Proposed Routing



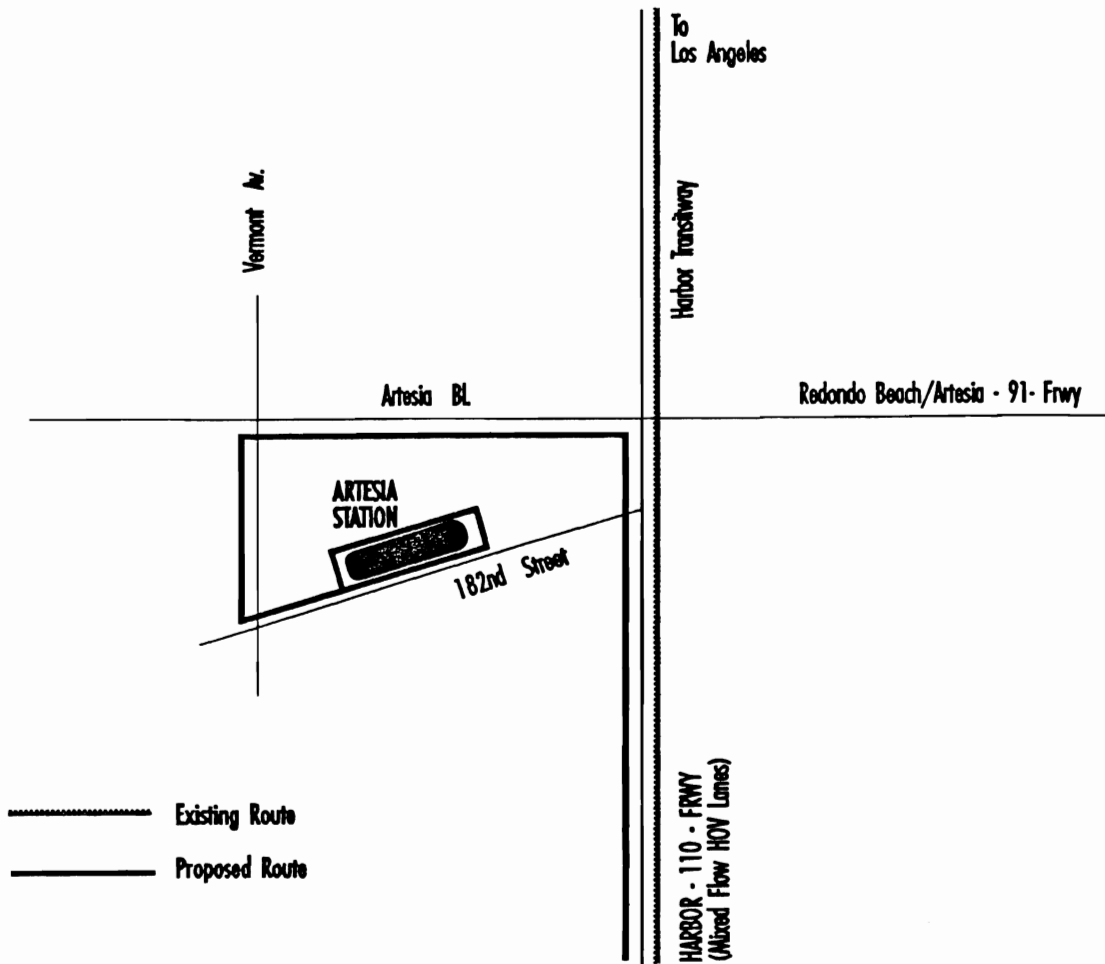
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Artesia Boulevard Station Line 443-444 Proposed Routing



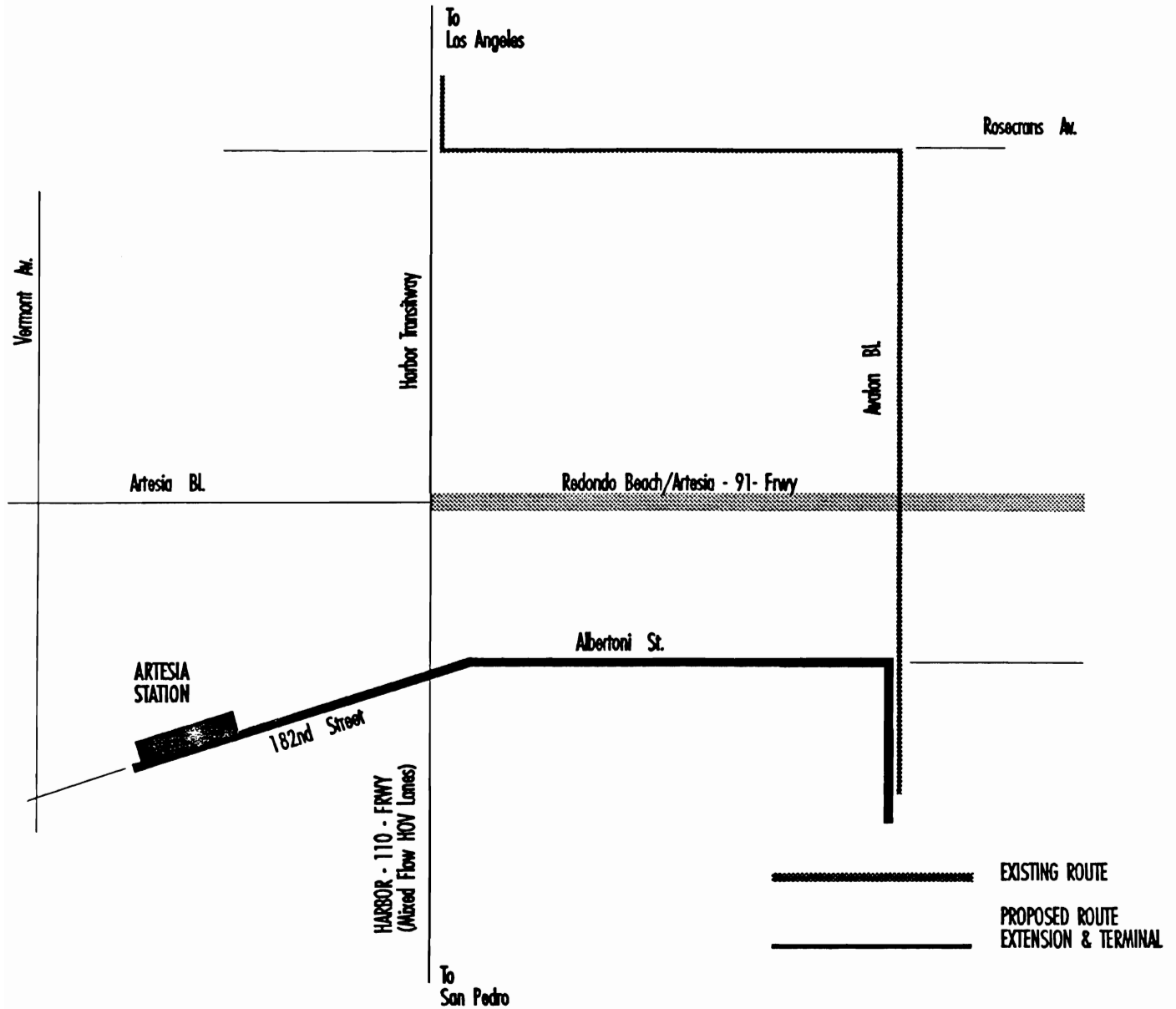
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Artesia Boulevard Station Line 445 Proposed Routing



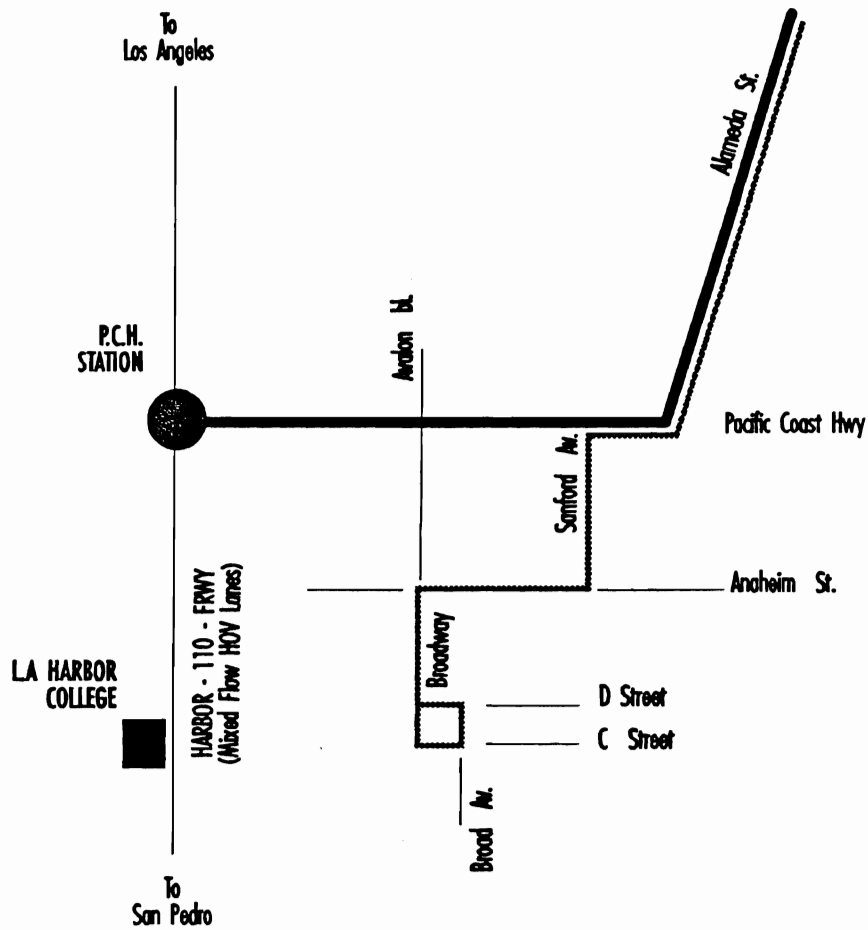
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Artesia Boulevard Station Line 446-447 Proposed Routing



map not to scale

Pacific Coast Highway Station Line 202 Proposed Routing

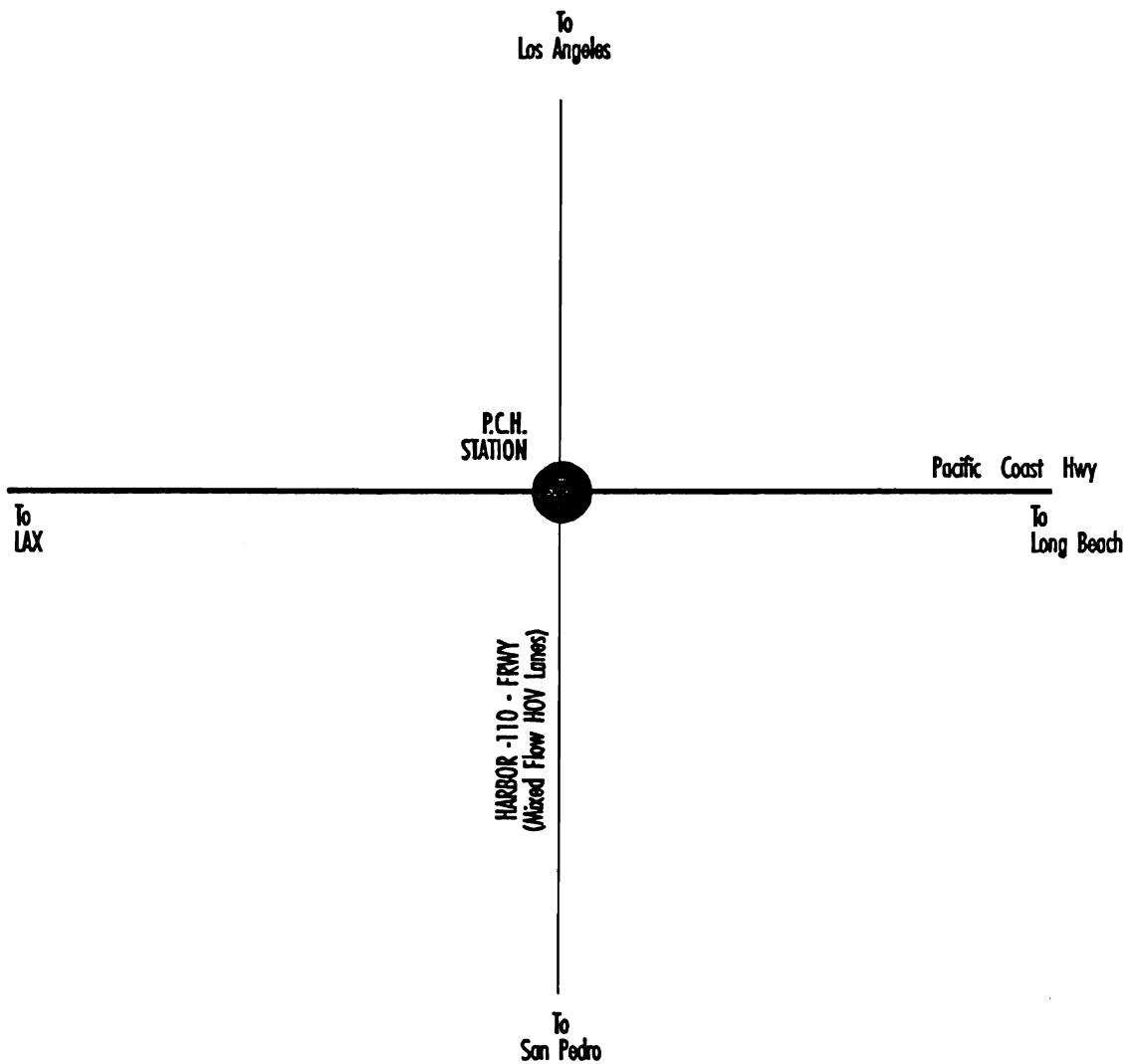


 EXISTING ROUTE
 PROPOSED ROUTE



map not to scale

Pacific Coast Highway Station Line 232 Proposed Routing

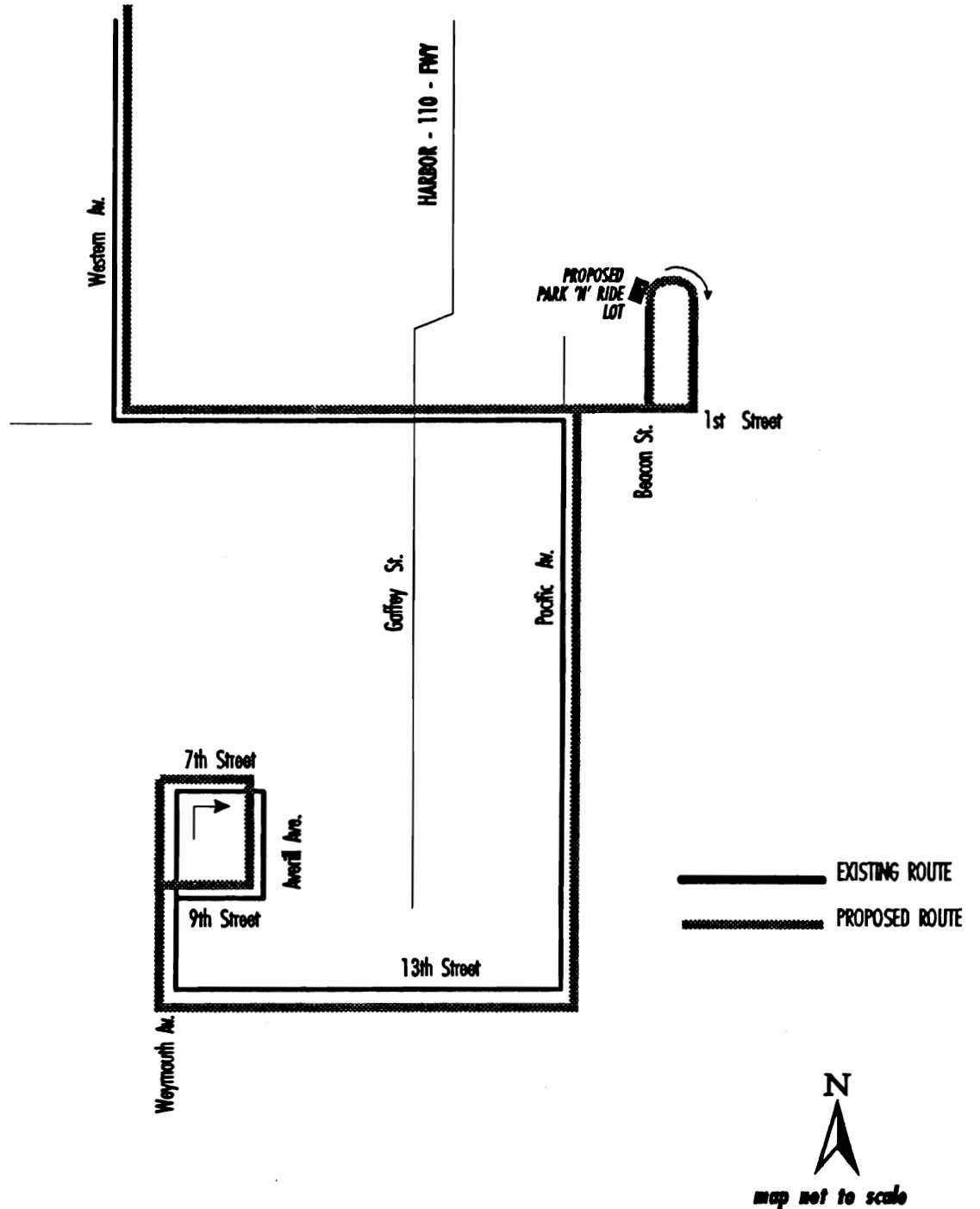


————— NO CHANGE TO EXISTING ROUTE

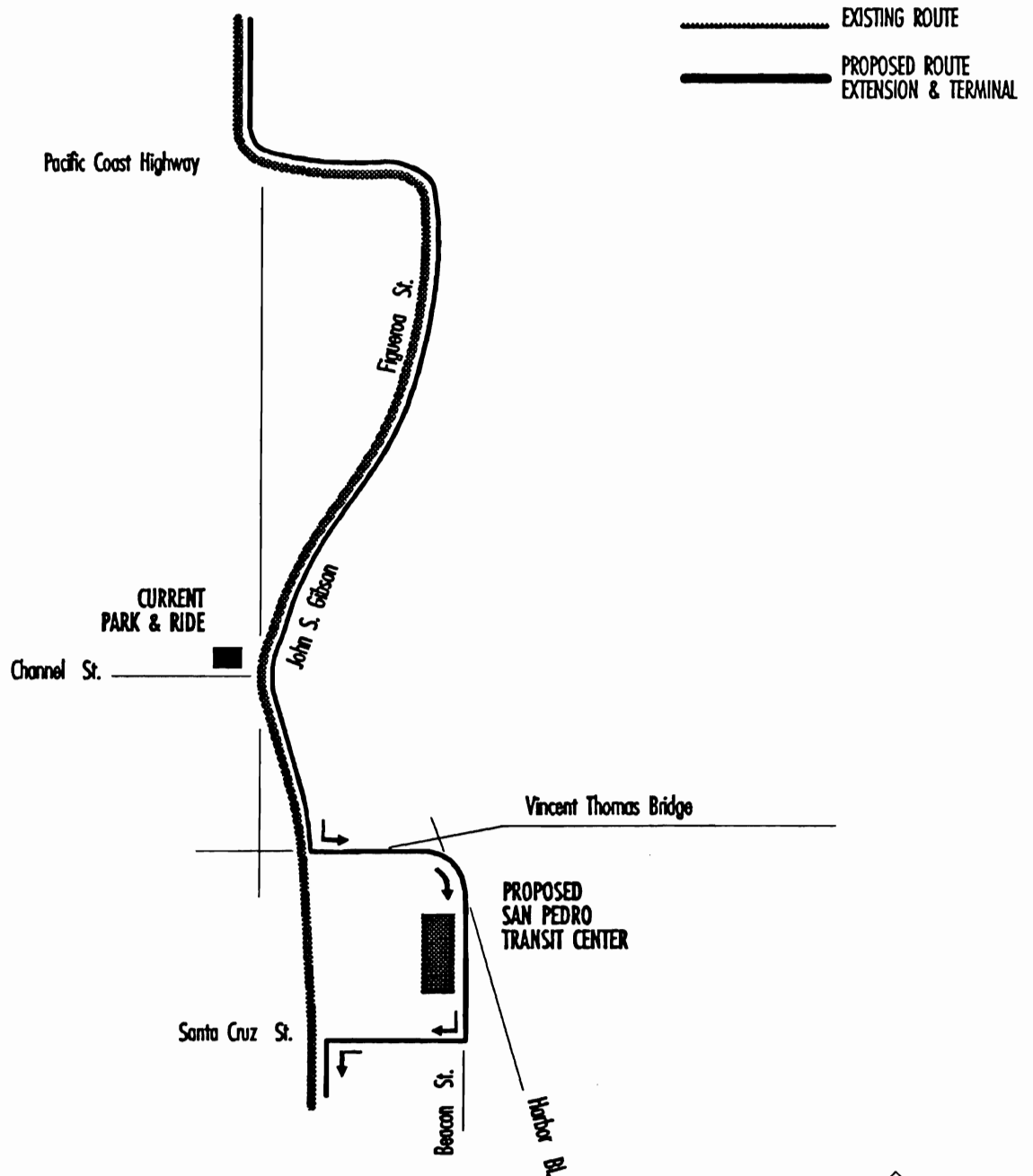


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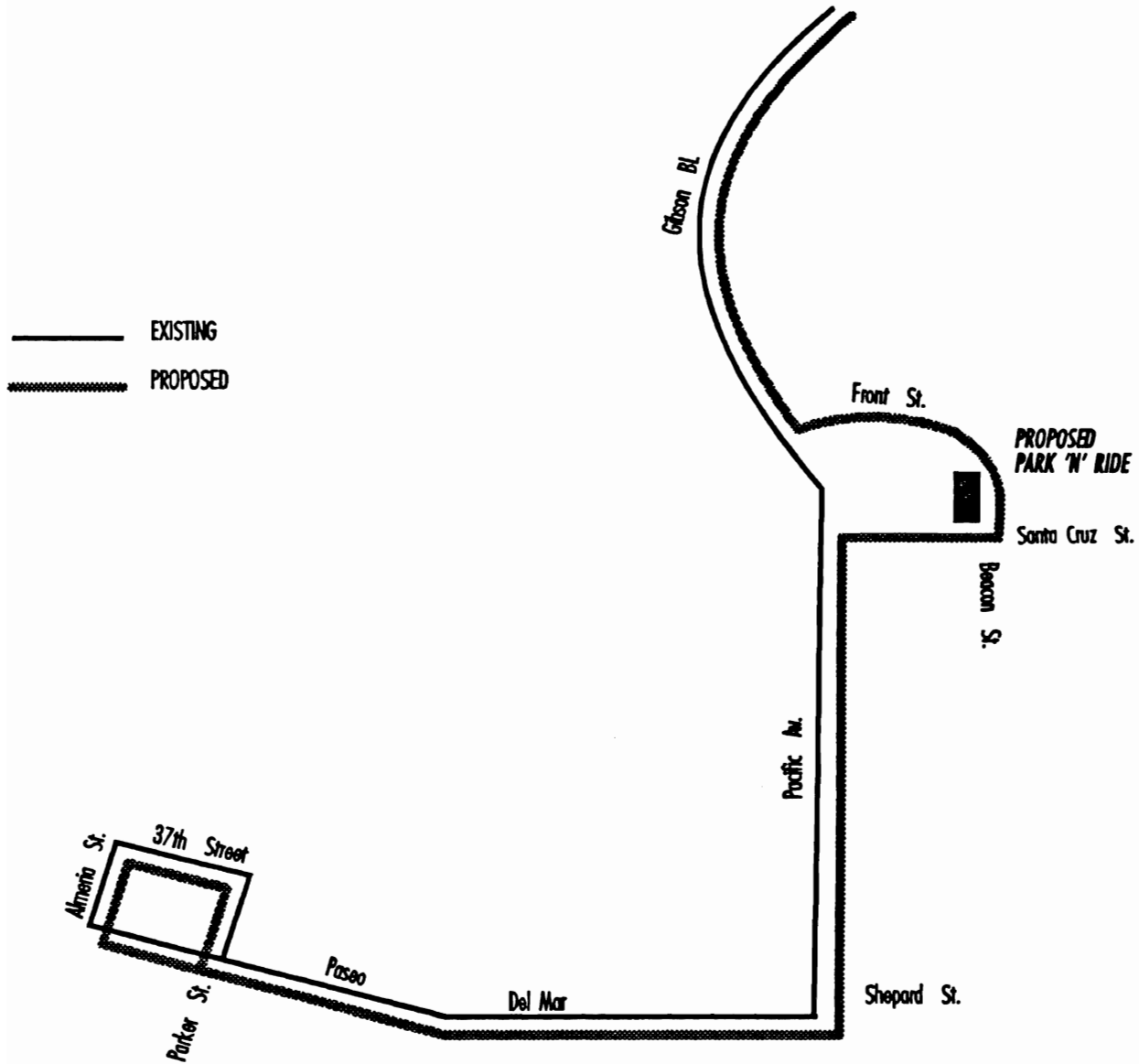
Proposed San Pedro Transit Center Line 205 Proposed Routing



Proposed San Pedro Transit Center Line 445 Proposed Routing

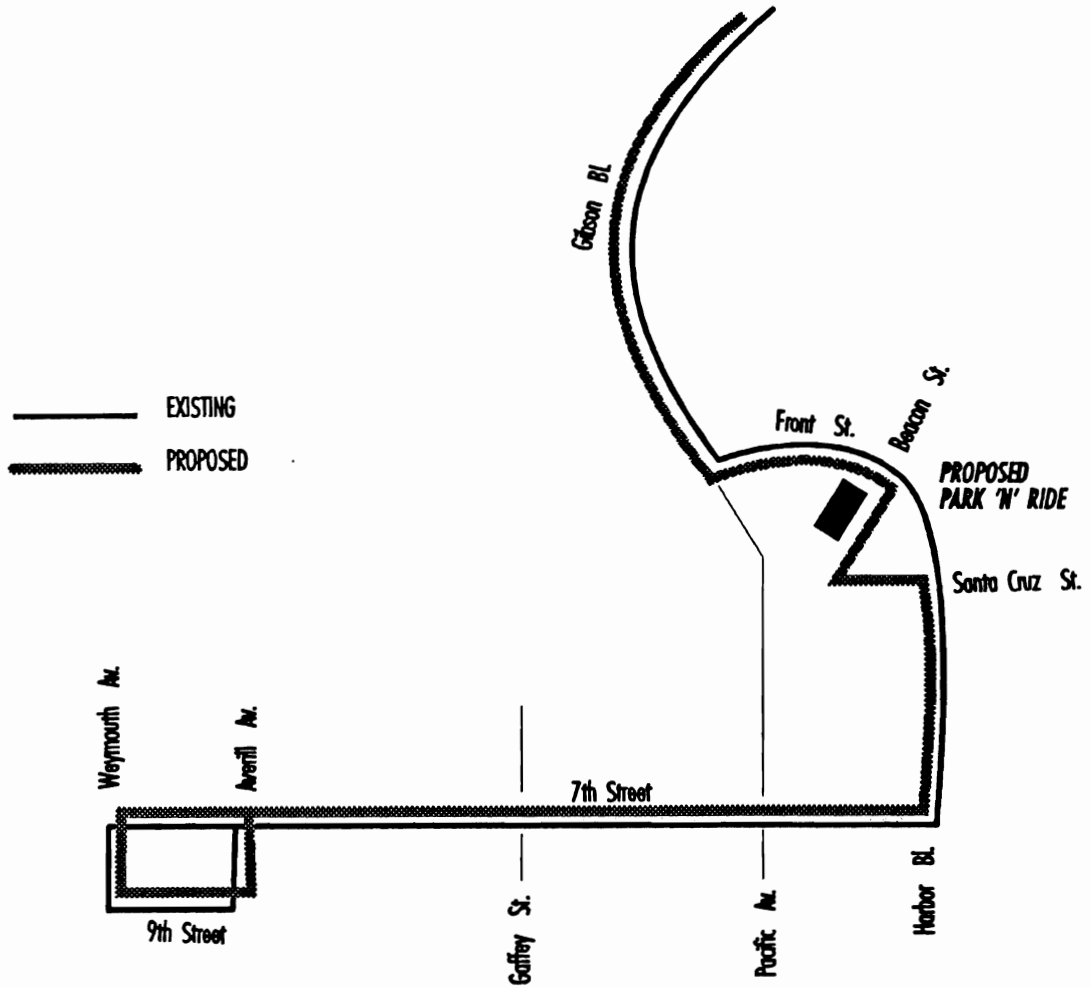


Proposed San Pedro Transit Center Line 446 Proposed Routing



map not to scale

Proposed San Pedro Transit Center Line 447 Proposed Routing



map not to scale