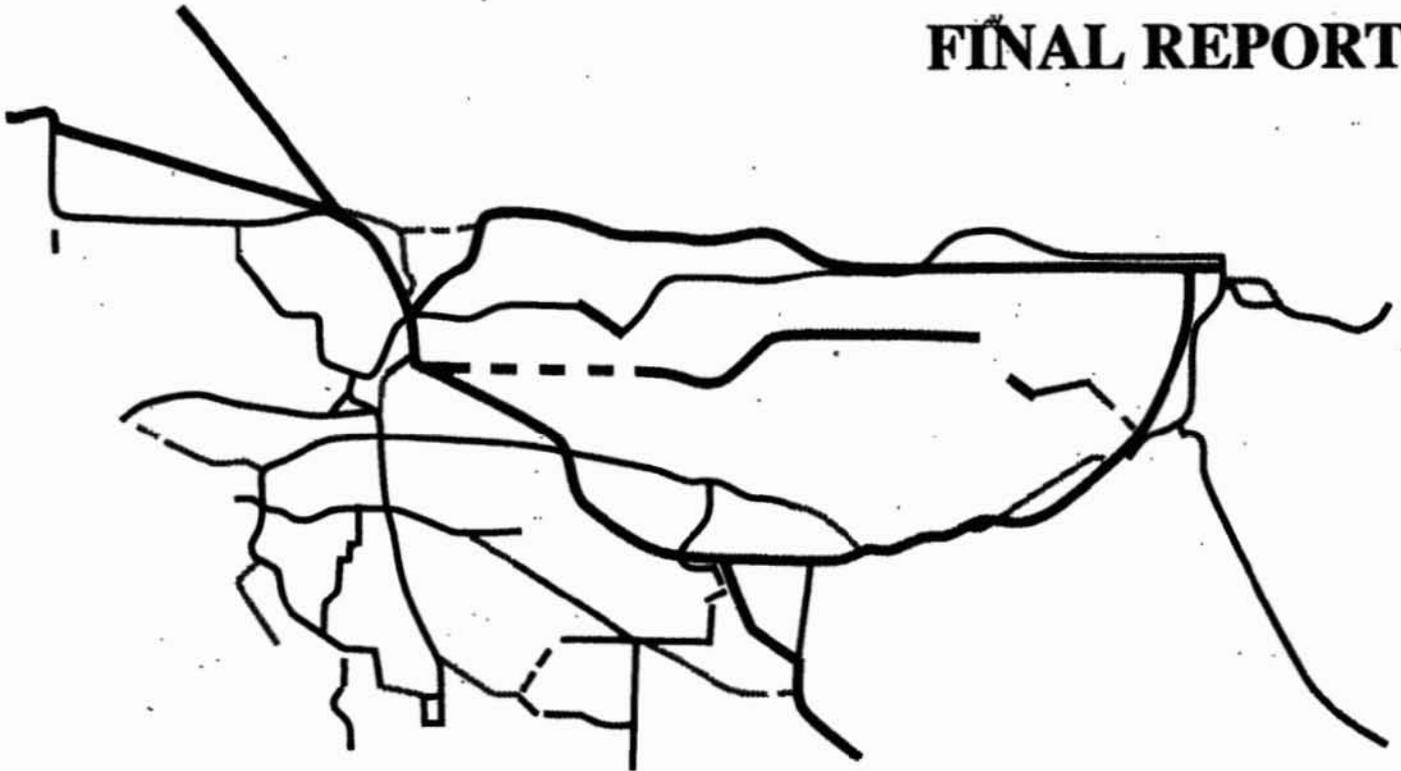


RAILROAD RIGHT-OF-WAY EVALUATION PROJECT

FINAL REPORT



August 1989

***Preliminary
Technical Report***

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RAILROAD RIGHT-OF-WAY EVALUATION PROJECT

FINAL REPORT

With Executive Summary

Southern California Association of Governments

818 West Seventh Street, 12th Floor

Los Angeles, California 90017

August 1989

FORWARD

This document is intended to advance the goals and objectives outlined in SCAG's Regional Mobility Plan in the areas of identifying and protecting potential rights-of-way for transportation corridors connecting subregions and major activity centers, and fostering coordinated and mutually supportive transportation and land use development.

The Regional Mobility Plan.

The Southern California Association of Governments has undertaken the challenge to maintain and improve the quality of life for the Region's residents by addressing regional transportation needs as we move into the Twenty-First Century. This challenge of managing rapid growth, avoiding resultant severe congestion, and securing healthful air has evolved into the development of the Regional Mobility Plan which has been adopted by SCAG's Executive Committee. The Plan provides an overall framework to meet regional transportation needs.

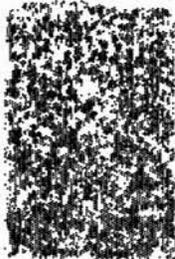
Major components of the Regional Mobility Plan are development of new transportation facilities, transportation system management (TSM), transportation demand management (TDM), and growth management.

On The Cover

The network displayed on the front cover is a simplified schematic of the railroad system, with the addition of abandoned rights-of-way.

- Black lines:** Transit facilities existing, under construction, or programmed/in final engineering.
- Red lines:** Operating main lines, used by existing intercity passenger services, or with commuter rail or transit potential.
- Dark blue lines:** Operating railroad branch lines, with transit or commuter rail potential.
- Light blue lines:** Abandoned railroad and interurban lines with transit potential.
- Dotted lines:** Possible links to other rights-of-way (all colors) (freeway or utility alignments, etc.).





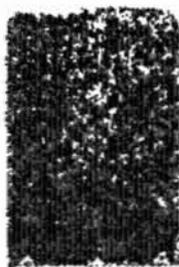
THIS IS THE FIRST OF TWO DOCUMENTS

APPENDICES to the Railroad Right-of-Way Evaluation Project
Final Report are separately bound in another volume.

Notice: This document is a preliminary technical report. Because of the widespread interest in the subject matter contained herein, it is released for purposes of public review and information exchange. Specific recommendations in this document, and suggestions as to the potential transit uses of individual rights-of-way, represent a collection of SCAG staff opinions, and should not be construed as adopted SCAG policy. However, study recommendations are consistent with SCAG's adopted Regional Mobility Plan, Growth Management Plan, and other adopted regional policies.

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**RAILROAD RIGHT-OF-WAY EVALUATION PROJECT
FINAL REPORT**

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ABSTRACT

The SCAG region is favored by an extensive network of railroad lines owned primarily by three major rail freight carriers. Many of these rail lines are currently underutilized, and recent trends in the railroad industry to improve efficiency dictate a continuing reduction in route mileage over the next several decades. At the same time, in-migration and vigorous economic growth are leading toward worsened traffic congestion and air quality in urbanized areas of southern California.

Railroad rights-of-way are particularly attractive for transit development, as many of them were former Red Car or steam railroad routes which helped to create our older community centers; and because some are bordered by marginal light industrial land uses, providing opportunities for public/private joint venture projects centered on new transit facilities.

Numerous examples are given of successful transit operations on railroad rights-of-way in North America, using various modes: rapid transit, light rail, busways, commuter rail, and new guideway technologies. Considering the exorbitant cost of tunnel construction and the disruptive effects of new surface right-of-way preparation, it is highly desirable to redevelop certain existing and former railroad lines for transit purposes, where feasible without interfering with viable rail freight services.

A primary objective of the Railroad Right-of-Way Evaluation Project has been to identify underutilized rail lines which may soon be abandoned and could if preserved be used for developing line-haul transit facilities to help solve our urban mobility problems in the relatively near term. Approximately twenty railroad branch lines (and one main line) in Los Angeles, Orange, San Bernardino, Riverside, and Ventura Counties are discussed in detail, which have a modest level of freight activity or may soon be subject to withdrawal of freight operations, thus presenting major public transportation opportunities.

Four lines, the SP Santa Monica, West Santa Ana, and Burbank Branches, and the Santa Fe Second Subdivision, were advanced several years ago by railroad industry representatives as likely candidates for abandonment and subsequent transit use, and have been the subject of considerable recent publicity. Limited development for transit of a fifth line, the Santa Fe Harbor Subdivision, will soon take place under a right-of-way sharing arrangement; more segments of this line may become available after implementation of the Alameda Corridor rail freight consolidation plan to serve port growth. All five lines correspond with recent county transit plans and proposals.

Transit facilities constructed on these railroad rights-of-way would serve numerous employment, residential, retail, and other activity centers which would generate high levels of patronage;

they would provide commuters and other travelers with an alternative to driving on congested, parallel freeways and arterial highways. They would also furnish opportunities to enhance existing centers, facilitate community development, and promote favorable and balanced land use patterns.

An allied project goal has been the identification of abandoned rail lines and former interurban electric railway rights-of-way meriting protection for future transit use: approximately twenty such abandoned rights-of-way are described. In addition, several main line segments (not in danger of abandonment) are discussed which may have considerable transit potential; and plans to develop intercity and commuter rail service on about a half dozen additional lines, entailing trackage rights agreements with the host railroads, are elaborated on.

A second major objective of the study has been to investigate transit/real estate joint development opportunities on under-utilized railroad yards and other property which can make transit projects on railroad rights-of-way partially self-supporting. Various strategies exist for transit to capture increases in land values; some of these are especially well suited to railroad industry participation. Some experts believe that from 20 to 40% of capital costs for new transit facilities can be defrayed through public/private joint ventures and a variety of value-capture mechanisms.

Another important reason for interest in joint development is that by focusing growth around transit stations, it can help to promote jobs/housing balance and be a key element in the improvement of mobility and air quality in our multi-centered region. Further, by concentrating new and relocating development (such as mixed-use projects) that will occur in outlying areas along linear rail corridors, environmentally sound development patterns can be engendered, along with reverse commute movements and off-peak travel that will help to reduce transit operating subsidies.

Transit technologies most suitable for operation on railroad rights-of-way are detailed, including representative capital costs and operational and environmental issues. Also discussed are the different ways in which transit facilities may be constructed on existing or former railroad lines, with special regard to accessing major centers. A number of examples of joint transit/commercial undertakings are described, including several cases of privately-financed transit shuttle lines.

Rail freight issues are also covered, with a description of the regional railroad network as it exists today, comments on rail cargo access to the port area, and a discussion of options for right-of-way sharing between freight and passenger lines: including joint LRT/short line freight service, and commuter rail on railroad main lines. Finally, the railroad abandonment process is briefly described, together with the issue of agency responsibility for R/W protection.

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EXECUTIVE SUMMARY

Introduction. The Railroad Right-Of-Way Evaluation project was instituted to evaluate the potential for utilizing railroad rights-of-way (R/W) for public transportation purposes. Major findings of this study are discussed in the following pages.

The SCAG region is favored by an extensive network of railroad lines belonging primarily to the Southern Pacific Transportation Company (SPTCo), the Atchison, Topeka & Santa Fe Railway (ATSF) and Union Pacific Railroad (UPRR). In addition, rights-of-way of many former Pacific Electric Railway (PE or "Red Car") interurban lines are still partially intact, as are a few Los Angeles Railways (LARY or "Yellow Car") rights-of-way.

With a thriving and diverse economy, a strategic location on the Pacific Rim, and continued in-migration, bolstered by a favorable climate and numerous cultural and recreational advantages for its inhabitants, the SCAG region will experience significant growth over the next several decades. However, as long as heavy automobile dependency continues, this will lead to serious congestion on freeways and surface streets, longer commutes for many people, and a worsening of air quality conditions.

Development of new line-haul transit facilities providing fast service on private rights-of-way or exclusive guideways is a major element of the public transportation strategy for alleviating congestion, and can help to guide growth throughout the urbanized part of the region. SCAG's Regional Mobility Plan calls for an increase in the percentage of home-to-work trips made by transit from the current six or seven percent to 19% by the year 2010.

Such line-haul facilities are appropriate and effective in travel corridors featuring major employment and residential centers, as well as significant concentrations of educational, recreational, retail-commercial, and other trip-generating activities; provided that adequate park-and-ride, shuttle/feeder bus, and other access facilities can be supplied. They can provide linkages between growth centers and support multiple centers, thus improving the balance between jobs and housing within the region.

Surplus and abandoned rights-of-way constitute a valuable resource toward solving our urban mobility problems. This is particularly so in view of urban infilling trends, and the high cost/increasing difficulty of creating new surface right-of-way. Similarly, the very high cost of new underground (subway) construction will make building more than a very few lines in tunnel quite unlikely, again placing a premium on using extant surface rights-of-way.

Railroad rights-of-way are a particularly attractive option for locating major transit facilities, for the following reasons. Many railroad rights-of-way were formerly Red Car or steam

railroad passenger lines which helped to develop our region's older community centers. Unlike utility corridors such as flood control channels or power line rights-of-way, certain railroad lines have continued to serve economic activity (freight service to light and heavy industry); and unlike freeways, rail rights-of-way do not pose formidable barriers to pedestrian access.

A number of railroad lines, despite their proximity to existing commercial and residential areas, are bordered by older light industrial land in only marginal economic use today. They present major opportunities to recycle such property in new and well-planned development projects with excellent pedestrian/transit access and urban amenities. Such projects can enhance existing centers, promote community development and jobs/housing balance, and help to establish favorable land use patterns.

Further, many railroad lines traverse a mixture of residential, commercial, industrial, and other land uses that will favor efficient transit operation with frequent ons and offs, enhanced off-peak patronage, and establishment of reverse-peak commuting to outlying centers. These conditions in turn will help to increase the farebox return and reduce operating subsidies.

Railroad Industry Trends. Despite the failure of the Santa Fe-Southern Pacific merger in 1987, certain trends in the railroad industry and in our local situation will create circumstances that favor creative reuse of underutilized rail rights-of-way, depots, and other old railroad facilities:

- o The overall trend in railroading is towards more efficient line-haul operations: eliminating their least productive branch lines (abandonment, or sale to short line operators).
- o The recent Rio Grande-Southern Pacific merger will require the sale of unnecessary railroad lines, yards, and other properties to help finance the merger. The Santa Fe also has corporate reasons for selling lightly-used lines.
- o The Alameda Corridor Project for rail consolidation between downtown Los Angeles and the harbor area (to serve a major expansion of international trade through the San Pedro Bay ports) may also render certain rail freight lines redundant.

Appropriate Transit Modes And Other Technology Issues. It is feasible to employ any of the following transit modes on former railroad rights-of-way: rapid transit (including automated and high-, medium-, and light-capacity systems), at-grade light rail transit (LRT), busways, guided buses, and various "new technologies" such as monorails and magnetic levitation ("maglev") systems. In addition, commuter or regional rail could be operated on existing routes of the general railroad system of transportation.

Methods for speeding line-haul transit operations, such as skip-

stop, express or zonal service, can be applied to all of these modes, but grade-separated busway or medium-capacity automated rail systems should offer the greatest flexibility in this regard. Grade separation (avoiding or eliminating same-level crossings of roads, walkways, etc.) also greatly reduces interference with highway and pedestrian traffic.

For gated, at-grade rail transit crossings, various mitigation measures are desirable. In the case of operation in residential areas, noise, vibration, and air pollution are of particular concern, suggesting that electric-powered vehicles are preferred for use in these localities.

There are numerous examples in other parts of North America of transit lines constructed to a greater or lesser extent on railroad rights-of-way, including the Lindenwold High Speed Line, Vancouver's Skytrain, the San Diego, Sacramento, and Portland LRT lines, and the Pittsburgh and Ottawa busways.

New guideway technologies are feasible for certain line-haul transit investments on railroad rights-of-way. Maglev systems and suspended monorails would appear to be superior to straddle monorails with regard to vehicle stability and emergency evacuation. Maglev should prove suitable for surface lines where full grade separation is desired, while suspended monorails would be more appropriate for operation over certain former rail lines where the original right-of-way has been constricted in width.

Capital Costs. Capital costs vary not only by mode but also with the type of construction used. Transit modes which allow the lowest capital costs are busways (\$ 10-24 million/mile) and surface light rail lines (\$ 10-21 million/mile), both of which often rely upon transit malls for CBD access and do not require expensive subway tunnels. For at-grade light rail and commuter rail lines, grade separation is often desirable where the tracks intersect major arterial highways. Whereas individual grade separations are expensive--costing \$ 3.6 to 20 million, depending upon circumstances and the way they are built, they are frequently necessary as environmental mitigation measures.

Further, in areas where surface streets are heavily congested, substantial aerial and tunnel construction is often needed, and light rail costs in this case may increase to \$ 35-40 million/mile. Busways generally have to be fully grade-separated, to avoid adverse impacts on cross traffic; but are difficult to place in tunnels because they generate diesel emissions.

Subways cost at least \$ 135 million per mile; however, recent experience in Los Angeles indicates that underground lines can easily cost over \$ 200 million/mile. Automated, medium-capacity systems will cost \$ 19-61 million per mile (the higher figures for above-grade construction). Unconventional aerial guideway modes are believed to cost \$ 35 to \$ 55 million per mile. While

underground and aerial systems are fully grade-separated, local aesthetic and environmental problems may restrict the placement of elevated lines.

The Need For Transit Joint Development. Considering the high capital cost of developing fixed-guideway and busway transit facilities, the present climate of declining federal aid for transit (both for construction and for operations), and current limitations on State and local tax support, there is very good reason to examine value capture financing for future transit lines. Some experts believe that as much as 20-40% of the capital costs of new transit facilities can be defrayed through joint public/private development associated with transit systems.

In addition, joint venture projects, by focusing growth around transit stations, can promote community development, enhance new and existing centers, and reduce dependency upon the private automobile for personal transportation. Hence it can be a key element of a major strategy for improving mobility and air quality in our multi-centered region. For all of these reasons, an important objective of this study has been to identify joint development opportunities involving railroad rights-of-way, former or poorly-utilized rail yards, and nearby properties.

SCAG's Growth Management Plan has recommended an improvement in the balance between jobs and housing within counties and sub-regions as another major strategy for reducing lengthy commutes by auto. While the development of commuter services on rail lines serving existing major centers is a useful complementary method of reducing congestion, it is suggested that development of all-day, bi-directional transit service on railroad rights-of-way, serving outlying centers, and focusing growth at nodes all along these linear corridors, will be extremely helpful in promoting jobs/housing balance, while at the same time greatly increasing transit system efficiency.

There are many methods for value capture financing, including various types of zoning incentives, impact fees, supplemental land acquisition, public lease or sale of land or rights around transit stations, air-rights development, tax-increment finance, special assessments, and special districts. The first five methods specifically depend upon joint development, while all of these benefit from new transit-coordinated land development.

Zoning incentives would appear to be very useful when a railroad company is interested in developing its own property. There are indications that the railroad industry is becoming increasingly involved in transit/commercial joint-development projects (in fact, proposals by the Santa Fe Pacific Realty Co. were instrumental in structuring this study).

In the case that railroad land is sold to a public agency, such as a transit development district, then lease/sale of excess

right-of-way, and channeling of other public investment to station areas are likely strategies. In the event of sale of underutilized railroad parcels to private developers, zoning incentives and special assessments may be appropriate.

However, value-capture financing can also be applied to existing property-owners and developers of non-railroad land in cases where only the right-of-way (and not adjacent properties like former railroad yards) is sold. In this case, tax-increment financing, impact fees or mitigation requirements may be suitable methods. Air-rights development can apply in all cases.

There are numerous examples of transit joint-venture projects associated with rapid transit lines, especially in Toronto, Montreal, Washington D.C., Atlanta, and Vancouver. Similar projects are also now underway in conjunction with the Ottawa busway and with light rail transit in San Diego, Portland, and Sacramento. In a few cases, notably the Tandy Subway and the Long Beach and Irvine monorail projects, developers have provided or intend to provide short transit shuttle lines financed solely by the private sector.

But perhaps the most ambitious transit joint development project involving former railroad infrastructure is currently taking place in the London Docklands at London's East End. There, over eight square miles of abandoned wharves, warehouses, and tidal basins are undergoing redevelopment in conjunction with the Docklands Light Railway, a fully automated light rapid transit line. This urban renewal/transit joint venture entails a \$ 15 billion public and (mostly) private commitment, with some 250 individual commercial, industrial, and residential projects underway and the expectation that at least 40,000 jobs and 24,000 housing units will be generated.

In this country, there are also several major joint transit/real estate development projects in progress involving light rail and busways on former railroad rights-of-way in New York and New Jersey. The Hudson River Waterfront Project in New Jersey will involve 33 million square feet of office space, over 40 public and private developers, and 35,000 new dwellings.

Freight Service Issues. Another form of joint venture with transit is the operation of railroad freight services on the same trackage, gaining extra revenues for the transit system. One of the best-known cases of this is the joint operation of the San Diego Trolley and the San Diego and Imperial Valley short line railway. The transit service occupies the sections used in common during the daytime and early evening, and the freight trains run during very late night/early morning hours.

This concept pertains to operationally marginal freight lines. The railroads, being desirous of maintaining daily bulk freight shipments to customers on lightly-used branches while alleviating

certain property tax and maintenance burdens, prefer transfer of control to a transit authority which will guarantee continued customer access (through the intermediary of a short-line carrier) rather than abandonment and loss of this business.

Conversely, commuter rail service is possible on main lines (and occasionally branches) owned by major rail carriers. There are numerous proposals to operate commuter trains during peak period time "windows" over routes which are still in fairly heavy freight use. This will entail trackage rights agreements and trackage fees paid to the host railroad, special insurance/indemnity provisions, and some additional railroad infrastructure provided by the implementing public agency: including a complete second or third track if necessary, sidings (passing tracks on single track lines), crossovers (to switch between double tracks) and signalling/control improvements.

It must be noted that it is essential to the economy of the SCAG region to maintain the integrity of freight operations on the railroad main lines and viable branch lines. The major rail carriers require track time and track space to permit time-sensitive freight shipments to arrive at their destinations as expeditiously as possible. Fast freight traffic includes, but is by no means limited to, COFC and TOFC service (Containers and Trailers On Flat Cars).

It could be counter-productive to our regional mobility and air quality goals and to regional port and economic development if additional long-haul rail cargo were forced to divert to trucking. Hence, where it is desired to operate commuter or intercity passenger trains over major freight lines, the required infrastructure should be provided to avoid incurring either freight or passenger service delays.

Existing Transit Plans. Current and adopted plans for rail, other fixed guideway, and busway transit development in the five urbanized counties of the SCAG region are very pertinent to this study. SCAG's Regional Mobility Plan, which is the adopted regional transportation plan for the urbanized areas of Ventura, Los Angeles, Orange, Riverside, and San Bernardino Counties, outlines a three-tiered transit program, including a longer-distance line-haul system, a feeder network, and a local transportation element.

The line-haul system is envisioned as a complementary mix of rail or other fixed-guideway and express bus services, providing the backbone for intra-regional transportation. The feeder network (including local bus routes) is intended to connect activity centers and service line-haul stations. The local circulators, including paratransit, are intended to operate within subregions (some would also serve line-haul stations).

Los Angeles County has the most elaborate plans for transit

development, with a voter mandate under Proposition A to implement a 150-mile rail transit system along at least thirteen corridors (supported by a half-cent local sales tax). The Los Angeles County Transportation Commission (LACTC) is the lead agency for construction of the Los Angeles-Long Beach light rail line (now under way: largely following existing and abandoned railroad branch lines), and the Norwalk-El Segundo (Century Freeway) automated medium-capacity rapid transit line. Plans for the connecting Coastal Corridor and Pasadena light rail lines are also fairly well advanced.

Meanwhile, the Southern California Rapid Transit District (SCRTD) is responsible for construction of the first few miles of the Metro Rail rapid transit project, a subway route through and west of the Los Angeles CBD (Central Business District). Plans have been adopted to eventually extend this line to Hollywood and to the San Fernando Valley (with LACTC as the lead agency for the extension). The El Monte Busway, a high occupancy vehicle lane (HOV) facility with several en-route bus stations, has been in operation along the I-10 San Bernardino Freeway for over a decade, and Caltrans District 7 has begun work on the I-10 Harbor Freeway HOV lane/transitway project.

In Orange County, an HOV/transitway system is under development, featuring grade-separated connections for express buses, vanpools and carpools operating in commuter lanes on the I-5, I-405, SR-55 and SR-57 Freeways. In addition, the Orange County Transportation Commission (OCTC) has proposed as part of its 20 Year Plan a rail transit strategy, including linkage to LA County lines via the Southern Pacific West Santa Ana Branch (Pacific Electric) right-of-way, as well as commuter rail from southern Orange County to Los Angeles on the Los Angeles-San Diego (LOSSAN) corridor.

Following the passage of its Measure A, half-cent sales tax, Riverside County has plans for a Riverside-Orange County commuter rail service and for light rail or commute service along the railroad corridor from Hemet and Perris to the City of Riverside.

There is also considerable interest in establishing commuter rail operation from Ventura to the Los Angeles CBD, and commuter rail or other rail transit service between downtown Los Angeles and San Bernardino.

The Los Angeles-San Diego Rail Corridor Agency has recently been formed to implement intercity rail improvements in Los Angeles, Orange, and San Diego Counties. A single San Diegan round trip has been extended up to Santa Barbara, and a study was recently completed on further Amtrak service improvements for this north coastal corridor.

There remain a number of unanswered questions as to what modes will be developed on a number of regional corridors, how linkages will be established between different modes and transit corridors,

and how through service will be established for routes that cross county lines. This is a major regional issue that needs to be addressed in fulfilling the goals of the Regional Mobility Plan.

Five High-Opportunity Railroad Corridors. During the first phase of SCAG's Railroad Right-of-Way Evaluation Project early in 1987, the regional rail network was examined to determine the most plausible candidate railroad lines for future placement of major transit facilities. It was assumed the latter would provide rapid, frequent, all-day service using any of these technologies: busways, light rail, rapid transit, or unconventional fixed-guideway systems such as monorails or maglev.

Availability of right-of-way was crucial to this assessment, as was correspondence with county plans for transit corridor development. Other evaluation criteria included population and employment densities along the rail lines, service to commercial and other high-activity centers, potential for land development/value capture on underutilized railroad property, and evidence of latent transit demand based on parallel freeway volumes, existing congestion, and current public transportation service.

Although many additional railroad rights-of-way were surveyed during the third and final phase of the project, the greatest amount of data has been gathered on five railroad branch lines and combinations of lines which had been identified as representing major opportunities during Phase I: either because they were lightly-used for freight service and were expected to soon be abandoned, or because they would become redundant under the Santa Fe-Southern Pacific merger which was pending in 1987.

Although the SFSP merger was denied by the Interstate Commerce Commission (ICC), four of these lines are still considered very likely to be put up for sale by the railroads, and portions of the fifth line could become available for transit under the Alameda Corridor rail consolidation plan.

It is appropriate to discuss these rail corridors in detail, as they were the first to be proffered for transit (subject to certain conditions and eventualities) by railroad industry real estate representatives, have figured prominently in plans of the County Transportation Commissions and/or have been the focus of much public interest since the original tentative offers were made. These rail lines are the following (Figure 1):

1. The Southern Pacific Santa Monica Branch. The Santa Monica Branch is currently in the process of abandonment and has been offered for sale in the near future. The most promising transit route would extend from Santa Monica to USC using the railroad right-of-way along Exposition Boulevard, and extend to the LA CBD via the Harbor Freeway/Flower Street. This would provide a superior travel alternative to the very congested Santa Monica Freeway. It would serve major commercial areas of West Los

Angeles and Santa Monica, the University of Southern California and nearby sports and museum complex, the expanded LA Convention Center/South Park development area, and the LA CBD.

The Santa Monica Branch/Exposition line is seen as not competing with the western extension of Metro Rail, since their service areas would substantially differ. Other options for future transit development on the Santa Monica Branch include using the easterly segment of the right-of-way over to Alameda Street and the west bank of the LA River to access the east side of downtown Los Angeles at Union Station. This would serve possible joint development projects involving air rights over the Metro Rail yard and shops, along with other potential sites.

2. The Santa Fe Harbor Subdivision. Transit routes following the Santa Fe Harbor Subdivision could provide a diagonal link between the LA CBD and the Los Angeles International Airport (LAX) areas, and thence extend south and southeast across the South Bay to Wilmington. A Harbor Subdivision transit line is of particular interest because it would access LAX, a key west side activity center including hotels, offices, and industry as well as the passenger and air cargo terminals. Numerous employment, residential, and retail concentrations would be served by a transit route using the Harbor Subdivision from Inglewood to South Bay.

An extension along several underutilized SP lines, a former PE R/W, and other rights-of-way into downtown Long Beach would serve a rapidly growing commercial, tourist, and retirement center in southern Los Angeles County. Further, a Harbor Subdivision transit service could provide congestion relief for many drivers on the heavily congested I-405 Freeway.

A middle piece of the Santa Fe right-of-way has already been proposed for incorporation into the LACTC's Coastal Corridor transit line. The Harbor Subdivision R/W is not currently endangered, as it the railroad's only freight route to the ports, and portions may remain in operation even after the inauguration of the Alameda Corridor rail freight consolidation project. However, other rights-of-way in the seaport area needed to access the Long Beach central city area may need to be protected.

3. The Southern Pacific West Santa Ana Branch. The West Santa Ana Branch (a former PE right-of-way) extends from Lynwood in Los Angeles County southeast to the City of Santa Ana in Orange County. The segment south and east from Stanton to Santa Ana was already abandoned, and then purchased by the Orange County Transit District (OCTD) over five years ago. The Southern Pacific is currently proposing to sell the remainder to public agencies for transit development purposes. The West Santa Ana Branch/PE right-of-way is of particular interest as a diagonal route paralleling the heavily-congested I-5 and I-405 Freeways.



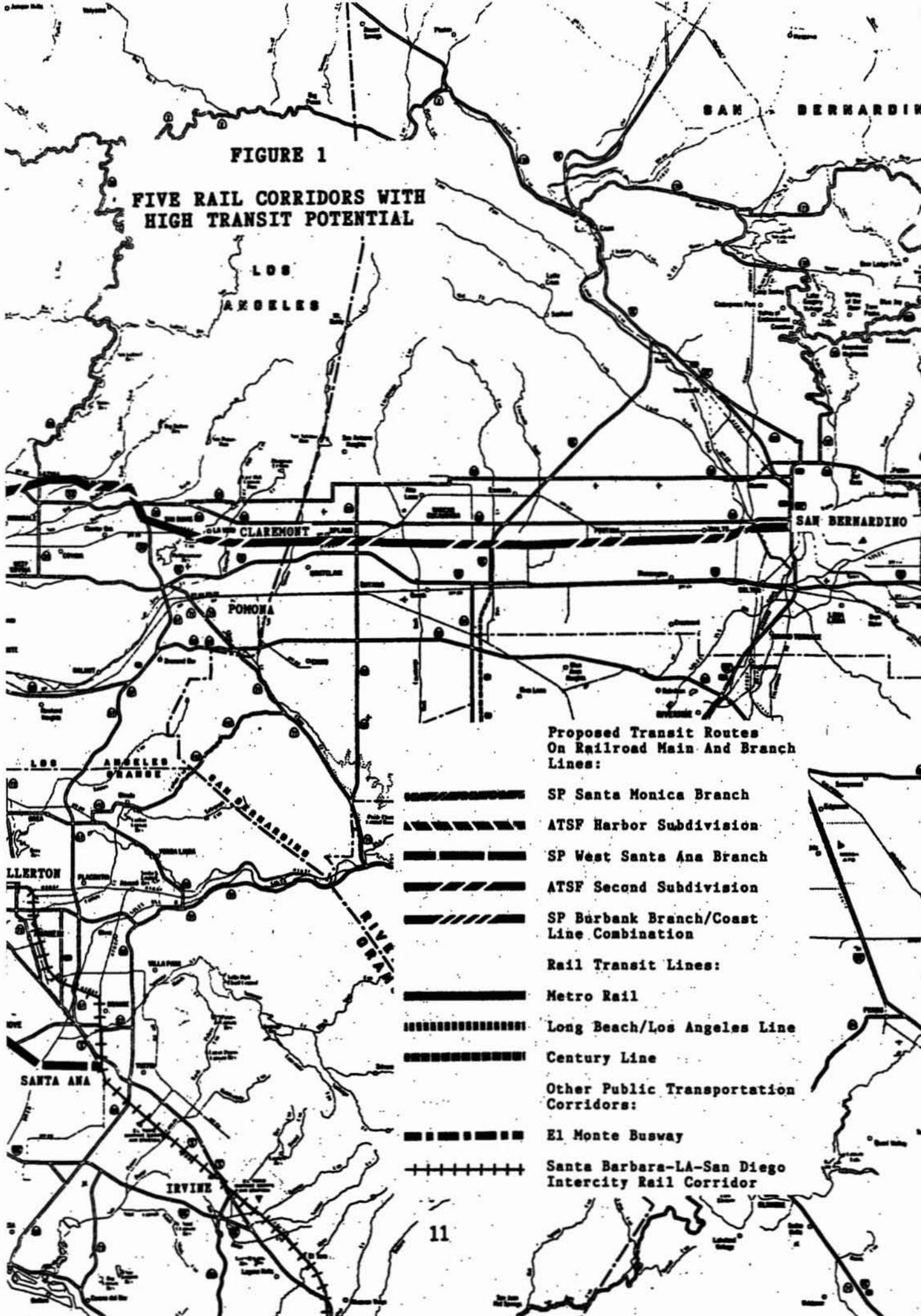


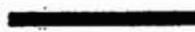
FIGURE 1

FIVE RAIL CORRIDORS WITH HIGH TRANSIT POTENTIAL

Proposed Transit Routes On Railroad Main And Branch Lines:

-  SP Santa Monica Branch
-  ATSF Harbor Subdivision
-  SP West Santa Ana Branch
-  ATSF Second Subdivision
-  SP Burbank Branch/Coast Line Combination

Rail Transit Lines:

-  Metro Rail
-  Long Beach/Los Angeles Line
-  Century Line

Other Public Transportation Corridors:

-  El Monte Busway
-  Santa Barbara-LA-San Diego Intercity Rail Corridor

A West Santa Ana Branch transit route would serve a number of commercial, employment, educational, and residential nodes in the two counties, in Bellflower, Cerritos, Cypress, Garden Grove, and Santa Ana. A connection with Santa Ana is of special significance because the latter is the governmental and administrative center for Orange County, and also has a dense residential base and an OCTD transit terminal. Finally, a West Santa Ana Branch transit route could extend to the LAX area by way of the LACTC's Century Freeway rail transit line and to the LA CBD via transfer to the LA-Long Beach light rail line.

4. The Santa Fe Second Subdivision. The Santa Fe Second (Pasadena) Subdivision extends from the LA CBD northeast to Pasadena, thence east through the San Gabriel Valley to Claremont/Montclair and continuing on to San Bernardino. Although it is presently a railroad main line, the Santa Fe has proposed to abandon the Second Subdivision and consolidate all of its through traffic on the ATSF Third Subdivision (via Riverside/Fullerton) if the Second Subdivision could be sold at an agreeable price. A transit route following the Second Subdivision would relieve traffic demand on the Pasadena, I-10, and I-210 Freeways; it would serve the commuting needs of fast-growing bedroom communities in eastern Los Angeles and western San Bernardino Counties.

The Second Subdivision would serve major employment centers in Pasadena, Claremont/Upland, and San Bernardino as well as commercial, educational, and other activity centers all along the route. This railroad R/W has been proposed both for a light rail line from Los Angeles to Pasadena (and beyond), and also for commuter rail development between LA and San Bernardino. Different sections of the line could be used by LRT and by commuter rail, or else an interurban electric railway could be extended all the way from the LA CBD to the City of San Bernardino.

5. The Southern Pacific Burbank Branch, combined with parts of the SP Coast Line. The Burbank Branch has long been considered a likely candidate for cessation of freight service and later conversion to transit. This branch is currently one of two alternative alignments remaining under study for east-west LRT (or Metro Rail) service in the San Fernando Valley, connecting Warner Center, Tarzana, Van Nuys, and North Hollywood.

Extensions from this basic trunk line are also possible: to Chatsworth in the northwest and Burbank in the east--where a connection could be made with Glendale and the LA CBD via former Red Car rights-of-way, the recently-abandoned UP Glendale Branch, the SP Coast Line, and SP's old Taylor Yard site. Additionally, a link could be made to Metro Rail at Universal City using the Vineland Avenue PE right-of-way and the Hollywood Freeway. These routes could divert considerable travel demand from the congested Ventura, Hollywood, and Golden State Freeways.

Transit lines from both Chatsworth and Warner Center to North Hollywood/Universal City and the LA CBD via Burbank and Glendale would link a number of major employment areas and other activity centers including Van Nuys, the administrative center for the San Fernando Valley. In addition, there appear to be major opportunities for transit joint-development projects centered on old railroad yards south of Glendale, such as Taylor Yard.

Other Rights-of-Way Meriting Protection. Although the Santa Fe Southern Pacific merger did not come to pass, railroad industry trends toward more efficient operations and the need to sell unproductive lines for corporate financial reasons make it very likely that a number of additional lines will be made available for public transit use in the future. Also, considering the spread of population towards the eastern parts of the urbanized area (and the desire to increase employment growth here under the Growth Management Plan), there has been increasing interest in improving public transit systems serving these communities.

For these reasons, during Phase III of this study, it was deemed desirable to conduct a more comprehensive survey of other extant branch lines and main line segments which could have transit potential, and especially railroad lines in Orange, Riverside, and San Bernardino Counties. It was also logical to extend the investigation to abandoned railroad and interurban (Red Car) rights-of-way. These rights-of-way were surveyed to determine how they might fit into a regional, line-haul passenger transport system, and so complement existing plans.

Detailed notes were taken on surrounding land use, especially office, retail-commercial, and residential concentrations, civic centers, and recreational facilities in proximity to each line (as well as adopted land development plans in potential service areas); recognizing that diversified activity along prospective transit facilities would support all-day ridership, increase patronage, and reduce the consumption of operating subsidies-- thus making those lines that enter high-activity areas very promising candidates for transit and further community growth.

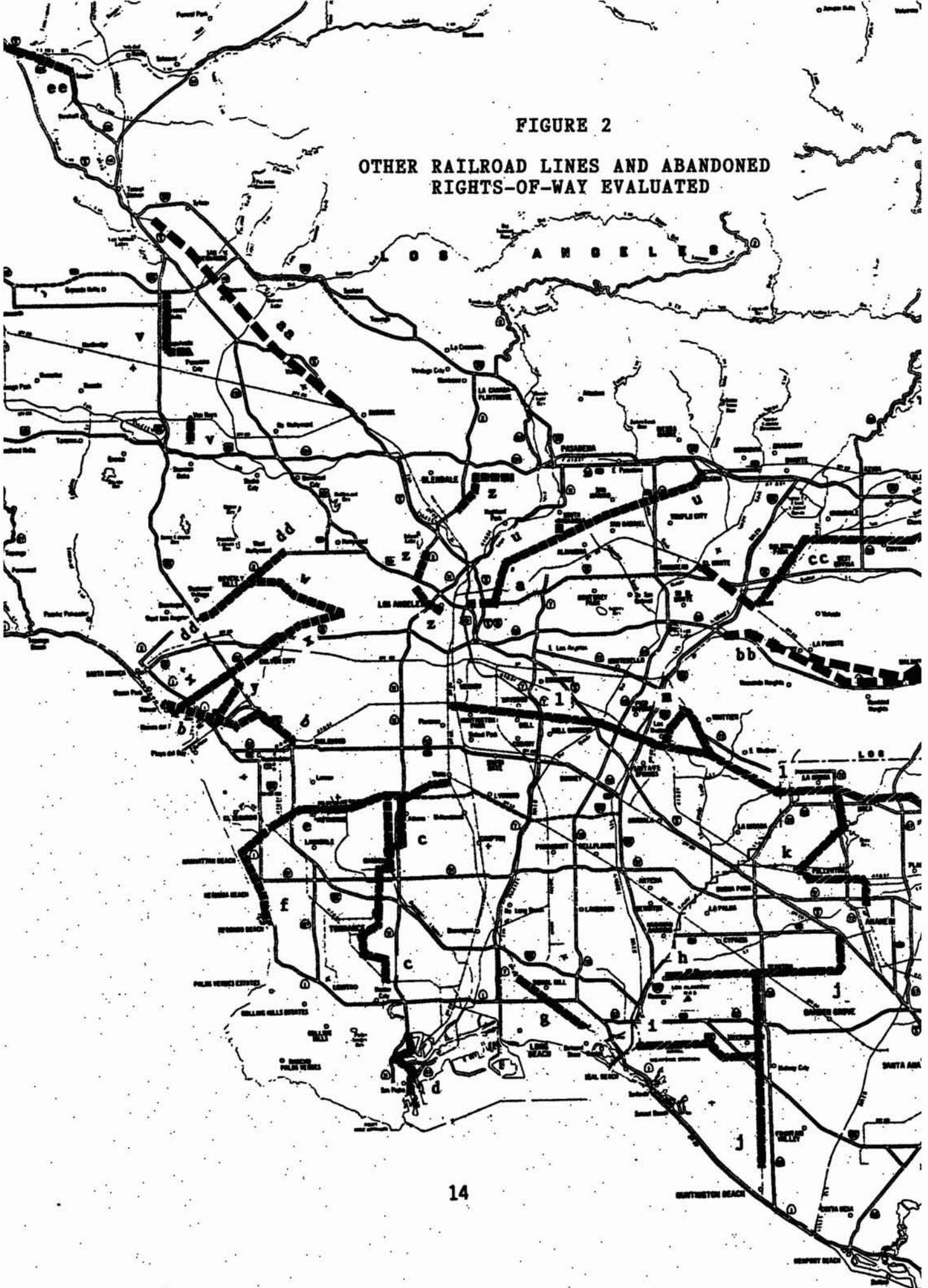
These rights-of-way are displayed in Figure 2 (the letter designations in the text following will correspond to those shown on the figure).

A number of railroad lines currently remain in service but at present experience limited freight traffic and could face abandonment soon. Some of these could provide the basis for a "second tier" of rights-of-way for future transit development:

- o The SP Torrance Branch (c) and El Segundo Branch (e), and the southern end of the SP San Pedro Branch (b), which is used by the Harbor Belt Line, in southwestern LA County.
- o SP Lincoln Park Spur track (a), northeast of the LA CBD.

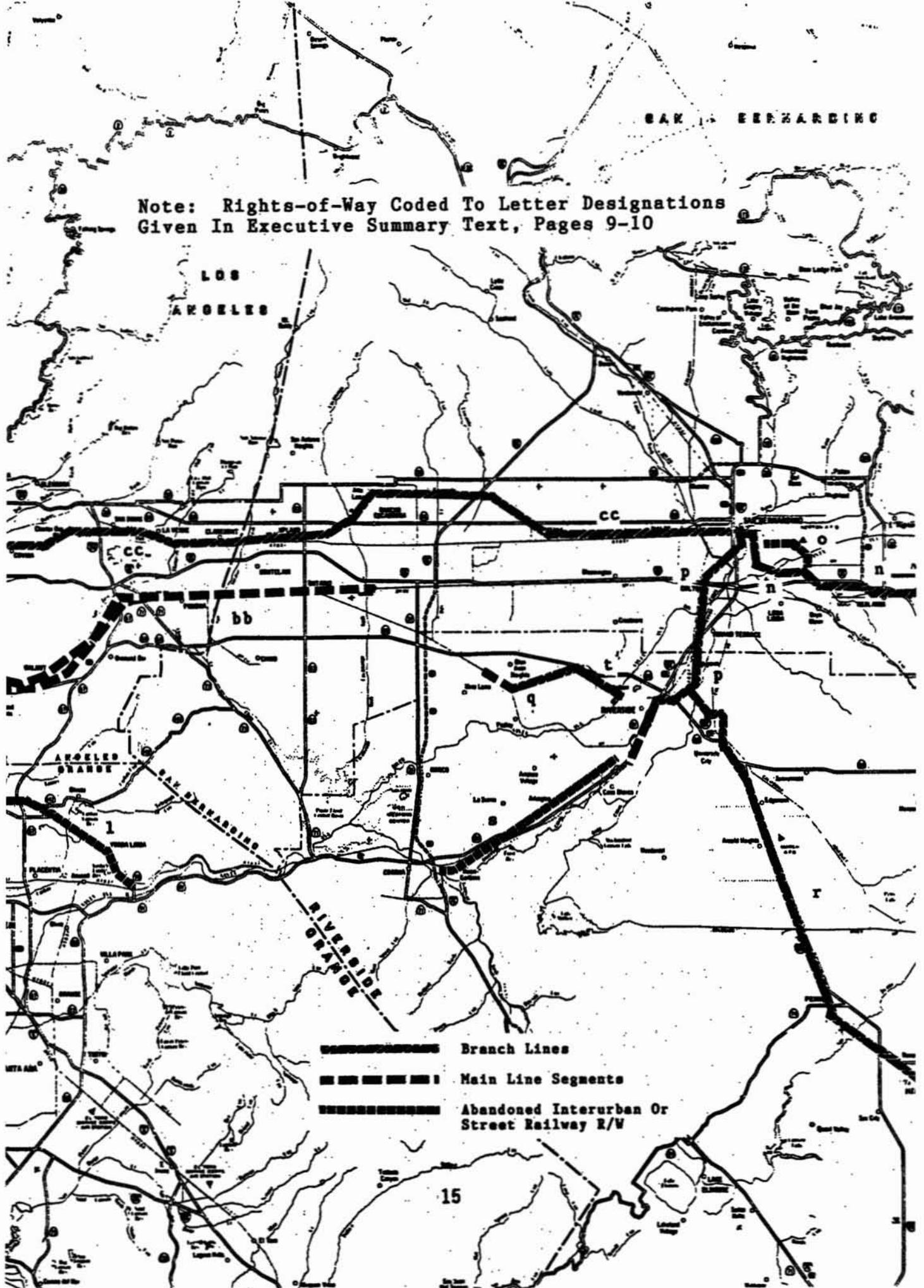
FIGURE 2

OTHER RAILROAD LINES AND ABANDONED RIGHTS-OF-WAY EVALUATED



Note: Rights-of-Way Coded To Letter Designations Given In Executive Summary Text, Pages 9-10

LOS ANGELES



- Branch Lines
- Main Line Segments
- Abandoned Interurban Or Street Railway R/W

- o The SP Los Alamitos Branch (h) and Stanton Branch (j), and US Naval Railroad (i) in western Orange County.
- o The UP Anaheim Branch (k) and SP La Habra Branch (l) in southeastern Los Angeles and north-central Orange Counties.
- o The SP Baldwin Park Branch (cc) in eastern Los Angeles County and western San Bernardino County, which has recently been proposed for sale by the Southern Pacific--combined with SP State Street Line (I-10 Freeway alignment).
- o The ATSF San Jacinto Subdivision (r) and Redlands Subdivision (n), SP San Bernardino and Riverside Branches (p), and UP Crestmore Branch (q) in San Bernardino and Riverside Counties.
- o Segments of the SP Santa Paula Branch (ee) may also be put in this category (reverse commuter rail potential).

Although not in any danger of abandonment, parts of several main lines may also have considerable transit potential:

- o The SP Saugus line (aa): San Fernando Road corridor.
- o The SP Alhambra Line and/or UP Second Subdivision (bb) between Industry and Ontario (combined with the Pomona Freeway and other rights-of-way).

Certain abandoned railroad branch lines and former Red Car and Yellow Car lines also fall into the high-potential category. These former rights-of-way, some of which are highly endangered, include (but are not limited to) the following:

- o Former PE rights-of-way in Van Nuys Boulevard, Parthenia Street, and Sepulveda Boulevard (v) in the San Fernando Valley.
- o The former SP Aila-Inglewood Branches (b) and ATSF Redondo District (f) in western Los Angeles and South Bay.
- o The PE rights-of-way along Venice Boulevard (x) and Culver Boulevard (y), in Venice/western Los Angeles/Culver City.
- o The surviving segments of the former SP West Los Angeles Branch (dd) and former PE rights-of-way in San Vicente Boulevard/Burton Way (w) in western Los Angeles.
- o The unused Downtown People Mover tunnel and former PE tunnel in the LA CBD, and PE right-of-way in Glendale Blvd. in the Silver Lake area; together with the former Yellow Car right-of-way in Eagle Rock and Colorado Boulevards (z).
- o The former PE rights-of-way in Huntington Drive and Fair Oaks Avenue in the western San Gabriel Valley (u).
- o The former SP East Long Beach Branch/PE Newport Line (g) in Long Beach.
- o The former SP Whittier Branch (m) in eastern Los Angeles County.
- o Abandoned sections of the SP San Bernardino Branch (o) and SP Redlands Branch and the interurban or utility R/W in Mission Boulevard (t) in Rubidoux (near the Riverside CBD).
- o The former PE Riverside-Corona right-of-way (s) in Magnolia Avenue south of downtown Riverside.

Intercity And Commuter Rail. As noted above, there have been a number of recent proposals to develop intercity and commuter rail service on railroad main lines. In general these involve lines not on the endangered list. However, it should be noted that the Santa Fe Fourth Subdivision, from Fullerton to southern Orange County (and on to San Diego), which handles primarily passenger trains, has been proposed for sale to public agencies.

This line figures prominently in plans to enhance the existing LOSSAN corridor intercity train service, and to develop new commuter rail services (perhaps electrified) from southern Orange County to Los Angeles and from Riverside to Irvine.

Other railroad main lines could be utilized in intercity and commuter rail improvement projects, including the Santa Fe Third Subdivision from Los Angeles to Fullerton, Riverside and San Bernardino, and the Southern Pacific Coast Line from Los Angeles to Simi Valley, Oxnard, and Santa Barbara. These two lines are in active freight use and in no danger of abandonment.

Jurisdictional Responsibility For Right-of-Way Protection. The delineation of responsibility for right-of-way acquisition and preservation, and precisely how these tasks would be accomplished, is a major regional issue. There are a number of jurisdictions and public agencies involved in railroad right-of-way protection and purchase, and in regulation of the abandonment process, including the following: the Interstate Commerce Commission (ICC), the California Public Utilities Commission (PUC), California Department of Transportation (Caltrans), the California Transportation Commission (CTC), County Transportation Commissions, transit districts, and cities.

SCAG's Regional Mobility Plan calls for the identification and protection of potential rights-of-way connecting subregions and major activity centers for future transportation purposes, to be accomplished primarily through local governmental action. The roles and responsibilities of various agencies and jurisdictions in the area of right-of-way preservation and acquisition however already overlap (especially where rights-of-way cross county or city lines), and will need to be more clearly delineated in the future.

The County Transportation Commissions are responsible for development of major transit facilities within their respective counties, and in connection with this they have been heavily involved in right-of-way preservation and acquisition. Protection of former rail rights-of-way already in public hands is often the responsibility of cities, while Caltrans is frequently involved in the protection of former interurban rights-of-way along state highway corridors (for purposes of future highway widening).

The Interstate Commerce Commission is responsible for granting permission for railroad abandonment, including main and branch

line track. Under ICC procedures, a System Diagram Map showing the line to be abandoned is published by the railroad and forwarded to designated state clearing houses, four months prior to application for abandonment.

Public agencies have the right of first refusal, permitting states, local agencies and jurisdictions to purchase such abandoned lines for public transit (and other) purposes. After the application for abandonment is filed, the ICC will make its decision to permit abandonment 75 to 255 days after the filing date (according to whether it decides to investigate, and whether there is an appeal to the initial decision). The burden of proof is upon shippers of goods by rail to demonstrate the need to maintain service to sidings, spurs, and team tracks, and along branches.

The railroads can ask for an exemption from this procedure in abandoning branch lines which have had no freight movements within the preceding two years. The California PUC has jurisdiction over abandonment of spur lines; while abandonment procedures may not be needed in cases of track consolidation where no freight customers have been cut off from service.

Caltrans is authorized under existing law to purchase abandoned rail rights-of-way and offer them to local agencies and jurisdictions for transit purposes. However, the Abandoned Railroad Right-of-Way Account, which was used for the purpose of acquiring already abandoned rights-of-way based on a 1978 priority list (which has never been updated), has been exhausted; it would require legislative action to restore funding. Caltrans also has the power to condemn and acquire abandoned lines by eminent domain.

Senate Bill 1562, sponsored by Senators Presley, Ayala, and Craven, in enacting the California Commuter and Intercity Transit Right-of-Way Preservation Act, would authorize the county transportation commissions and other transportation planning agencies to prepare and submit to the California Transportation Commission (CTC) comprehensive inventories of rights-of-way suitable for commuter rail, urban rail transit, and exclusive busway facilities for the areas under their jurisdiction.

These, together with a Caltrans Intercity Rail Right-of-Way Inventory, would be used by the CTC to draft a statewide plan encompassing all the rail right-of-way acquisitions included in these plans (and conforming to adopted regional transportation plans) in order to foster the development of an efficient passenger rail and urban transit system in California.

Although private enterprise was responsible for the original construction of most of these rights-of-way, often to serve real estate development, the recent private sector role has for the most part been as an agent for breaking up and redeveloping abandoned rights-of-way for other purposes.

At present, short line freight carriers have been the most significant private entities engaged in right-of-way preservation: by purchasing marginal freight lines from major railroads, they could have an important role to play in saving some of these R/W for future transit use on a time-sharing basis (under appropriate agreements with transit development agencies).

However, considering that private corporations are becoming increasingly involved in providing their own public transport shuttle services (such as the Irvine monorail), there is some precedent for a greatly expanded private sector role in right-of-way protection in the future.

Hence, the private sector role in right-of-way preservation will need to be more clearly defined in the future; creative ways should be found to involve commercial developers, short line carriers, and others, in acquisition and protection of railroad rights-of-way for future public transportation purposes. In many cases, this involvement would probably be concerned with providing transit access to major public/private joint venture projects.

Other Major Findings. Although it is believed that as much as 20 to 40% of transit capital costs may be defrayed by using transit/real estate joint projects and other value-capture techniques, additional revenues may often be needed both for purchase of endangered rights-of-way and for construction of new transit facilities along rail corridors. Possible sources include sales taxes, a state gasoline tax increase as advocated by Assemblyman Richard Katz and others, and sale of bonds for passenger rail capital improvements as recently proposed by Assemblyman Costa and the Planning and Conservation League.

Delineation of responsibility for funding major transit facilities within the SCAG region--especially those that cross county lines--is a major regional issue, and one which will need to be resolved if we are to achieve the goals of the Regional Mobility Plan.

Current plans by the LACTC, OCTC, RCTC and SanBAG that favor transit development on certain existing or former railroad rights-of-way provide a useful starting point for the evolution of a regional strategic plan to preserve rail corridors for transit use. The construction of the LA-Long Beach and Norwalk-El Segundo (Century Freeway) lines in Los Angeles County will facilitate development of a number of other transit lines, including an Orange County line on the West Santa Ana Branch.

Similarly, construction of a transit line on the West Santa Ana Branch would enable development of a number of connecting lines within Orange County, some of which could follow railroad rights-of-way. Generally, the future development of transit lines on

railroad rights-of-way in Orange County will complement--not compete with--current HOV lane/transitway plans.

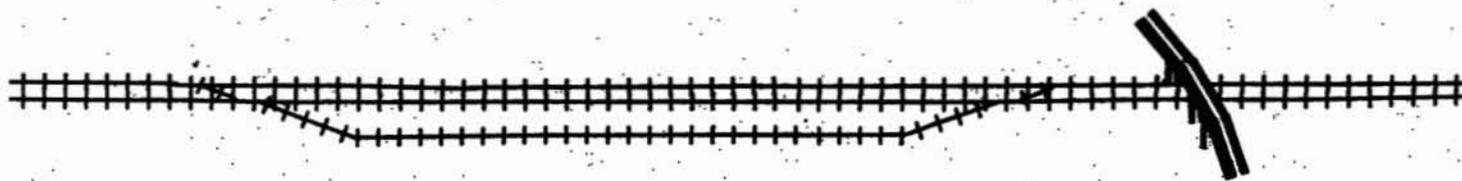
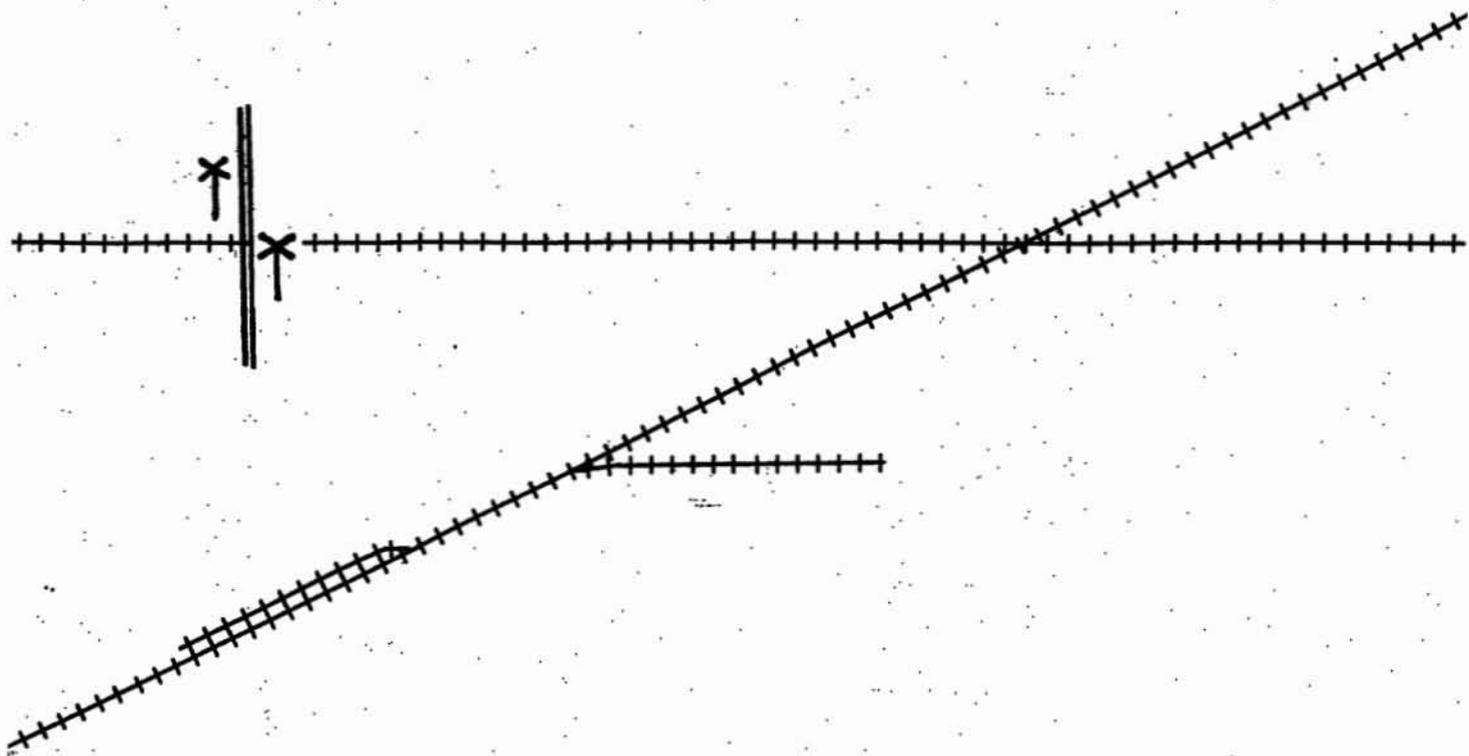
While most of the recent proposals involving Riverside and San Bernardino Counties have focused on longer-distance links to Los Angeles and Orange Counties, there exist in the eastern part of the urbanized area several underutilized and abandoned railroad branch lines and former Red Car rights-of-way which may merit preservation for possible future development of line-haul transit (e.g., LRT for shorter trips within the Inland Empire).

Study Recommendations. The following major study recommendations, are consistent with SCAG's adopted Regional Mobility Plan, Growth Management Plan, and other adopted regional policies. These recommendations are:

- o As part of the Regional Mobility Plan implementation program, a strategic plan should be developed for railroad right-of-way preservation and development. This should:
 - Devise a plan for acquisition of railroad rights-of-way to preserve them for future transit and community development.
 - Establish means for protection of railroad and interurban rights-of-way which have already been abandoned.
 - Determine who will be responsible for right-of-way acquisition and preservation, and describe how these tasks would be accomplished.
 - Delineate responsibilities for transit and community development of railroad rights-of-way.
 - Find ways to finance construction of transit facilities on railroad rights-of-way, and determine funding responsibilities by agency and jurisdiction.
 - Establish a private sector role.
- o Development of transit facilities along appropriate railroad lines which are determined to have high transportation, joint development, and growth-management potential should be pursued where practicable and environmentally feasible.
- o A more thorough inventory should be made of the status of former Red Car, Yellow Car, and overlooked steam railroad rights-of-way; the search for rights-of-way suitable for transit should also be extended to other types of right-of-way (freeways, utility corridors, undeveloped land, etc.).
- o Efforts should be made to integrate transportation and land use planning, using transit facilities on railroad rights-of-way to promote community development, enhance the growth of

regional centers, improve jobs/housing balance, and encourage the clustering of new and relocating activity on the periphery of the urbanized area along linear travel corridors.

- o A comprehensive study should be undertaken of joint development potential as an important supplementary funding source for all capital-intensive, major transit operating facilities. This should include creative ways of involving the railroad industry in transit joint development.
- o County and city planning agencies should become actively involved in assessing the transit and development potential inherent in existing and former railroad lines. Local agencies should consider nominating transit/railroad right-of-way projects for inclusion in the Regional Mobility Plan, to aid in refining the intra-regional line-haul transit system.
- o The private sector should become more actively involved in the planning and financing of public transportation facilities, especially those on former railroad lines. Public institutions should support and promote their active participation in providing transit infrastructure.



1. INTRODUCTION AND BACKGROUND

1.1 Historical Background And Current Problem.

The SCAG region is favored by an extensive network of railroad lines, belonging primarily to three major carriers: the Santa Fe, Southern Pacific, and Union Pacific (Figure 1.1). To a large extent the early growth of the Los Angeles Basin was shaped by the expansion of steam railroad lines in the late 1800's and the early part of this century. This was supplemented by a large network of electrified interurban ("Red Car") and street railway ("Yellow Car") lines (Figures 1.2-1.4). Together, the railroad, interurban railway, and streetcar lines provided a highly efficient form of public transportation in the Southern California area, connecting suburban communities with the Los Angeles central city core.

As in many other parts of the country, these rail transport services underwent a continual decline beginning in the 1930's (during the Depression) and accelerating during the 1950's with the widespread expansion of freeways. In the Los Angeles area, the low density pattern of growth which the rail network had first made possible was particularly amenable to the use of the private automobile. As more and more families were able to afford their own cars, there was a steady reduction in the use of streetcars, interurbans, and commuter trains. The last Red Car service (on the Long Beach line) terminated in 1961, leaving only intercity passenger rail service on a few corridors.

Although the private automobile, supplemented by local and express buses in mixed flow traffic, might have sufficed for our mobility needs had no more growth occurred after the 1950's, regional population has in fact grown from under five million in 1950 to 11.5 million in 1980; and it is expected that population will reach 16 million by the year 2000. Southern California is presently faced with a serious traffic congestion problem (see Chapter 2). Mobility and growth-management are among the most serious issues facing our area today.

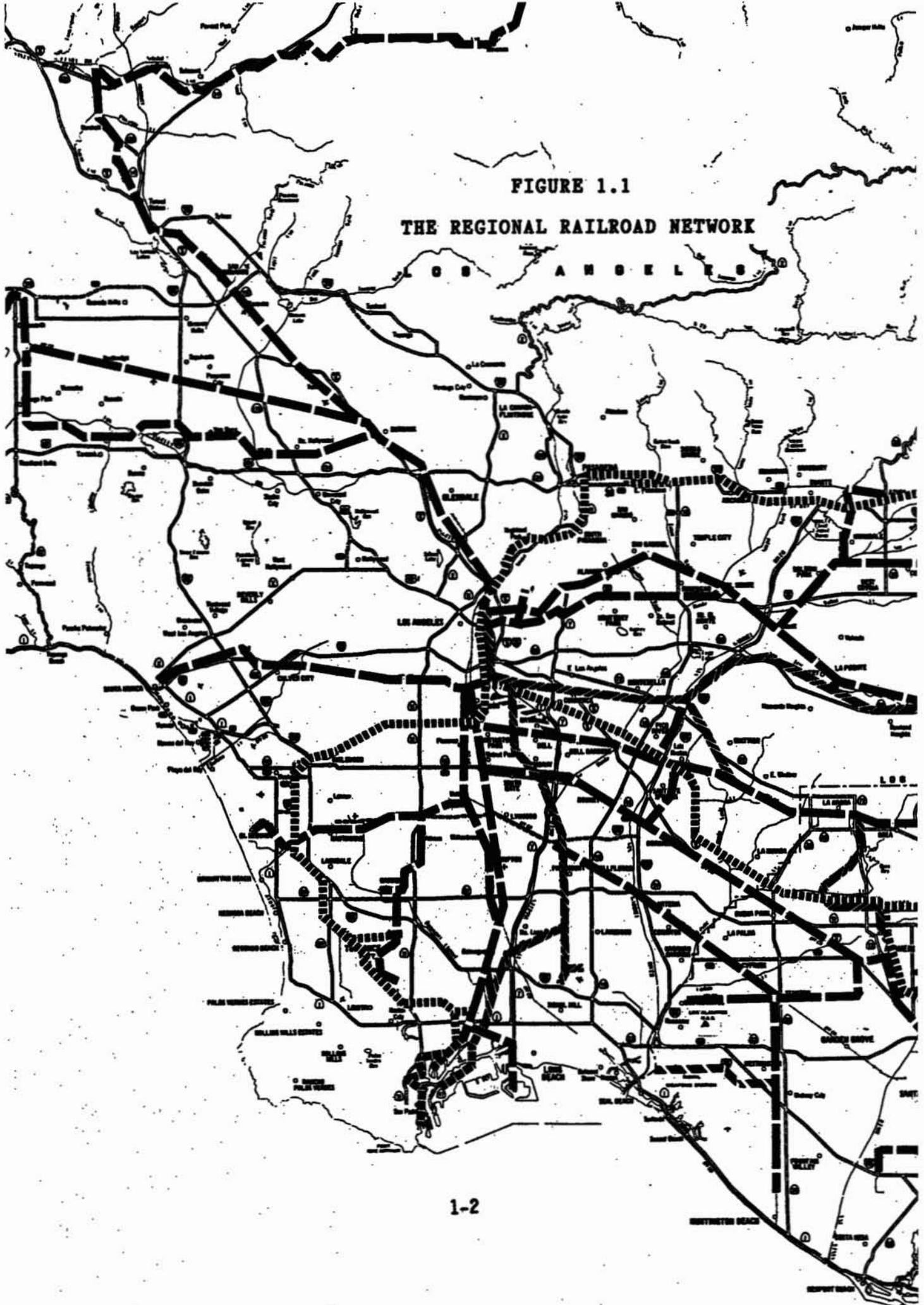
The SCAG region is currently embarking on an ambitious program of rapid transit, light rail, and HOV (high-occupancy vehicle) lane development to alleviate traffic congestion, including the Los Angeles and Riverside County Proposition A networks and Orange County's transitway program. However, one of the most serious constraints to developing a cost-effective transit network is the availability of right-of-way. Unless we are able to utilize pre-existing rights-of-way such as old railroad lines for a significant portion of the emerging regional transit system, it will be necessary to rely upon much more costly options including subway construction, extensive rebuilding of freeways, or condemnation of homes to create new rights-of-way.

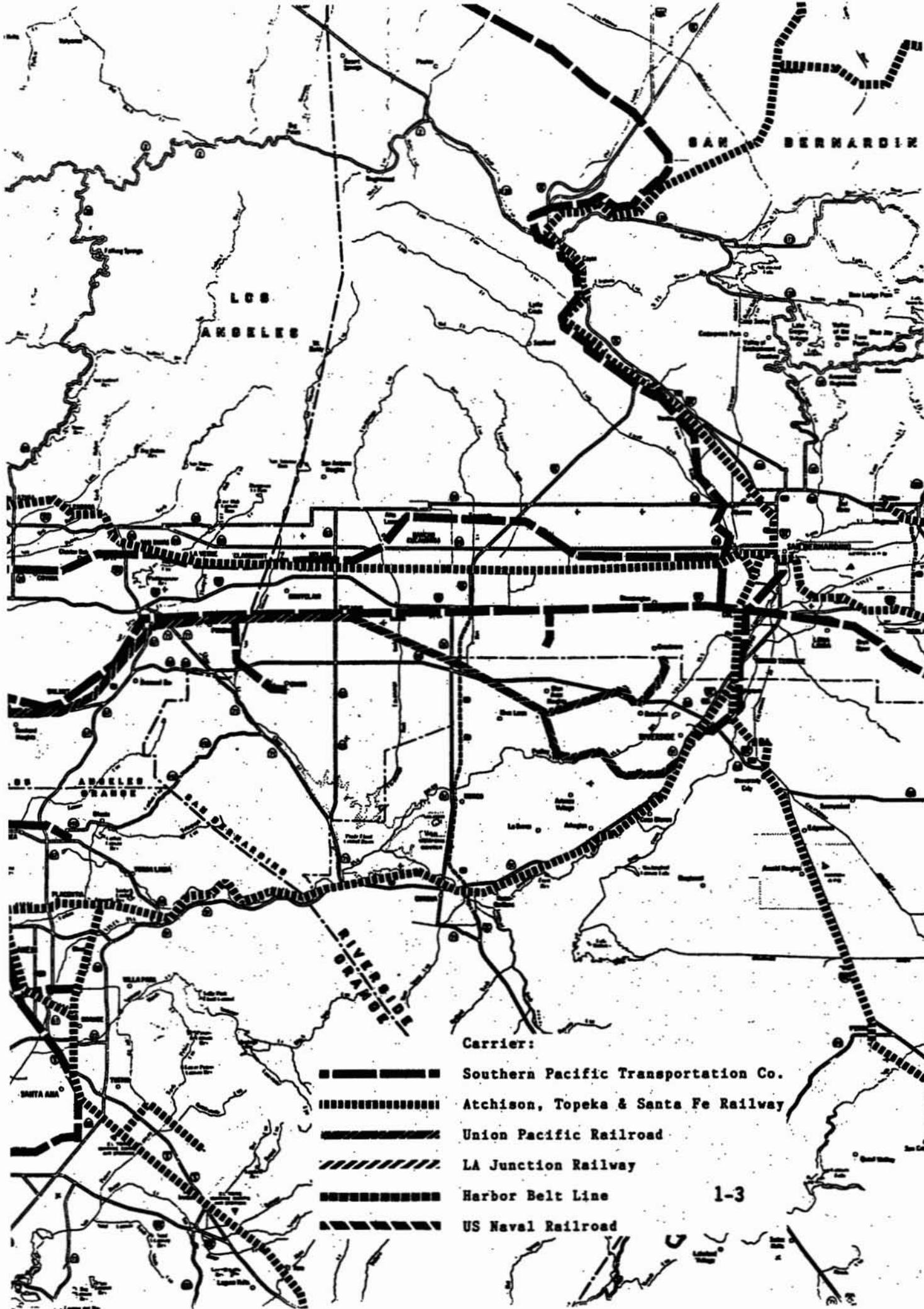
1.2 Basic Study Concept And Objectives.

Although some of the Red Car rights-of-way have been paved over and incorporated into local streets and highways, the rail freight network has remained largely intact. A considerable amount of land is currently owned by the three major rail carriers in the SCAG region. This takes the form of linear rights-of-way

FIGURE 1.1

THE REGIONAL RAILROAD NETWORK





Carrier:

-  Southern Pacific Transportation Co.
-  Atchison, Topeka & Santa Fe Railway
-  Union Pacific Railroad
-  LA Junction Railway
-  Harbor Belt Line
-  US Naval Railroad

used as railroad main lines and branches, yards (often centrally located), existing and former station sites, and other property contiguous with the rail lines. These rights-of-way connect the Los Angeles CBD with other regional centers, or pass through or near other high-activity areas.

Many of the railroad branch lines in Southern California are underutilized, owing in part to the changing nature of the railroad business which emphasizes large, efficient yards, unit train operation for bulk commodities, and fast intermodal movement of higher-valued goods: trailer-on-flatcar (TOFC) for domestic cargoes and container-on-flatcar (COFC) for international trade. Pick-up and delivery of much of this freight by truck has made smaller rail yards and team tracks largely obsolete. In addition, corporate developments such as mergers, a strong interest in real estate development by the rail carriers, and track consolidation plans for reasons of greater efficiency will lead to a local railroad network of reduced size over the next several decades.

The use of railroad rights-of-way for public transportation, including rapid transit, light rail, other fixed guideway modes, and busway facilities, could play a major role in the future in solving our increasingly severe peak-period congestion problems. Additionally, commuter and intercity rail services on main line tracks and even high speed "Bullet Trains" or magnetic levitation systems may have a significant role in providing service on densely traveled corridors connecting the Los Angeles area with nearby cities.

Further, there may be considerable potential for joint transit/land use development focused on railroad corridors serving downtown Los Angeles and a number of other major centers in the SCAG region. The kinds of joint ventures particularly suitable for these corridors would include office space, commercial shopping centers, medium- and higher-density residential projects, recreational facilities, and industrial parks. Also very appropriate are multi-purpose projects incorporating commercial and residential land uses, and multi-modal transportation centers (including station parking).

Some of these undertakings could utilize old railroad yards contiguous with CBD areas, together with redevelopment of other privately held property and municipally owned land near the rail lines. Projects of modest size could combine narrow strips of railroad owned land (including the air rights over the tracks) with adjacent non-railroad property. The general idea is to concentrate future growth along linear railroad/transit corridors so as to reduce the need for new highway facilities, maximize transit system utilization and lower transit operating subsidies; while at the same time promoting community development and more efficient land use patterns, and enhancing urban centers.

Such developments could be located in outlying areas (neighborhood work centers) as well as in more centralized locations. The former would promote reverse commuting along the transit corridors, thus increasing transit revenues while improving equipment utilization. It is apparent that the railroads could participate in these ventures, in partnership with other private investors and municipal redevelopment agencies for mutual benefit. It follows that special development districts and other financing mechanisms could be instituted to allow some of the revenues from these developments to be applied to financing the capital costs of new transit facilities.

However, only certain rights-of-way have potential for significant railroad corporate involvement in joint-development projects. The protection of other rail lines for future transit purposes may require substantial property acquisition by various jurisdictions in southern California. The projected reduction in the size of the railroad network in the near future also carries with it a danger: that the public sector may not be able to react rapidly enough to secure rights-of-way that will ultimately be needed to solve our urban mobility problems.

Significant right-of-way loss has already occurred in the SCAG region, and even greater losses will occur if timely action is not taken. For this reason, it is important to identify at this time those rights-of-way which may have transit potential, whether or not it is possible at this time to identify opportunities for partial transit self-financing along all of the corridors. (A detailed assessment of transit joint development potential for all rail lines in the region would have required a far more massive work effort than has been possible during the course of this study.)

Study efforts have been concentrated on taking an inventory of the region's railroad facilities, identifying the lines that appear to have transit potential, and determining the likelihood that they will be abandoned in the near future. In addition, attempts have been made to identify other railroad-owned land such as large rail yards which could form the nucleus of joint development projects--some of which might involve railroad industry investment. The Railroad Right-of-Way Evaluation project therefore has the following primary objectives:

- I. To determine which rights-of-way are in danger of abandonment and being lost, and to suggest priorities for right-of-way preservation.
- II. To identify major opportunities to utilize railroad rights-of-way for transit purposes, with regard to future patronage potential.
- III. To recommend ways in which transit utilizing railroad rights-of-way can promote regional connectivity and help to alleviate major traffic problems.
- IV. To investigate joint development opportunities, especially those involving railroad-owned land such as underutilized rail yards, and suggest ways in which the private sector can become involved in helping to plan and fund transit infrastructure, both to reduce public subsidy requirements and to promote community development, environmentally favorable land use patterns, and balanced growth in our multi-centered urban area--with a more favorable ratio between housing and jobs within counties and major sub-areas.

1.3 Study Approach.

This report will begin with an overview of the expected levels of economic and population growth in the SCAG region and call attention to the serious levels of traffic congestion which are associated with this growth. This will be followed

by a review of recent developments in the railroad industry.

Next will come a survey of some recent transit developments elsewhere in North America which have utilized existing or abandoned railroad rights-of-way, and a discussion of the various value-capture methods which have been proposed to improve our ability to make transit self-financing. This will be followed by descriptions of some of the more significant transit/real estate joint development projects and proposals elsewhere.

After this will come a description of the railroad network in the SCAG region; we will briefly discuss the Regional Mobility Plan and review county fixed guideway and busway transit plans within the region.

We will then elaborate upon demand factors which were used in determining potential for viable transit development on railroad rights-of-way in the SCAG region, and discuss in some detail transit patronage and joint development potential for five "high-opportunity" lines which were identified in our early discussions with railroad industry representatives. Of these, four have been the subject of considerable recent discussion, and for the fifth, transit development has already been approved along one segment.

This is followed by a synopsis of many additional railroad lines and former Red Car rights-of-way, some of which also have moderately high transit patronage and/or joint development potential and would comprise a "second tier" for future transit utilization. A discussion of the right-of-way preservation issue will be included here, and priorities for right-of-way protection indicated.

Finally, we will discuss financial issues as well as recent legislative proposals for transit funding (which could have major bearing on right-of-way preservation), and present major study findings--including ways in which use of railroad rights-of-way may help fulfill goals already established by local transit planning/implementation agencies. We will end by detailing study recommendations, including actions relating to acquisition/protection of certain endangered rights-of-way, and indicate additional right-of-way study needs.

Several appendices to the report will provide supporting material on transit technologies suitable for use on railroad rights-of-way, and on methods of constructing transit facilities along railroad corridors. Further appendices provide a detailed discussion of rights-of-way other than the five lines investigated during the initial study phase: including branch lines which may soon be abandoned, main lines which may also have transit potential, and already-abandoned rights-of-way (including former interurban lines); and the reasons why certain lines were excluded from the analysis. Another very important appendix provides an overview of intercity passenger rail development plans and commuter rail proposals.

1.4 SCAG's Role In Regional Transportation Planning.

SCAG is responsible for developing the Regional Mobility Plan, which serves as the Federally and State required Regional Transportation Plan and is intended to establish policies and actions to address regional mobility issues over a 20-year horizon. Hence, SCAG has a major role in coordinating planning efforts

within the region, with particular regard to long-range transit planning and major new transit facilities which will cross county boundaries.

Additionally, SCAG is responsible for the Growth Management Plan, which makes recommendations for balanced growth within the region, including coordinated transportation and land use.

SCAG also has an advisory role to play with respect to planning of major transit facilities by the County Transportation Commissions and other agencies charged with the responsibility of establishing local priorities for transit route development, and the design, funding, construction, and operation of such facilities. Finally, SCAG has an educational role in regard to informing elected officials, the private sector, and the general public on these matters.

SCAG has been involved in many projects relating to rail freight and rail access to the ports, as well as commuter and intercity rail development, and has had extensive experience in the area of land use and demographics. Therefore, SCAG is in a unique position to undertake a study of this nature.

1.5 Previous Work.

This is by no means the first investigation of the transit potential of railroad lines in our area. There have been numerous proposals in the past for transit development on individual corridors, mainly in Los Angeles and Orange Counties. The most comprehensive earlier study of transit on railroad lines (as well as other rights-of-way) was conducted by the LACTC in 1983 and in 1984, with the emphasis on patronage projections (1,2). The OCTD during the same period focused on several railroad corridors, especially the Southern Pacific West Santa Ana Branch, a former Pacific Electric (Red Car) right-of-way (3). Additionally, several detailed inventories were made over the last two decades by SCAG and Caltrans on surviving Pacific Electric rights-of-way (4,5).

However, none of the earlier studies had a transit value-capture/joint development orientation. In addition, since these studies were done, there have been marked increases in population, employment, and commercial development within the SCAG region, with recent forecasts showing some marked shifts in home-buying activity and other development towards the eastern part of the urbanized area. Finally, there have been changes in the railroad corporate situation which have major bearing on the potential for public acquisition of rights-of-way. For all of these reasons, it is apparent that the time is ripe for a fresh look at the use of railroad corridors for transit.

1.6 Project History.

The Railroad Right-of-Way Evaluation had its origin in 1985 when there was interest at the Los Angeles County Transportation Commission (LACTC) and at SCAG in the impacts of the then-pending merger between the Atchison, Topeka & Santa Fe Railway (ATSF) and Southern Pacific Transportation Company (SP) on regional transit planning. It was anticipated that the merger, if consummated, would produce some positive benefits for the Los Angeles area by making available for public transportation purposes certain railroad rights-of-way which would no longer be needed for rail freight.

SCAG's Railroad Right-of-Way Project began in the summer of 1986. Just prior to this, in the spring of 1986, the Santa Fe Pacific Realty Co. (6) suggested that the merged railroad enter into a partnership with public agencies to develop light rail or commuter rail lines on several lightly-used branch lines which would likely be abandoned after completion of the merger (Figures 1.5, 1.6.). With electrified commuter lines operating on high-volume corridors offering direct access to the Los Angeles central city core area, railroad-owned property would have greater development potential, increasing its value.

Two lines were originally proposed, using the SP Burbank and Santa Monica Branches; relatively low capital cost and short implementation time were cited as major advantages of this concept (7,8). At the time there was considerable railroad interest in mixed-use development of their Union Station property in downtown LA, a site with potential for excellent transportation access (9).

As there was every indication in 1986 that the Santa Fe-Southern Pacific railroad merger would be approved by the Interstate Commerce Commission (ICC), it appeared that the near future would see a major opportunity for transit joint development projects involving the use of the railroad corridors. Several meetings were held between SCAG staff, the Santa Fe Pacific Realty Co. and the Urban Innovations Group (UIG), a consultant team affiliated with UCLA, to develop a detailed scope of work for the first phase (FY 1986-87) of the Railroad Right-of-Way Evaluation project.

During Phase I, four individual lines, and a fifth corridor representing a composite of several lines, were identified as probable candidates for abandonment owing to a low level of freight activity, or because they would be redundant under track consolidation plans. As transit corridors, these lines would have potential for realizing heavy patronage, and all of them coincided with previously-identified fixed guideway/transitway corridors in existing regional plans. Staff collected a considerable amount of right-of-way and land use data pertinent to these corridors.

On July 24, 1987, contrary to the expectations of most people, the ICC denied the Santa Fe-Southern Pacific merger. Had the merger been approved, plans would have progressed to immediately consolidate certain rail freight corridors where the ATSF and SP owned parallel trackage, notably between San Bernardino and Los Angeles, and from the LA CBD to the port area. With the denial of the merger, these opportunities were lost to the rail carriers, and it was up to the managements of the ATSF and SP to determine how best to improve their operations, without the possibility of combining their main line and other line-haul freight services.

Rescoping of Phase II of the project, for FY 1987-88, was therefore necessary. It was decided to concentrate on the study of intercounty transit connections, including commuter rail service. Project resources were diverted to supporting SCAG's Regional Transportation Plan effort to develop patronage forecasts for a regional transit system (as most of the railroad rights-of-way in question closely parallel recognized travel corridors in the area), and to commuter rail patronage forecasts for specific lines, notably on the Los Angeles-Oxnard, Los Angeles-San Bernardino, and Riverside-Orange County corridors. Also, a focused

study was begun of land use and development potential along the LA-San Bernardino (ATSF Second Subdivision) corridor.

Meanwhile, a fresh assessment was made of the railroad situation, and of the likelihood that corporate changes, track consolidation, or abandonments would make certain lines available for transit. During the latter part of FY 87-88 and in FY 1988-89, extensive field surveys were made of a large number of railroad rights-of-way, including the five "high opportunity" lines identified during Phase I, and most of the remaining branch lines. Note was made of recent commercial and residential projects in the vicinity of these rights-of-way, and of proposals for new development nearby. This work has constituted Phase III of the Right-of-Way Evaluation, in preparation for writing the Final Report on the project.

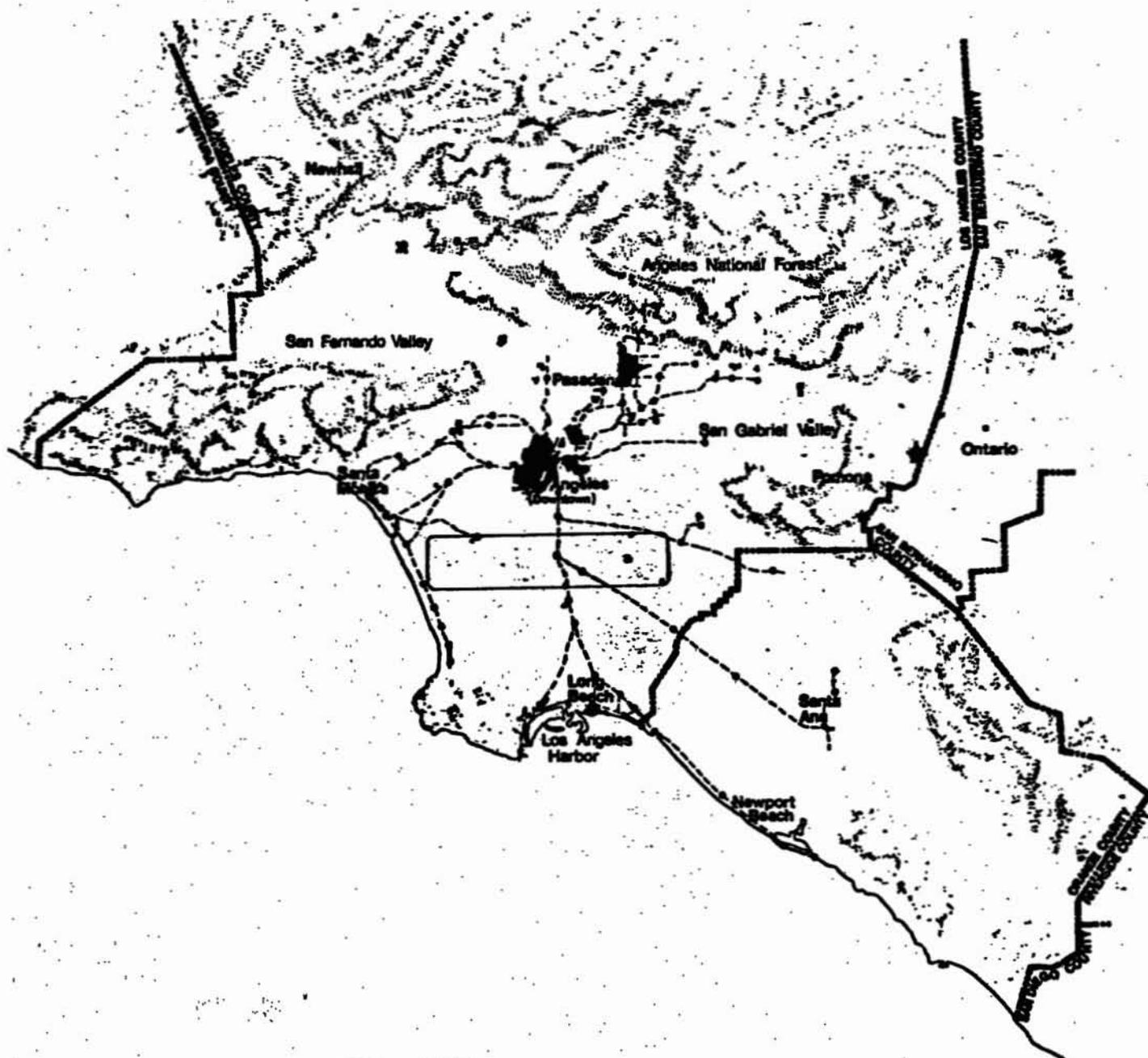
These studies have made it possible to update and expand upon the initial study findings. This is especially important in the light of recent proposals to discontinue freight service on certain lines. Considering the magnitude of the congestion problems facing our region in the future, we cannot afford an ill-informed assessment of transit potential for any of these railroad corridors.

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FIGURE 1.2

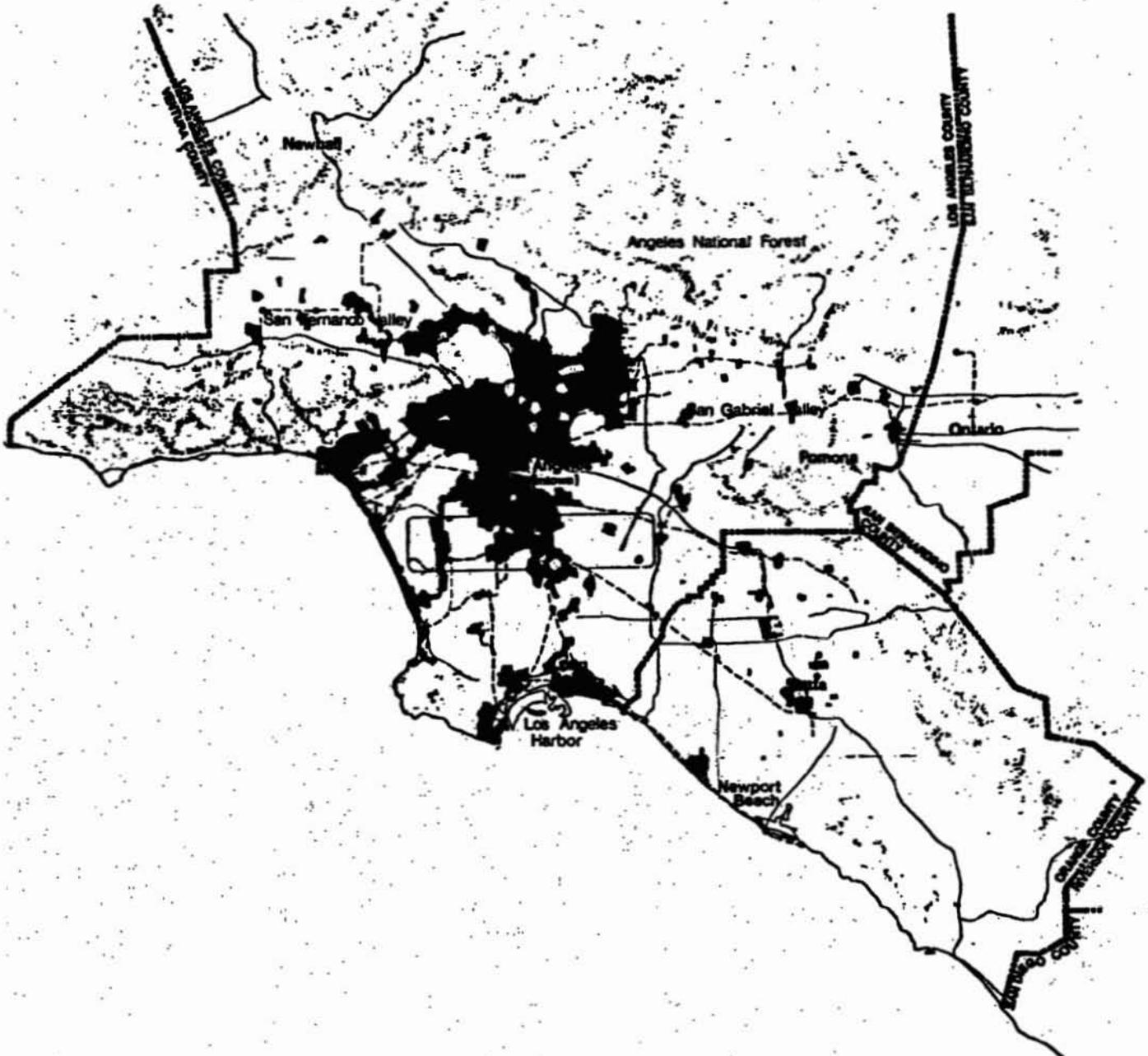
GROWTH IN THE LOS ANGELES AREA INDUCED BY
THE PACIFIC ELECTRIC SYSTEM: 1906



Source: I-105 EIS, 1978

FIGURE 1.3

GROWTH IN THE LOS ANGELES AREA INDUCED BY
THE PACIFIC ELECTRIC SYSTEM: 1924



Source: I-105 EIS, 1978.

LINES OF THE PACIFIC ELECTRIC RAILWAY IN SOUTHERN CALIFORNIA

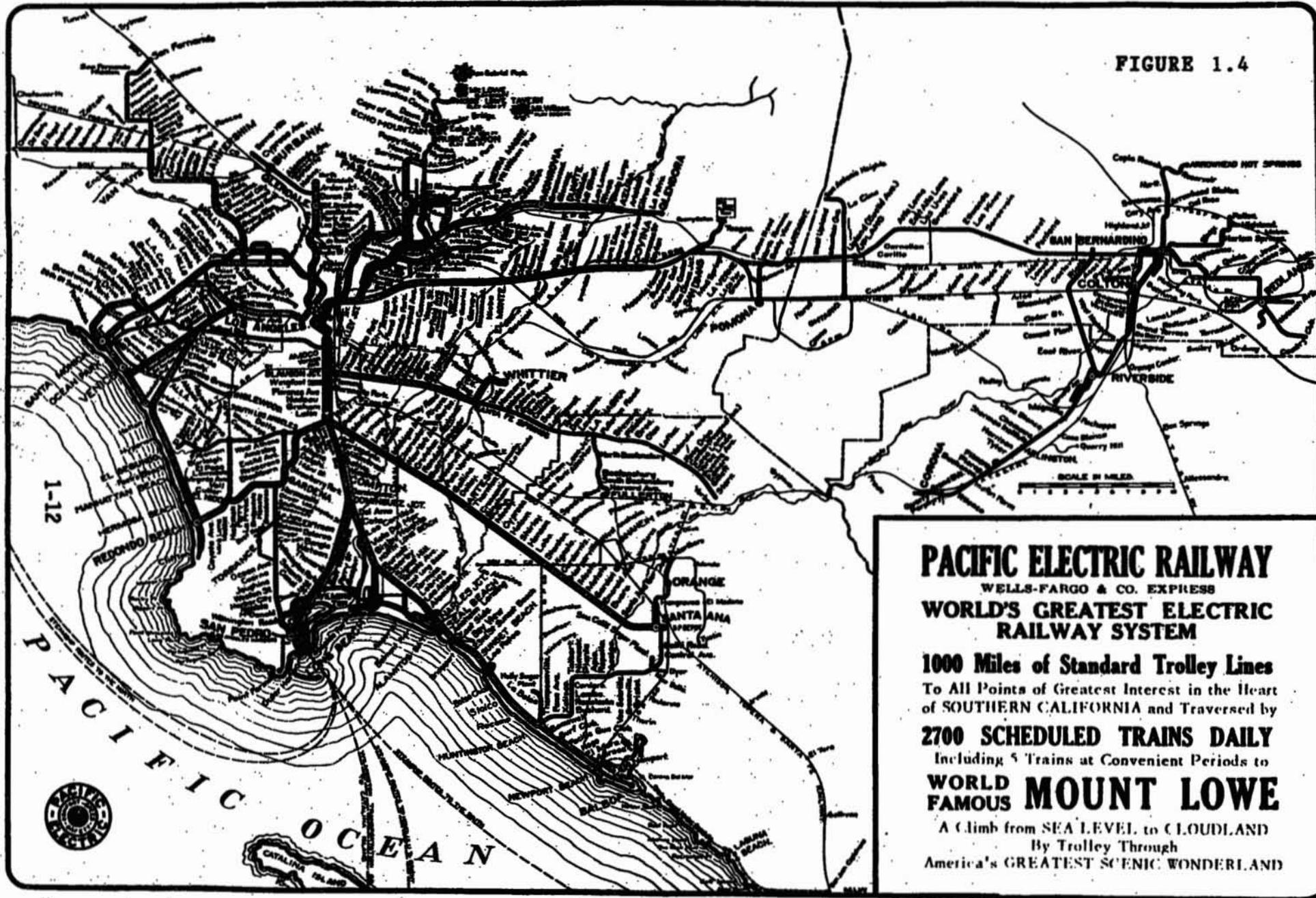


FIGURE 1.4

PACIFIC ELECTRIC RAILWAY

WELLS-FARGO & CO. EXPRESS

WORLD'S GREATEST ELECTRIC RAILWAY SYSTEM

1000 Miles of Standard Trolley Lines
 To All Points of Greatest Interest in the Heart
 of SOUTHERN CALIFORNIA and Traversed by
2700 SCHEDULED TRAINS DAILY
 Including 5 Trains at Convenient Periods to
WORLD FAMOUS MOUNT LOWE

A Climb from SEA LEVEL to CLOUDLAND
 By Trolley Through
 America's GREATEST SCENIC WONDERLAND

2. REGIONAL GROWTH TRENDS AND TRAFFIC CONGESTION

The six-county SCAG region is currently home to 13.7 million people, and faces significant growth over the next several decades. It is projected that by the year 2010, population will grow by nearly five million people, to 18.3 million. By 2010, it is expected that the number of jobs will grow from approximately six million to nine million, and that the current 4.6 million housing units will be increased to 7.4 million (1).

Los Angeles County alone will add one million people to its current 8.5 million residents by the year 2000, owing to continuing in-migration of workers from elsewhere in the U.S. to jobs in the Sun Belt, foreign immigration (especially from Asia and Latin America), a high birth rate, favorable climate, and Pacific Rim economic growth and trade. In addition, there will be considerable growth in nearby metropolitan areas within the SCAG region: for instance, by the year 2000 Riverside County will increase its current 946,000 residents by about 500,000 (2).

Southern California's regional economy includes banking, hi-tech industries, aerospace, defense, electronics, the apparel industry, health care, agriculture, and the entertainment and tourism industries. The service sector has been characterized as booming; the retailing and building industries are strong, and there has been considerable growth in small businesses. Southern California is seen as becoming a major world financial center, with rising international trade; and is the focus of considerable foreign investment activity (with many of the new buildings in the LA CBD financed by foreign development companies).

A recent RAND Corporation survey of 1230 residents of Los Angeles County and parts of northern Orange County and western Riverside and San Bernardino Counties, indicated that the five characteristics of the Los Angeles area that people list as its best features are good weather all year (33%), employment opportunities (17%), access to geographical diversity (15%), recreational facilities (10%), and cultural diversity (10%). Eighty-two percent of residents surveyed rated their overall quality of life as good. This study was conducted for Los Angeles 2000, a citizens' group established by Mayor Tom Bradley in 1986 to formulate strategies for Los Angeles in the Twenty-First Century (3).

The diversity of the Southern California economy is expected to largely insulate it from the economic swings experienced by cities dependent upon only a few industries (4). With a diverse and expanding economy, and a perception on the part of many residents that the quality of life in the area is good, it is easy to account for current population growth trends.

While there are many obvious benefits from growth, including financial and economic benefits to individuals as well as increased recreational, cultural and economic opportunities, the current growth trends bring with them some serious problems, including traffic congestion and related mobile-source air pollution (smog). Mobility in the SCAG region is more heavily dependent upon the private automobile than in other urbanized areas of comparable size; the transit share of home-to-work trips was only 6.6% in 1984. Congestion on many of our freeways and gridlock on surface streets and arterials in certain places is already

severe during peak commuting hours, and will become acute in the future.

Of the 20 most congested metropolitan areas in the country, including New York, Chicago, and Houston, Los Angeles drivers experience more hours of delay than motorists elsewhere, with a higher percentage of travel (20%) at speeds under 35 MPH than any other city except for Houston (based on 1984 FHWA statistics). Although Los Angeles has a higher number of traffic deaths than many other cities (339 in 1985, as compared to 282 for Chicago and 230 for Houston) and the 1987 wave of freeway shootings suggests that stress levels associated with driving in congestion are on the increase, most commuters probably perceive travel delay to be the most serious problem (5).

By the year 2010, daily person trips are projected to increase by 42%, from 40 million in 1984 to 57 million, with commute trips alone increasing from seven to 10 million. Without significant transportation system improvements, these additional trips may bring traffic to a near standstill over much of the system, and for a considerable part of the day. The average speed of highway travel will decrease from 35 MPH to 19 MPH (with average speeds on freeways dropping from 47 to 24 MPH). The percentage of vehicle hours subject to delay will increase from 10% to 52%, and PM peak period miles of congestion will increase from 856 to 4567 (6).

A recent study of congestion costs, which considered business, commuter, and personal trips, suggests that the annual cost of recurrent (normal rush-hour) highway congestion in the SCAG region will increase from approximately \$ 1.8 billion in 1984 to over \$ 26 billion in 2010 (1987 dollars) if system improvements are not made (7). Total daily hours of congestion will increase from 628,000 in 1984 to over 10 million in 2010. These figures do not include the effects incident-induced congestion, which are also substantial.

It is anticipated that patterns of growth will change in the future: land shortage is expected to trigger a big increase in densification and in-filling, particularly in Los Angeles and Orange Counties. The City of Los Angeles will see an expansion of apartment and condominium construction owing to the scarcity of buildable lots. Additionally, two-thirds of the housing growth in the SCAG region through the year 2010 is expected to occur in outlying areas, including San Bernardino and Riverside Counties, where land prices are relatively low.

The recent Merrill Lynch Realty Index indicates that the average annual household income in Los Angeles County is below the level needed to qualify for a mortgage; while this situation is reversed in areas like San Bernardino and Riverside County (and Palmdale in the Antelope Valley). Many people will move to these latter areas, as that is the only way they can afford to buy their own homes. However, as 57% of the employment growth is expected to occur in Orange County and in the southern part of Los Angeles County, the prospect is that more people will experience lengthy commutes (8-11).

Finally, it should be noted that by the year 2010, the number of people 65 and older will more than double, increasing by 104%, with a four-fold increase in people over 85 (12). This segment of the population is more prone to rely on public transportation than are most younger age groups.

In light of the above, a poll taken by the Southern California Air Quality Management District asked people in the four-county South Coast Air Basin area to list problems that they perceive to be "extremely serious" and deserving immediate action. The largest percentage of the 996 respondents (63%) listed freeway traffic congestion first. The third and fifth most serious concerns were air pollution and traffic congestion on city streets, listed by 52% and 32% of respondents respectively (13).

The RAND Corporation study cited above indicated that although crime is perceived as the most negative feature of the four-county urbanized area, congested highways, smog, and lack of public transportation were each listed by 14% of 1230 respondents as serious problems. The same study found that nearly 75% of Los Angeles area residents said they would be willing to pay higher taxes to solve some of the region's most serious problems, including poor transit (14).

Many strategies have been proposed to alleviate congestion, including more and better public transportation, carpooling and vanpooling, improved highway facilities--both new facilities and TSM measures, parking controls, restricted hours for truck deliveries, flextime and staggered work hours, and telecommuting. SCAG's 1988 Regional Mobility Plan is intended to achieve and maintain the level of mobility which was experienced in 1984. This includes attaining a 19% transit share of home-to-work trips by 2010, and an increase in the number of people ridesharing by 1.6 million (15).

The development of new transit services on extant and former railroad rights-of-way could be an important measure for congestion relief over the next several decades. This could include new fixed guideway and busway facilities, as well as commuter rail lines operating on existing tracks. The fact that much of the new housing will be developed in outlying areas, requiring increasingly longer commutes, suggests that intercounty fixed guideway and bus/HOV priority facilities will receive much greater attention in the future.

However, SCAG's Growth Management Plan recommends a better balance between jobs and housing within counties, and there is evidence that some of the new employment growth is beginning to follow skilled workers to their places of residence in the eastern part of the urbanized area, where land is cheaper. Future employment centers in these places, focused on linear railroad corridors, can be expected to receive more attention in the future as a means of controlling urban sprawl, while at the same time promoting a better jobs/housing balance.

The trend toward infilling in the more heavily urbanized areas of the region will make it more and more expensive to prepare new surface rights-of-way in the future (i.e. where none already exist), in particular restricting the development of new highway facilities which owing to their width requirements would require a considerable amount of land to be condemned. This will put a premium on the reuse of railroad rights-of-way for new transit facilities. Another trend, the increase in the percentage of elderly people in the population (who tend to be heavily transit dependent), will also favor expansion of public transportation.

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3. RECENT RAILROAD MERGER ACTIVITY AND OTHER OPPORTUNITIES

As noted in Chapter 1, the proposed merger of the Southern Pacific and Santa Fe railroads was denied by the ICC in July of 1987. Had it gone through, the joining of the 11,800 mile ATSF with the 14,000 mile SP would have created the country's second largest railroad in terms of track mileage and gross revenue. Anti-competitive problems were cited by the Commission as the primary reason for its decision. (To a large extent this would have been a parallel merger, with substantial service areas in common in southwestern states.) The holding company was given two years in which to divest itself of one of the two operating railroads (1).

When it was announced in 1983 that the Southern Pacific Co. would merge with Santa Fe Industries, the two railroads continued to be operated separately and were required to actively compete for business. However, the new company did combine the assets of its two predecessors in real estate and construction, petroleum and coal production, forest holdings, and pipeline operations. With 6.5 million acres of land (perhaps worth \$ 5 billion), including industrial and residential properties in 16 states, the Santa Fe Southern Pacific is a significant economic force in its own right (it owns 520,000 acres of timberland and 158,000 acres of farmland in California).

It has been noted that some of the past railroad mergers, by creating larger railroads, have resulted in new management problems; this has led some carriers to achieve efficiencies primarily by shrinkage. Several years ago, after failing to attract a merger partner, the Illinois Central Gulf Railroad began to sell off its least productive lines to smaller railroads, which can operate with lower labor and overhead costs (2). Similarly, it can be anticipated that with the denial of the SFSP merger, the productivity problems that led to the merger proposal in the first place will eventually lead both the SP and ATSF to prune their rail networks and cut off little-used branch lines.

On August 10, 1988, the ICC announced that it had approved the sale of the Southern Pacific to Rio Grande Industries, which owns the Denver & Rio Grande Western Railroad. With the completion of the new merger in December of 1988, this has effectively created the nation's fifth-largest railroad, with 15,000 miles of track and serving 15 states. The Rio Grande is a much smaller railroad than the Southern Pacific, operating between Ogden, Utah and Kansas City. Combination with the SP provides it with direct access to west coast markets and port areas, including San Francisco and Los Angeles (3). This is an end-to-end merger, and it is anticipated that it will not generate serious anti-competitive problems.

Although the Southern Pacific will bring with it massive parcels of real estate, the owner of Rio Grande Industries has affirmed a serious interest in improving the railroad side of the business, believing the merger will produce efficiencies that will aid it in competing with other railroads and with the trucking industry. D&RGW management has stated that land holdings will be analyzed in detail, and that surplus properties not vital to railroad operations will be sold off to retire the huge debt the Rio Grande will incur by buying the SP, and to provide funds to upgrade railroad facilities and equipment.

Under Rio Grande management, several surplus rail yards and rights-of-way in the Los Angeles area are to be put up for sale, including 150 acres of Taylor Yard, a large yard facility between the LA CBD and Glendale, valued at \$ 60 million; the Bullring and Cornfield Yards next to Chinatown near the LA CBD, comprising about 50 acres and valued at \$ 32 million; and the abandoned rail right-of-way stretching from Sepulveda to Beverly along Santa Monica Boulevard, valued at \$ 50 million (4).

Recently it was announced that 112 acres of SP owned land along Alameda Street on the east side of downtown LA have been sold to a development company. This property lies in an area which has seen numerous recent sales to buyers who plan to build offices and retail stores (5); this property is located along the partially-abandoned San Pedro Branch extension which ran along Alameda St. north to Union Station.

As the Rio Grande was the last private railroad in this country to introduce its own intercity passenger service (the Rio Grande Zephyr--since assumed by Amtrak), the D&RGW management has been considered by many to have a relatively enlightened attitude towards possible future rail passenger transportation development.

Meanwhile, corporate restructuring at the Santa Fe Southern Pacific has had financial repercussions which are likely to affect Santa Fe Railway and Santa Fe Pacific Realty Co. land holdings and property development in southern California and elsewhere. The SFSP, in defense against a "hostile" takeover by two major stockholders, the Henley Group and Olympia & York Developments, responded by naming two Olympia & York executives to its board, and made a provision for Santa Fe shareholders to receive a special \$ 30-a-share dividend. It was noted that Santa Fe had had a weakness in the area of real estate, and that greater participation by Olympia & York would correct this deficiency (6,7).

Olympia & York is a Toronto-based real estate company with considerable past experience in the area of joint transit/commercial development in Canada. Their involvement with SFSP could ultimately have some positive impacts on projects in our area. Another ramification of the SFSP restructuring is that there has been increased interest in selling off certain lightly-used railroad freight lines in southern California, to assist in debt retirement. However, the properties in question had already been under study for possible sale to public agencies, from the viewpoint of improving system efficiency.

Compared with the Southern Pacific and Santa Fe developments, there has been relatively little activity on the Union Pacific relating to potential changes in the southern California rail system. However, the UP Glendale Branch, a little-used line extending between Taylor Yard on the SP and the City of Glendale, was recently put up for abandonment (8). Considering the scarcity of surface rights-of-way, even short branch lines like the Glendale Branch should receive close scrutiny by public agencies involved in transit development.

The Alameda Corridor Project, a publicly-sponsored rail consolidation proposal, could also have a significant impact on railroad operations and right-of-way requirements over the next several decades. Major growth in Pacific Rim trade

will result in a great increase in tonnage handled by the San Pedro Bay Ports-- the Port of Los Angeles and Port of Long Beach. Cargo is projected to grow from approximately 80 million metric tons at present, to 200 million metric tons by the year 2020, almost half of which will be high-value, containerized cargo. This will require the addition of 38 new terminals, 2400 acres of new landfill, and extensive railroad and highway system improvements to accommodate the growth in trade (9).

To handle this vast increase in international trade, plans are underway to condense onto a single corridor--the SP San Pedro Branch--rail traffic now running over four north-south, single track branch lines that extend from the Los Angeles CBD to the port area (and on three feeder lines to the south and east of the CBD). The Alameda Corridor would be a double track line with centralized traffic control, allowing increased train speeds and the ability to concentrate environmental mitigation measures such as grade separations onto a single, 20-mile corridor. By following Alameda Street, which has substantial industrial buffering, impacts on residential neighborhoods would be minimized (10).

With the consolidation of container unit trains and other through traffic on the Alameda Corridor, other parallel rights-of-way (which will in the future carry only local freights), will become more available for transit use. The recent decision by the San Pedro Bay Ports to take the leading role in Alameda Corridor development is seen as a major step towards implementation of this economically important project.

The Southern Pacific Transportation Co. has very recently announced its intentions to sell at least three railroad rights-of-way to public agencies for transit use (Figure 3.1): the Santa Monica Branch (14 miles), the West Santa Ana Branch (12.5 miles, including abandoned R/W), and the Baldwin Park Branch combined with the State Street Line and an easement to develop a strip of R/W along the Alhambra Line (50 miles for this entire corridor). The railroad has advertised its proposed sale as a partial solution to the severe traffic problems facing the Los Angeles area (11,12), and notes that development of transit along these rights-of-way would greatly enhance the value of the transit facilities already under construction (Metro Rail, the LA-Long Beach line, and Century Freeway line).

There is considerable interest on the part of the Los Angeles County Transportation Commission in the SP right-of-way offer (13); and the Orange County Transportation Commission has budgeted \$ 50 million towards the purchase of West Santa Ana Branch right-of-way, pending voter approval of a half-cent sales tax for transportation purposes (14).

In conclusion, despite the failure of the Santa Fe-Southern Pacific merger, economic trends in the railroad industry as a whole, together with institutional changes affecting the rail carriers which serve southern California, are encouraging the railroads to divest themselves of underutilized branches, yards, and other property. This will provide opportunities for public agencies to acquire rights-of-way for public transportation purposes, as well as making land

available for major transit joint venture projects near the LA CBD and in other important urban centers (with strong private sector participation). The Alameda Corridor Project, by shifting port-related rail freight traffic onto a single line, will further strengthen the trend towards creative reuse of existing rail corridors.

Meanwhile, there has been a great increase in awareness of transit/real estate joint development possibilities on the part of the rail carriers themselves, suggesting that they will actively encourage such development on parcels which they expect to retain.

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FIGURE 3.1 1989 SOUTHERN PACIFIC TRANSIT PROPOSAL



4. EXAMPLES OF TRANSIT DEVELOPMENT ON RAILROAD RIGHTS-OF-WAY

In this section, we will examine in detail line-haul transit facilities which have been developed on railroad rights-of-way in other cities (some quite recently), including several of the more highly-acclaimed projects in the U.S. and Canada. Several examples each will be given for conventional rail rapid transit, light rail, and busways, and one example of a medium capacity rapid transit system using new technology. The Lindenwold, San Diego, Sacramento, Pittsburgh, and Vancouver projects made extensive use of railroad rights-of-way, while in the case of Portland and Ottawa, old railroad lines were employed to a lesser extent to complement more extensive use of freeway and arterial highway in transit corridor development.

While it is beyond the scope of this project to advocate any particular transit mode, some lessons can be learned from these case studies which may be useful in planning transit projects utilizing railroad rights-of-way in the SCAG region.

Supporting material on technologies suitable for transit development on existing or former railroad rights-of-way is presented in Appendix A, including operational considerations, additional cost data, and a discussion of evaluation criteria. Appendix A also discusses the traffic interference problem at grade crossings, compatibility with residential neighborhoods, and the question of compatibilities between various different rail and transit modes. Appendix B provides some related information on rights-of-way, including the reasons why railroad lines are attractive for transit development. It also contains a discussion of transit/short line freight carrier joint venture projects, and some alternative uses for former rail rights-of-way.

4.1 Rapid Transit.

Lindenwold Hi-Speed Line. The Port Authority Transit Corporation (PATCO) operates the Lindenwold Hi-Speed Line between center city Philadelphia and suburban southern New Jersey (Figures 4.1 and 4.2). The line is 14.2 miles long, and was constructed by the Delaware River Port Authority from 1966 to 1969 (when the line opened for revenue service) using DRPA funds partially derived from bridge toll receipts. The Lindenwold line operates over 10.5 miles of former Pennsylvania-Reading Seashore Lines right-of-way between Lindenwold Borough and Camden, N.J. Here it gains access to the former Bridge Line to the Philadelphia CBD (1,2).

The rapid transit line is double tracked, and in addition there is a third track (formerly a freight line) along the outer end of the line, from Lindenwold to Haddonfield. The eastern section follows an at-grade alignment with highway overpasses. In Haddonfield, the entire right-of-way is in open cut with concrete retaining walls; the freight track is at a lower level than the transit line--a safeguard in case of freight car derailments. West of this point the transit line is on embankment and aerial structure, still on former railroad right-of-way.

In Camden the line goes into a subway tunnel, emerging to operate over the Ben Franklin Bridge; a second tunnel provides access to the CBD. The third track on

the north side of the right-of-way provided freight service parallel to the Lindenwold line as far as Haddonfield during the early years of service; later it was used as a rapid transit test track. However, in May 1989, it re-opened for intercity rail service (to the Atlantic City Casinos).

The Lindenwold line is fully grade separated. Service is provided by six car trains of 68' long, air-conditioned rapid transit vehicles built by Budd and Vickers, Canada. Comfortable seating is provided; most of the cars are semi-permanently coupled in pairs. As the system was intended to be competitive with the private automobile, design speed is 75 MPH; the cars have fast acceleration and braking (3 MPH/S). Service is very frequent, with four minute headways during the height of the AM peak, 7 1/2 minute headways (frequency, eight per hour) thereafter, and 10 minutes off-peak. 98.6% of trips operate "on time" (i.e. within five minutes of timetable).

Limited stop and express service is operated, and during the height of the PM peak, the headway can be as tight as two minutes. Daytime operation is limited to 65 MPH, to reduce peak period electric power charges. "Owl" service operates on a 12 minute headway, at the design speed of 75 MPH (and a lower power rate!).

The private automobile is the primary mode of access to the line; heavy use is made of park-and-ride, with space for 12,571 cars at New Jersey suburban stations. About 50% of patrons park and ride, 40% are driven to stations by someone else (drop-off or kiss-and-ride), and 10% ride transit, walk, or bicycle to the line. Automatic fare collection is employed, with magnetically-coded tickets used to gain access to and egress from stations. Large windows in the ends of the transit cars provide an excellent view of the Delaware River, city skyline, and the right-of-way ahead; seats at the front end of the train are always the first to be occupied by passengers.

Security is enhanced by remote-controlled TV cameras for observation of fare collection and waiting areas; generous use of glass in station construction (both picture windows and glass block) permits police surveillance of the headhouse and platform area. PATCO has its own transit police, with dog patrols.

The line utilizes automatic train control; the primary duties of the train operator at the front end are to open and close the doors, and announce station stops. The automatic feature allows rather precise stopping in the correct location at station platforms, making possible a reduction in braking time of over two minutes per round trip. However, train attendants are expected to operate in manual mode for practice on occasion, usually during off-peak periods. The operator's cab is open, so that passengers can ask questions about the service; having the train operator accessible to the the public increases the perception of security by patrons.

Ridership on the Hi-Speed line began at 18,000 per day, increasing to 29,000 by the end of 1969 and 36,000 riders per day in 1971. Since that time, patronage has fluctuated due to various factors, including fare increases and the addition of more parking spaces. 1988 ridership was 39,481 (3). A 1970 passenger survey, taken shortly after the line opened, revealed that 40% of PATCO users

formerly drove their cars, and 13% were making new trips not previously made.

Capital costs were \$ 54.2 million in 1969 (not including the bridge line infrastructure which was taken over by PATCO). Of this, \$ 2.15 million went for the purchase of the 10.5 miles of railroad R/W. O & M costs in 1984 were \$ 16.9 million. Over the first 16 years of operation, farebox returns have covered about 89% of operating costs, higher than for most other transit operations (in earlier years, the operation yielded surpluses).

High speeds, frequent schedules, reliability, a high level of passenger comfort and security, and excellent park-and-ride access have all contributed to the success of this transit line.

Other Cities. Other examples of rail rapid transit operating on former railroad right-of-way or paralleling current railroad freight operations on separate tracks occupying the same R/W include certain MARTA lines in Atlanta and WMATA routes in Washington, DC; and the Cleveland Transit System rapid transit service (Figure 4.3), which also shares trackage with light rail lines of the Shaker Heights Rapid Transit.

It should be noted that the Atlanta and Washington examples have required expensive subway construction to serve the CBD area, and that the Lindenwood line was fortunate in being able to utilize a pre-existing, poorly-utilized subway line (incorporation of which makes cost comparisons with other more recent transit projects difficult). Lack of a CBD subway circulator in Cleveland has been cited as a restraint on that system's ridership for decades.

4.2 Light Rail.

San Diego Trolley. One of the best-known examples of a light rail line developed primarily on former railroad rights-of-way is the San Diego Trolley. The first line to open in San Diego was the San Ysidro line, which runs south to the international border (Figure 4.4). This 16-mile line was constructed primarily on the tracks of the old San Diego & Arizona Eastern Railway, which when purchased by the Metropolitan Transit Development Board in 1976 belonged to the Southern Pacific. The 109-mile SD & AE freight line had recently suffered severe tropical storm damage (washouts); and rather than rebuild a minor freight line, the SP decided to sell it to the MTDB at the bargain price of \$ 18 million (4).

The line was originally single tracked with passing sidings (50% double track) located such that the headway was 20 minutes. In 1981, under this arrangement, ridership was 11,000 per day. A combination of increasing demand and operational difficulties with the single track led to the decision to double track the entire line, and reduce the headway to 15 minutes. In 1985, after double tracking, ridership had risen to 19,000 per day; in 1988, it exceeded 27,000 per day (5). This line is unusual in that there is considerable weekend tourist travel to the border with Mexico, where people walk across to Tijuana.

The San Diego Trolley is operated in the same manner as most European light rail lines, with self-service fare collection. Riders purchase and validate tickets at machines located on station platforms, and are required to show proof of

payment upon request. The vehicles are six-axle Duwag U-2 cars similar to those used on one of the subway-surface lines in Frankfurt, Germany; seating is spartan and the balancing speed of the cars is only 50 MPH. Three-car trains are run during peak periods. Access into the CBD is via two miles of reserved street median and transit mall on 12th and C Streets. An interesting feature is that loud speakers are built into the roofs of the cars, to provide information to passengers waiting at station platforms.

A short section of the East Line has been open for several years; the complete line to El Cajon opened in June of 1989, and is expected to carry 15,000 riders per day by the end of 1990 (it has already attained about 13,000 riders/day). The 11.1 mile extension, also on a former SD & AE freight line, cost about \$ 108 million, including eight stations, 15 cars, yards, engineering, and design (exclusive of R/W acquisition); this comes out to \$ 9.7 million/mile (6). The East Line is mostly double-tracked except for three bridge structures and their approaches; cost per mile will increase slightly when the line is fully double-tracked. (It is difficult to determine the exact capital cost of the San Ysidro line, since it was later reconstructed; it is believed to have cost \$ 8-10 million per mile.)

Operations cost \$ 6.2 million dollars in 1986, including \$ 3.1 million for vehicle operations, \$ 1.1 million for vehicle maintenance, \$ 800,000 for non-vehicle maintenance, and \$ 1.2 million for general administration. A high operating ratio of about 80% (fare receipts as a percentage of costs) is maintained, a figure far superior to most U.S. transit operations.

The San Diego Trolley is unique in that a short line freight operation, the San Diego & Imperial Valley (running on the old SD & AE line, including the section in Mexico), shares some of the same trackage as the light rail line. These sections are dispatched by the San Diego Trolley control tower, with freight operation only very late at night after service on the transit line has shut down for the day. The SD & IV is an aggressive carrier, and has experienced a slow but steady growth of traffic.

One of the lessons from the San Diego Trolley is that attempts to save on capital costs using single-track construction may be futile, because growth in traffic will eventually necessitate full double tracking. Also, it is apparent that the initial 20-minute headway (based on certain European examples, e.g. Basel) proved to be too long for U.S. operating conditions where the private automobile provides heavy competition. It may further be argued that the current 15-minute headway has somewhat restrained the growth of ridership; however, longer headways do reduce the number of train operators needed, and thus can help limit operating deficits. Finally, the 50 MPH cars are a little slow for operation on a long, straight line with a one mile mid-corridor station spacing.

Track sharing with freight operation provides a means of maximizing the use of the right-of-way, and furnishes an additional source of income for the transit operator. As such, there is considerable interest in copying this form of shared R/W use elsewhere in the country where new light rail services could be installed on old railroad branch lines which now have only a marginal level of freight demand.

Portland MAX. Portland's MAX (Metropolitan Area Express) is an example of light rail development utilizing a variety of right-of-way types (Figures 4.5,4.6). The 15-mile line operates in the Portland CBD partially in transit mall and partly on reserved lanes along downtown streets. It then occupies freeway medians (including the Banfield Freeway, which follows the Union Pacific Railroad for some distance) and new right-of-way created in the center of an arterial highway. The easternmost segment of the line operates over the old Portland Traction Co. interurban R/W into Gresham (7).

Nearly all of the line was constructed with double track from the outset; peak hour train frequency is eight per hour (a 7.5 minute headway) with trains every seven or eight minutes--five minutes when extra runs are added. Off-peak headways are 15 minutes. Although patronage was originally forecast to be 14,000, average daily ridership was 20,000 per day in July 1987, after one year of operation. This is something of an achievement, as Portland's economy is considered to be depressed, and the transit system which provides feeder bus service is financially troubled. The peak day ridership was 70,000 during the city's Rose Festival (8). Self-service fare collection is employed, as in San Diego.

Two car trains of six-axle, Bombardier light rail equipment are operated; these high performance vehicles offer a maximum service speed of 55 MPH and fast acceleration. This, combined with a peak hour frequency that is double that of the San Diego line, helps to account for the rapid growth of ridership. Normal operating speeds are the same as the maximum allowed for auto traffic on parallel highways: 10-15 MPH in the downtown mall, 55 MPH for the freeway medians, and 35 MPH along East Burnside, a suburban arterial street.

Capital costs for the line were \$ 314 million, including track and electric power supply, right-of-way, stations, cars, maintenance facility, etc. (including about \$ 107 million for Banfield Freeway reconstruction). This averages about \$ 20.9 million per mile. Operating costs amount to \$ 2.1 million per year for rail transportation and \$ 3.6 million for maintenance. Farebox recovery is 51%, as compared with 31% for Portland's bus operations (9).

As compared with San Diego, rush hour headways are much better, and faster equipment is utilized. Almost the entire line was double tracked from the beginning, which has allowed excellent operational reliability. This can help to explain why MAX attained higher ridership in the very beginning than was realized in San Diego four years from the start-up of service; and without the benefit of the considerable tourist traffic which accounted for much of San Diego's early San Ysidro Line ridership.

RT Metro. Sacramento's RT Metro is an 18.3 mile-long light rail system comprising two legs, to the northeast and to the east of the city, joined together in the CBD where the line operates over two pedestrian/transit malls with a short section of street running (Figure 4.7). Most of the operation is at-grade, with crossing gates and some signal preemption at road and highway crossings. The line is operated with trains of 80'-long, Siemens-Duwig Advanced U2 vehicles (10). Self-service fare collection is employed.

The RT Metro system has been pieced together from a number of existing rights-of-way including streets, arterial highways, freeway alignments, bridges, and railroad lines. However, extensive use has been made of railroad right-of-way. The I-80 corridor to the northeast follows an easement on the north side of the Southern Pacific main line, which was originally to have been a freeway alignment. This section is completely grade separated (11).

The western end of the Folsom Branch, which extends to the east of the CBD, operates over several miles of abandoned railroad branch line. The remainder of the line east to the terminus at Butterfield shares right-of-way with a minor but still-operating freight line, whose track is fenced off from the adjacent transit property. The Folsom branch is primarily at-grade with crossing gates; however, no delay is encountered at gated crossings, and this is the faster of the two lines.

RT Metro exhibits some interesting constructional features, including extensive park-and-ride lots in the I-80 Freeway median, CBD pedestrian/transit malls which work quite well with a 20 MPH maximum permitted speed, and a section of the Folsom Branch where the LRT trackway was paved to provide industrial street access along the R/W--with the entire street gated to give the trains priority over cross traffic (but not over vehicles on the same street). The Folsom Branch also has two 1/4 mile, single track concrete viaducts which grade separate the line from active rail freight tracks below, costing only \$ 1.8 million each (12).

Capital costs for the 18.3 mile system amount to about \$ 176 million, or about \$ 9.7 million per mile (13). The system is about 40% double tracked at present; cost to double track an additional five mile increment will be \$ 8.5 million (14) or \$ 1.7 million per mile. Hence, the marginal cost to double track the line, even when the additional single track flyovers are added, will be relatively small.

Patronage at present is about 13,600 per day, about evenly divided between the two corridors. Although the Folsom Branch has fairly good off-peak ridership, the I-80 corridor is almost exclusively a rush-hour operation, owing to lack of local trip generators in this rather bleak industrial/freeway corridor. Even so, three- and four-car rush hour trains fill up during the AM peak close to the outer end of each line, and the system is rapidly approaching capacity. There is talk of leasing light rail cars from San Jose, which will have an excess of equipment until 1991.

A major impediment to increasing patronage on RT Metro at present is the single track operation, which fixes headways at 15 minutes and causes delays because certain sidings are of inadequate length. Consequently, a high priority is the double tracking of the entire system, which could allow headways to be reduced to 10-12 minutes (or less, depending upon demand). Additionally, a warranty agreement for maintenance of the gearboxes on the LRVs applies only if the speed of the cars is governed at 50 MPH. These are high-performance vehicles, with good acceleration at higher speeds and a balancing speed of over 65 MPH; SRT is considering operation at 55 or 60 MPH in the future, after the warranty expires.

Design of the stations may be an impediment to possible future express service,

as the track area is unfenced at stations and patrons walk across the R/W at certain mid-corridor stations to gain access to the platform on the opposite side. De facto skip-stop operation however already occurs on the I-80 corridor, with trains halting only on demand in order to maintain schedules on the single-track line. However, they must slow down to about 30 MPH when running through station areas.

Considering that a large part of the I-80 corridor in Sacramento is fully grade separated, following wide utility and freeway alignments (some light industry and mostly open space), and that most of the patronage was diverted from former express bus routes, an argument can be made that this service might just as well have been provided by a busway. However, the Folsom Branch has a large number of at-grade crossings, and would have been rather difficult to economically construct as a busway. As it happens, it was desired to operate both corridors as sections of the same line, through-routing the light rail trains downtown; which accounts for the use of the rail mode for both.

The Folsom Branch has surprised many planners. Even though it is bordered only by a narrow band of residential land along the north side of the line, a combination of high visibility from Folsom Boulevard (a major east-west arterial), walk-on access from apartments and houses, service to several schools, strip commercial development, and a variety of light industries on the south side of the line has resulted in much higher ridership than originally projected.

The next extension will be farther east on the Folsom corridor, serving a number of new industrial parks. After this, a south line will be built, probably following a railroad right-of-way which will provide access to major residential areas on both sides. The south line, therefore, should generate higher ridership than either existing line.

4.3 Busways.

Pittsburgh's East Busway. The first exclusive busways in this country were constructed in Pittsburgh, PA (Figures 4.8,4.9). The East Busway comprises 6.8 miles of fully grade-separated facility between the CBD and the eastern suburb of Wilkinsburg. This transitway is unique in that it was constructed along the Conrail main line. Five new bus routes, and 21 existing suburban Red Flyer and other express bus routes operate over the busway; 90 buses use it during peak periods, in the peak direction. One of the new lines--the EBA (East Busway All Stops) operates exclusively on the busway and provides a fast local service with high-capacity, MAN articulated buses stopping at six stations. Access to the CBD is via a downtown circulator loop in mixed traffic on surface streets (15,16).

Maximum speed on the busway is 55 MPH (slower on curves). At stations, bypass lanes allow express buses to overtake locals. Two intermediate ramp areas are provided for shorter express routes. Park-and-ride lots are not provided, although "kiss-and-ride" facilities are incorporated into stations.

Patronage on the new busway routes is 13,000; most of which is on the EBA route, whose riders have realized a 21-24 minute savings over buses on surface streets.

7000 additional passengers use the express routes that were diverted to the facility (saving 7 minutes). Headways on the EBA route are four minutes during peaks, and 15 minutes off-peak. Although total corridor ridership has increased by only 800-900 per weekday (the service area is heavily transit-dependent), it is obvious that appreciable time savings have been realized for existing transit riders.

Right-of-way is rather constrained in places, with high concrete retaining walls and fencing to guard against rock falls, in order to fit in both the two-lane busway (with a shoulder on one side only) and the railroad tracks. Reconstruction of nine highway overpasses and four pedestrian bridges was required.

Capital costs totaled \$ 156 million in 1983: 58% for construction, 14% for railroad relocation, 16% for land purchase, and 12% for engineering. The first two items total \$ 113 million, or \$ 16.6 million per mile in 1983 dollars. Operating costs for the diverted routes are higher than for the new busway services (mainly the local EBA and EBO routes); costs for the latter are said to be less than for Pittsburgh's light rail operation.

However, it is difficult to make a modal comparison as several distinctly different kinds of service are provided by the busway, and operating costs for the entire busway system have never been aggregated. Also, purchase price for bus equipment used is apparently not included, as existing vehicles were placed into busway service. The maintenance cost for the busway only (not including wear-and-tear on surface roads incurred by buses) has been reported to be \$ 14,000 per year in 1984, and \$ 17,500 for 1987 (17).

The East Busway provides a high frequency of local as well as express service, and is considered to be quite successful. The only notable drawbacks have been lack of a dedicated transitway in the CBD area, and omission of park-and-ride access.

PAT also operates a shorter South Busway, which shares right-of-way with Pittsburgh's new light rail vehicles and rebuilt PCC streetcars both in the South Hills tunnel and farther out along a short section of the Library-Drake line. The shared private right-of-way on both segments consists of paved LRT track, with special traffic lights/block signaling to provide for safe operation of rail vehicles and buses both on the R/W and at junctions.

Ottawa Busway. Ottawa, Canada is the first North American city to develop a complete busway/bus lane system. The busways will, when finished, include 22 miles of two-lane roadway, and 20 stations (Figures 4.10,4.11). In addition, a CBD transit mall for exclusive bus use (with six stations) will also be incorporated. By 1986, 14.5 miles of busway had already been placed in service (18).

Some of the bus stations are quite elaborate, with glass-covered shelters, covered pedestrian overpasses, and information kiosks. Bypass lanes allow express buses to avoid stopping at certain stations, and permit local buses to pull into/out of their loading points without delaying other vehicles. The top speed in station areas is 31 MPH, and between stations, 56 MPH (actually 50 and 90 KPH, respectively). Articulated buses and proof-of-payment fare collection will eventually be used.

The East Transitway operates over separate lanes in the Queensway alignment (a restricted access roadway), but the Southeast Transitway, which feeds into it, has been developed on railroad rights-of-way. North of the junction point, the transitway follows a completely separate right-of-way, and again parallels a limited access highway at the University of Ottawa. Peak hour flow/direction is expected to be 12,600 along this segment, which will be the maximum load point.

From there, most buses will circulate through the CBD transit mall. On this at-grade section, 179 buses are expected to carry 12,000 passengers in the peak direction during the peak hour of service. As there are intersecting streets, speeds will be low here, and planners envision some "platooning" of buses to move them through the downtown area.

The West Transitway uses a former railroad right-of-way, which had a number of grade crossings. To avoid interfering with cross traffic, the transitway has been placed in a trench 20 to 26 feet deep and 42 feet wide. Natural rock forms the walls of the trench most of the way, with the exception of concrete retaining walls and abutments for twelve road bridge crossings, three pedestrian overpasses, and three bridges for passenger station access over the transitway.

For about half of its length, the roadway is built on top of large box culverts that carry run-off from five storm sewers. In the event of major snowstorms, it is expected that the trench is wide enough to allow snow to be pushed off to the shoulders of the roadway and removed after midnight when the transitway is not in use (special snow-fighting equipment has been purchased).

At the end of the West Transitway, a traffic signal regulates entry onto the Ottawa River Parkway. This segment is operated using a contra-flow arrangement during rush hour, for an additional 2.5 miles. At Lincoln Fields, the Southwest Transitway begins, going through an area of "green space" to access the Queensway, where the buses operate in mixed flow (bus stops with shelters are provided on this highway as well).

Although no detailed cost figures are available, it is believed that the 22 mile busway system will total about \$ 300 million (Canadian) when complete (13.6 million Canadian dollars per mile). This figure apparently excludes the replacement value of a major portion of the buses now operating on the busway network, which were already on hand. [Light rail capital cost figures always include the purchase price of new equipment and maintenance facilities.] However, considering that Ottawa is a small urbanized area (population around 500,000), it was estimated that a rail line would have required 50% greater capital costs, and 20% more for operations (it is not known whether at-grade light rail, like the San Diego and Sacramento operations, was considered).

The possibility of incremental construction and the fact that the busway concept would allow considerable flexibility of operations, coupled with a desire to provide a more direct pick-up of passengers rather than rely on park-and-ride, were major factors in the mode choice decision. The transitway has been engineered for eventual conversion to light rail (which would however require construction of a CBD tunnel), in the event that increased population growth will demand added capacity.

The Ottawa busway is considered to be fairly successful. The only notable drawbacks appear to be an expectation of heavy interference with cross-traffic in the CBD area because of a high frequency of at-grade bus traffic in the future; and the fact that more expensive depressed construction was required where old railroad right-of-way was used, as compared to at-grade light rail with crossing gates.

4.4 New Modes.

Vancouver SkyTrain. The Advanced Light Rapid Transit (ALRT) technology which was chosen for Vancouver's new rapid transit system integrates the rapid transit and automated people mover concepts (Figures 4.12,4.13). This is a fully-automated (driverless) mode using bus-sized lightweight transit vehicles semi-permanently coupled in pairs, on conventional standard gauge track. A moving block control system is employed to permit safe operation of trains on headways as close as 60 seconds, permitting more frequent service than is possible with a conventional, fixed block system; as a result, smaller and less costly aerial stations are said to be possible (19,20).

ALRT trains have steerable axles to allow reduce noise reduction on curves. Linear induction motors are mounted between and below the axles, to permit smaller wheels to be employed. This is intended to lower the profile of the train and permit marginally-cheaper, smaller-bore tunnels where underground construction is required. Using a LIM reaction rail in the middle of the track instead of a rotor, the motor has no moving parts and some maintenance savings can be realized.

The LIM also provides a regenerative braking system, putting power back into the line when the trains decelerate. The electric power supply is unusual in that third and fourth rails are located to one side of the track, carrying positive and negative current at 600 volts DC.

The light rapid transit system was opened in December, 1985, in advance of the World's Fair, Expo 86, which was to be held in Vancouver. The line is about 13 miles long (21 kilometers), and has 15 passenger stations. In addition to handling regular commuter traffic, it was designed to provide shuttle service from the main Expo 86 fair grounds to the Canada Pavilion, near the waterfront and Seabus terminal (21).

The line begins at Waterfront Station in an at-grade alignment just inland of the Canadian Pacific tracks that follow the shoreline, and utilizes the historic Canadian Pacific Station. It then enters Dunsmuir Tunnel, an abandoned single-track railroad tunnel that penetrates the heart of the Vancouver CBD. The tunnel was reconstructed with its floor lowered about 4 1/2 feet to permit a stacked configuration, with the inbound and outbound SkyTrain guideway at different levels. This was facilitated by the low vertical profile of the cars.

After skirting around the fairgrounds site on aerial structure, the line proceeds across a railroad yard and alongside of the Grandview Cut, which is operated by the Burlington Northern. It then continues east (still on structure), following the old B.C. Hydro right-of-way. This was operated by the

interurban electric railway until the 1950's and then taken over by B.C. Hydro Rail, which still provides freight service to a number of customers in New Westminster, Burnaby, and eastern Vancouver. It generally follows this R/W into the terminus at New Westminster. About eight miles of the line are elevated, 3.7 at-grade, and 1.2 miles in tunnel (22).

SkyTrain normally runs in fully automated mode; there is however an emergency control position with a jump-seat which can be used in case of problems with the automatic train control system. Instead of attendants on each train, a number of roving BC Transit staff wander through the cars and visit station platforms somewhat at random. This continual staff presence, and the closed circuit TV system which is used to monitor activity on station platforms, contribute greatly to transit system security, as does reduced waiting at stations (resulting from the short headways).

A self-service, barrier-free fare collection system is used. Many of the stations have a distinctive, hoop truss structure supporting the roof and walls, and giving the impression of a high-tech architectural form. As there is no operator in the front of the train, an electronic track intrusion sensor system is employed; if a person or object falls into the track, power is cut off automatically and all trains in the vicinity are stopped. It has been determined that this provides at least as much safety (and probably a faster reaction time) than surveillance by a train attendant.

The initial intent was to be able to move as many as 8,000-10,000 people per hour per direction; during the first four months of operation it carried over 70,000 riders per day. Headways were four minutes during peak periods, and five to seven minutes off-peak (23). During Expo 86, peak day ridership jumped to over 140,000 per day. Headways during this period were reduced to 3.5 minutes with four car trains; and additionally, in the downtown section where the Expo shuttle was operated, trains ran as close as 45-60 seconds on a regular basis.

Maximum operating speed is about 56 MPH (90 KPH). Numerous crossovers and pocket tracks are provided at different points along the line, making it easy to add trains on demand during peak periods, and allowing disabled trains to be removed easily. In the event there has been an unexpected delay on the line, or when it is necessary to move some equipment up rapidly, the acceleration rate of the cars is increased above that used in regular passenger service.

Cost for the total system was \$ C 854 (about \$ 600 million U.S.). This comes out to approximately \$ 46 million U.S. per mile. While capital costs were high, they appear to have been justified on the basis of the very heavy ridership on this corridor.

Although SkyTrain is popular with Vancouver natives and visitors to the system, there are several negative features. One is the appearance of rail corrugations owing to unforeseen hunting movement by the radial wheelsets; this has only partially been corrected by re-profiling the wheels. The rail corrugation results in a rumbling sound as the cars move down the line at speed. In addition, the inverter control system used to operate the linear induction motors emits a very audible whine. Hence, the trains generate more interior noise than is desirable for a modern urban transit system.

Another problem is the small dimensions of the vehicles: only 42' long by 8' wide. Seating is limited to 40 per car, and because the narrowness of the carbody restricts aisle width, cross seats are located only at the ends: in order to facilitate passenger flow, side or longitudinal seating is provided in the center. Platform edges are designed such that they can be cut back at some future time, and it is anticipated that eventually a wider car of the same general type will be operated on the New Westminster Line.

Meanwhile, the line is to be extended another 4 KM (2.5 miles) to Surrey for an additional \$ C 170 million, crossing the Fraser River on a unique cable-stayed bridge. Whatever defects SkyTrain may exhibit, it certainly demonstrates that fully automated rapid transit is feasible, and suggests that operation of trains on very close headways (three to four minutes) can have a very positive role to play in boosting ridership.

Another fully grade-separated, automated rapid transit system (which has some vehicle design features in common with conventional light rail) is the Docklands line in London. As the transit line in this case has been an integral part of a massive urban renewal project, this facility is discussed below under examples of transit joint development, in Chapter 6.

4.5 Proposed New Transit Starts Elsewhere In The U.S. Using Railroad Rights-of-Way.

Planning is also underway in a number of cities in the U.S. towards transit development on still-operating and former railroad rights-of-way. Though space does not allow a complete elaboration of these projects, a few of the more promising ones will be mentioned.

Chicago is constructing its second airport transit line in a southwest direction from the Loop to Midway Airport. This will be a 9.1 mile, double track rapid transit operation. The cost will be \$ 496 million (including \$ 86 million for 90 new cars and a maintenance and storage yard), and ridership has been projected to be 118,000 by the year 2000. This line will rely on existing rights-of-way of Conrail, the Illinois Central, and the Santa Fe Railway for 6.1 miles (partly on embankment), with 2.7 miles of new aerial structure (in two locations), and 0.3 miles of open cut near the airport (24). This is a good example of piecing together a line using a variety of new and existing rights-of-way.

St. Louis has a plan for an 18-mile fixed guideway transit line from East St. Louis through the CBD, and out to Lambert International Airport. This would utilize right-of-way, structures, and facilities acquired from two railroads. Included would be the historic Eads Bridge across the Mississippi River, the Washington-Eighth Street railroad tunnel, the Union Station baggage tunnel, a MOPAC yard/repair facility, and nearly 14 miles of continuous railroad trackage or right-of-way, mostly abandoned (25).

In Minneapolis, five different transit corridors are under consideration; one of these, the Southwest Corridor, would utilize an abandoned Chicago and Northwestern Railroad right-of-way which was purchased by the Hennepin County Rail-

road Authority in 1984. LRT as well as other transit alternatives would be considered for this corridor (26).

Montgomery County, Maryland is investigating transit use of 4.1 miles of unused Georgetown Branch railroad right-of-way to connect Silver Spring, Md. to Bethesda, the C & O Canal Park, and Georgetown. The route would link stations of two Washington Metro lines. A light rail option (combined with recreational bikeways and a historic tourist railroad) and a guided trolley bus or trackless trolley system, are under consideration (27).

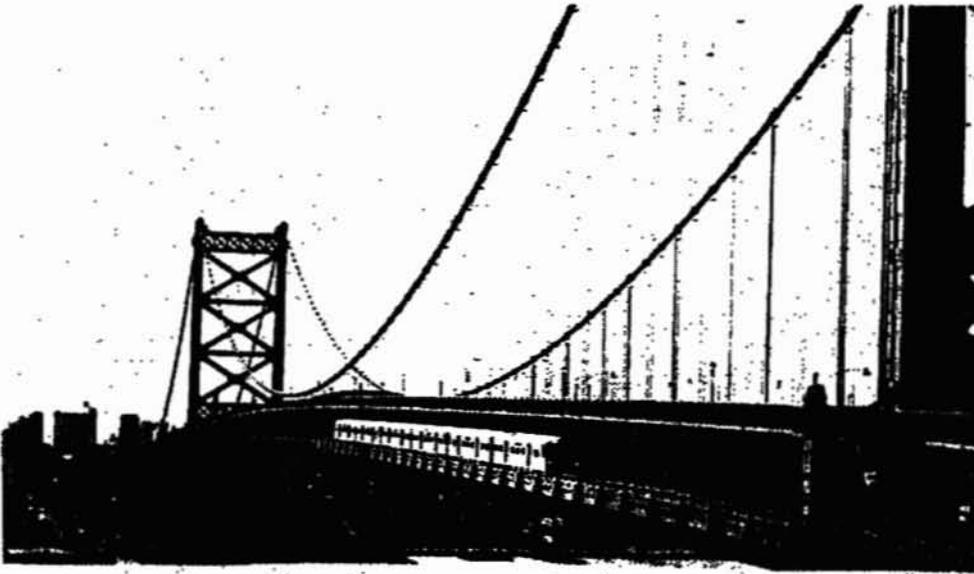
In the Norfolk-Virginia Beach area, a 19-mile LRT line has been proposed using railroad right-of-way, with about a mile of street running at each end. Finally, Austin, Texas has an Alternatives Analysis ongoing in preparation for development of its Northwest Corridor; the city and transit agency have already purchased a railroad right-of-way extending from the CBD in a northwest and in an easterly direction, for transit use (28).

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FIGURE 4.1 LINDENWOLD HIGH-SPEED LINE



**Above: On former
Bridge Line tracks.**



**Right: Views of the
Budd-built rapid
transit cars.**

**Below left: On viaduct
at Collingswood.**



**Below right: Station
parking at Lindenwold.**



FIGURE 4.2 LINDENWOLD HIGH-SPEED LINE (Cont'd)



On surface alignment/embankment near Lindenwold. At right is an RDC commuter rail car operating on the Pennsylvania-Reading Seashore Lines, whose R/W the Lindenwold Line follows for some distance to the west of this point.

FIGURE 4.3 CLEVELAND TRANSIT SYSTEM RAPID TRANSIT LINE



This system was constructed on excess right-of-way along a railroad main line. New York Central freight at left.

FIGURE 4.4 SAN DIEGO TROLLEY



Above: San Ysidro Line on former SD&AE right-of-way.

Right: East Line, on former SD&AE right-of-way. Gauntlet track on bridge over highway Route 805.



Left: Western terminus of line along C Street, at the Santa Fe Depot.

FIGURE 4.5 PORTLAND MAX



Left: On reserved lane at Pioneer Courthouse Square in CBD.



Right: Right-of-way on I-84.



Left: On the 75-year old Steel Bridge. Inaugural train with flowers on September 5, 1986.

FIGURE 4.6 PORTLAND MAX (Cont'd)



Left: Crowd at heavily used Lloyd Center Station, near a major shopping center.

Below: Joining the Banfield Freeway, where the line follows the Union Pacific RR.



Above: On old interurban right-of-way, Ruby Jct. to Gresham.

Right: Single-track section on the interurban line near Gresham.



FIGURE 4.7 RT METRO IN SACRAMENTO



Left: At Watt I-80 Station, a major bus transfer point.

Below: A simple but well-designed station shelter, with self-service fare collection equipment.



Above: Double-track LRT section, on excess SP main line right-of-way.

Below: A gated crossing with resilient road surface around track to improve safety and motorist ride quality.



FIGURE 4.8 PAT EAST BUSWAY IN PITTSBURGH



The busway alignment required relocation of the Conrail main line, seen at left. The busway itself has two lanes and a single shoulder in this segment.

FIGURE 4.9 PAT EAST BUSWAY IN PITTSBURGH (Cont'd)

Right: Articulated buses provide the local EBA service; express buses can bypass the locals at stations like the one shown here at East Liberty.



Above: High-capacity articulated bus entering the busway at Wilksburgh.

FIGURE 4.10 OTTOWA BUSWAY



**Above: The Rideau Street
Transit Mall.**



**Above right: Lincoln Fields
Station, on parkway alignment.**

**Right: Open cut section of the
East Transitway, constructed
along former railroad right-
of-way.**



FIGURE 4.11 OTTOWA BUSWAY (Cont'd)

Right: Busway station with board indicating where the various bus lines stop.

Below: Bus stations in open cut, showing bypass lanes.



FIGURE 4.12 VANCOUVER SKYTRAIN



Above: ALRT elevated guideway structure.



Right: Skytrain was a popular attraction for visitors to Expo 86.

Below: Stadium Station in Vancouver.

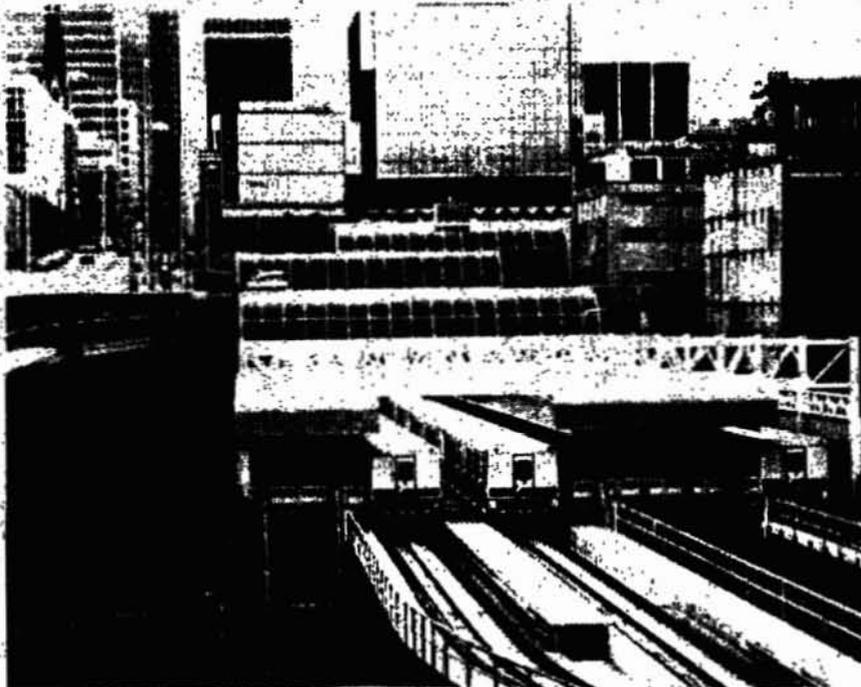


FIGURE 4.13 VANCOUVER SKYTRAIN (Cont'd)

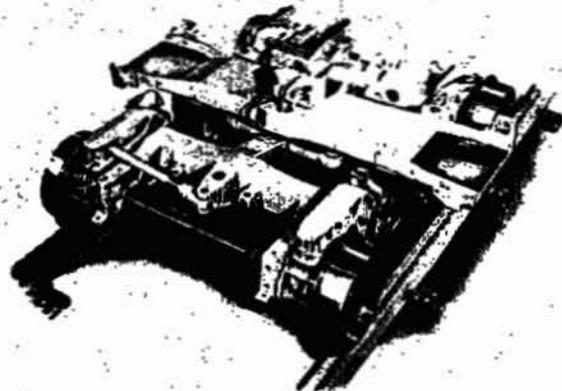


Above: Metrotown Station, Burnaby; line built over former interurban railway. Middle track allows trains to be reversed, added, or withdrawn as needed depending upon service requirements.



Left: On aerial guideway.

Below: Self-steering wheelset intended to reduce noise on curves.



5. THE NEED FOR JOINT DEVELOPMENT

5.1 Reasons For Interest In Transit/Real Estate Joint Development.

Public/private joint ventures can greatly improve the ability of public agencies to finance new transit lines. Joint development can include business/commercial/residential projects on transit authority-owned property, the sale or lease of air rights over transit stations and rights-of-way, and underground projects tied in with station concourses in the case of subway alignments. It is highly advantageous to encourage the private sector to participate directly in financing public transportation infrastructure (including, but not limited to, transit stations) where it can be shown that it is in their interest to do so, to improve access for employees, customers, clients, potential renters of office space, and residential tenants.

In the face of declining Federal aid for mass transit and limitations on the kinds and extent of State and local taxation which can be applied to transit construction, there has been considerable recent interest in value capture financing options. This is particularly so in view of the high cost of installing rail or busway transit facilities (ranging from slightly less than \$ 10 million to well over \$ 200 million per mile, depending upon type of construction and locality). Some researchers believe that from 20 to 40 percent of the capital costs of transit improvements and new transit facilities may be saved by using value capture finance techniques (1).

There are, of course, other important reasons why joint development is desirable. The shift in residential population towards the periphery of our urbanized area, and particularly to Riverside and San Bernardino Counties in the eastern part of our region--often the only place where workers can find housing that they can afford--has brought with it an imbalance in vehicular flows on our capacity-constrained east-west highway facilities, resulting in increasing congestion and a worsening in air quality.

SCAG's adopted Growth Management Plan (2) has recommended an improvement in the balance between housing and employment within subareas, to allow a reduction in the need for lengthy commutes by auto. The Growth Management Plan suggests a variety of methods for local jurisdictions to manage growth, including transportation system improvements and land acquisition to facilitate a better jobs/housing balance. Meanwhile, there have been a number of recent proposals for commuter rail, to divert long-distance commute trips to public transportation and reduce congestion in this way. However, with a highly directional mode of operation, this can result in considerable "dead-heading" or unproductive transit vehicle movements, which will increase transit operating costs.

A challenge in the future will be to develop environmentally-favorable land-use patterns without inducing further urban/suburban sprawl and excessive dependency on the private automobile for mobility, in our multi-centered metropolitan area. In theory, a polycentric city with a number of higher-density clusters of activity is better able to support a viable public transit system than an urbanized area with only one major center (3). Hence, investments in line-haul transit along former railroad rights-of-way could provide a means to encourage

clustering of new and relocating activities into "outer city" areas which can support their own internal circulation systems. With peripheral centers of activity, the viability of the line-haul service is improved, because commuting and other trips will be made in both directions, lowering operating subsidies.

By providing new focal points for growth around transit stations in outlying sections of the metropolitan area, joint development, such as new mixed-use projects including business, retail space, and housing in close proximity to transit, can promote favorable land use patterns and reduce sprawl. Thus transit-real estate joint ventures can help to increase efficiency in urban transportation, while promoting community diversity, helping to achieve an improved jobs/housing balance, preserving open space, improving air quality, and reducing energy consumption in the our multi-centered region.

5.2 Strategies For Value Capture Financing And Joint Development.

One value capture method is the public sale/lease of land around stations to developers following the purchase of right-of-way and adjacent property by a transit development agency, in excess of that necessary for construction of the transit line (with allowance to accommodate future expansion needs). Recent court cases have established a precedent for financing joint development projects on surplus lands, and providing a public benefit in the form of lower transit system capital costs. Similarly, the transit agency can construct transit-related facilities around a station area and lease, rent, or sell them; or cede development rights to land parcels bordering transit lines to other public or private parties in such a way that the transit entity participates in a portion of the income stream thus produced.

Closely related to this is air rights development above stations and rights-of-way (see Section 5.5) and in some cases also subsurface development rights.

Zoning incentives, in which increases in allowable floor-to-area ratios are awarded in return for certain public improvements by the developer (such as provision of a transit station, or station improvements), could be a particularly powerful tool in promoting joint development (4). Zoning incentives could include such strategies as cluster zoning, transfer of development rights, and floating zones (5).

Impact fees levied on new development, and representing a pro rata share of necessary improvements required to service existing residents, provide a potential source of revenues to help finance transit projects. Mitigations, in which developers minimize adverse environmental impacts of their projects by providing public improvements (including transit improvements) are yet another possibility (see also Section 5.6).

Tax-increment financing, in which incremental property taxes above the current tax base in a specified redevelopment district are dedicated to financing public improvements (such as transit) in the same district, can provide another source of revenue. In this case, no new taxes are introduced, which could make this a popular method where there is opposition to property tax increases.

Special assessments entail levies on properties that benefit from nearby station

improvements, and are also a potential source of revenues; however, objections may arise that it is unfair to charge such fees to property owners who have occupied sites in the vicinity of a prospective transit line with viable commercial enterprises, prior to construction of the transit facility (special assessments might be easier when vacant land is developed adjacent to a new transit line).

Similarly, creation of special transit development districts or authorities can permit separate taxes on the assessed value of land in the vicinity of transit stations where property owners are expected to benefit financially from the transit access.

Several additional joint development strategies should be mentioned which do not relate to value capture per se, but may be used to enhance the potential of the revenue-generating methods already discussed. One of the most commonly used of all land use strategies is the institution of parking controls, i.e. reductions in downtown parking/minimum parking requirements, so that the area around transit stations will be valued more highly by private developers because of the access provided. Another method commonly used is channeling of major public investment in facilities (such as municipal offices) and capital improvements (such as sidewalks and new sewer facilities) in the vicinity of stations. Provision of pedestrian sidewalks and mezzanines to access transit stations is also used to encourage nearby development (6).

5.3 Strategies Appropriate For Creative Reuse Of Railroad Lands.

With respect to railroad-owned property, we are faced with four situations: (a) the case in which a railroad is interested in developing a large parcel of its own property adjacent to a railroad right-of-way, (b) the case in which the railroad is in the process of disposing of a large parcel of land next to a right-of-way, and sells it to a public agency, (c) the case in which the railroad disposes of property for subsequent development by private real estate companies, and (d) the case in which only the right-of-way is sold off for transit line development, with little if any excess land.

In case (a), in which the railroad is interested in promoting a large multi-purpose development on its own (e.g., on a railroad yard which is to be closed down), zoning incentives could be used as follows: permission to develop at higher densities could be granted to the railroad in exchange for a commitment that right-of-way be provided for a rail transit line or transitway through the development site. It might also be possible to secure in return for rezoning, the donation, lease, or sale at modest cost of contiguous right-of-way for transit development, or perhaps even right-of-way needed for transit in a different part of the city.

In case (b), the railroad is interested in selling off a large parcel of land, providing a municipal redevelopment agency or other public entity the opportunity to acquire some of the property (in excess of that needed for transit development). When the transit facility is put in place, it is then possible for the public agency to sell or lease the excess property, as well as station-related facilities, to private land developers. Alternatively, the public entity purchasing the land can participate in its development in

partnership with the private sector, and derive revenues in this way. There would also be opportunities to channel public investment, such as new county/municipal office buildings, onto this property. Finally, a special transit development district should be relatively easy to implement as this case deals with real estate owned by the public.

In case (c), where the railroad sells off major parcels to private developers, there may be opportunities to provide zoning incentives to these developers such that they will contribute to transit station construction in return for rezoning. When development of vacant land is involved, special assessments may be feasible. Tax-increment financing may also be appropriate.

In case (d), in which only right-of-way is sold to a transit development agency (assuming that nearby land is already developed), there remains the possibility of allowing the railroad to retain air rights to the right-of-way, in exchange for a lower purchase price. With respect to expanded development of properties bordering the right-of-way, impact fees or mitigations may be appropriate, as would tax-increment financing.

5.4 Special Concerns Regarding Light Rail And Busway Joint Development.

Compared to subway development, light rail lines and busways have often been intended to minimize construction costs rather than maximize development potential. This applies especially to transit facilities developed on utility corridors (which may traverse low-density industrial belts and undevelopable land), but may also pertain to facilities along some (by no means all) freeway alignments and old railroad rights-of-way (7). There are obviously tradeoffs between building primarily commuter-oriented lines feeding a CBD area using the cheapest available R/W, and routing new transit lines to serve existing centers.

However, in an urbanized area experiencing strong regional growth, it should be quite feasible to develop real estate adjoining LRT lines or busways located on former railroad rights-of-way in marginal industrial areas, without possible negative impacts of redistributive growth (e.g. taking retail sales from another area). In a congested, high-growth area, the benefits of location on an emergent transit corridor may be a considerable incentive for transit/real estate joint development, especially if density bonuses and upzoning are used to attract major commercial and residential projects. In this regard, Los Angeles may be in a much more favorable situation than many other urbanized areas.

Another factor is that the poorer performance characteristics (in terms of speed, etc.) of some light rail lines, especially older systems, have not furnished the strong incentive to clustered development that has been offered by subway systems. For this reason the "influence zone" for joint development purposes surrounding LRT stations is generally considered to be only 1000 feet as compared to 2500 feet for conventional rapid transit (8). In the case of busways, the deficiency has often been lack of on-line stops, or few and poorly-accessible stations; and poor route identity on portions of lines that deviate from the busway and operate in mixed traffic to serve centers.

However, the use of higher performance light rail vehicles, adoption of wider station spacings (or skip-stop/express-local service during peak periods), and

right-of-way with a high degree of grade separation and traffic preemption can make it possible to closely approach rapid transit standards: thus permitting the zone of influence to be considerably expanded. For busways, provision of a sufficient number of stations, and properly designed bus lanes or transit malls (perhaps with electric bus operation) for local access could greatly improve the situation.

5.5 Air Rights Development.

Air rights development may take several forms. One of the more obvious of these occurs when a large parcel of land is occupied by a transportation facility adjacent to a CBD area where available land for new development is scarce. For example, Caltrans, which expended considerable sums of money in constructing the Los Angeles freeway network during the post-World War II period, is now looking for ways to realize a cash return from what is otherwise dormant space over these wide transportation corridors. A major project of this kind including hotels, office space, and park area has been proposed for the space above the Harbor Freeway between 4th and 6th Streets in downtown L.A. (9).

An example of this kind of development involving a major railroad yard in a CBD area is the air rights development over the former Illinois Central tracks on the east side of the Chicago CBD, which entailed decking over the railroad property at Randolph Street. This area is served by METRA Electric and South Shore Line commuter trains whose stations are located below the deck.

Another kind of air rights development can occur where a developer has acquired property adjacent to a transportation right-of-way and, requiring more space, finds it advantageous to work out an air rights agreement with the owner of the right-of-way. This was done in the case of the New York Central's West Side freight line on Manhattan Island, New York. Here, several warehouse buildings were extended over an elevated freight line, with the track running through the second story of each building (10).

This illustrates the point that air rights development over transit lines need not be limited to the right-of-way over transit stations (which relates to joint development and enhancement of patronage). Warehouses or other non labor-intensive industrial uses could be applied to the air space above such rights-of-way (between stations), as an additional way to generate revenues.

Similar to the above is the case in which a developer has acquired parcels on both sides of a transportation right-of-way, and needs to acquire air rights in order to complete the development, bridging over the R/W. There are several examples of this involving shopping malls in the Los Angeles area. One is Hawthorne Plaza, which has a large bridge structure spanning the SP El Segundo Branch to connect a major parking structure with the mall itself; a second is Del Amo Fashion Plaza, where the mall has been constructed on both sides of Carson Street as well as over the street (parking is also provided on a deck over the thoroughfare). In the latter case, Carson Street also provides access to the mall.

It is easy to conceive of a transit line with a shopping mall or office building built over the right-of-way, and providing direct access from a transit

station to the other activities in the building. An example of this has just been completed in San Diego (see Chapter 6). However, even more elaborate designs can be conceived, with an electrified transit line on the ground floor of a shopping mall and a large open space above so that shoppers at higher levels can view the activity in the station below (See Figures 5.1,5.2).

Philadelphia's Center City Commuter Connection comes close to this, as the regional rail trains are located just to the north of a major shopping mall (at a lower level), with a large glassed-in viewing area allowing shoppers on the mall level above to view the trains below. However, it would be optimal for the transit line to be directly in the center of the mall site. Perhaps the closest approximation to this concept is a hotel at Walt Disney World in Florida which has a monorail station built directly into the center of the building, with a spacious area above the right-of-way providing a fine viewscape.

Finally, there are cases in which development is conducted in a linear fashion, being confined to air rights following the transportation corridor. This can include development of the air space under an elevated structure such as a freeway, which has often been used for storage space, but is beginning to be used for commercial buildings, motels, etc. (11). Similar utilization of the space under an aerial transit structure located on an old railroad right-of-way should be possible.

Assembly Bill 680 (Baker) proposes to permit Caltrans to enter into agreements with private entities to lease for up to 35 years air space above (or under) state highways to construct transportation facilities and charge tolls sufficient to retire the private investment in the project (with a reasonable profit). Such agreements would provide for reversion of the facilities to the state at the expiration of the lease. Four public-private joint venture demonstration projects would be authorized--at least one of which would be in southern California. The intent is to use private funds to supplement public sources of revenues for provision of transportation infrastructure, permitting rapid formation of capital, providing travel alternatives, and reducing congestion (12).

An important alternative under AB 680 would be privately-funded Build-Operate-Transfer (BOT) projects whereby private companies would obtain exclusive development agreements to build with private capital all or a portion of public transportation projects.

Probably the most spectacular recent proposal for air rights development following a linear right-of-way in Los Angeles is the West Coast Gateway project, which would utilize the space over the Hollywood Freeway between Broadway and Alameda Street downtown. This is intended to be an urban sculpture on a grand scale, providing in addition an activity center linking the CBD with Chinatown, Little Tokyo, and Olvera Street. The winning design, titled "clouds of steel," would provide for theatres, museums, cafes, and a walk-through aquarium, all linked by pedestrian walkways (13).

Technically, air rights are termed "transferable development rights", and are bought and sold as a tool for further expansion in an area which has development limits and where a builder wishes to exceed allowed height limits. If the

developer wishes to construct a building higher than normally allowed, he must buy unused air rights in the same area. Air space on the other hand is the space above, around, and below a transportation right-of-way and is generally leased rather than sold. Air rights can be transferred by a variety of means, and in some cities, the developer can be required to provide public benefits, such as historic preservation, cultural or transportation facilities, etc., as a condition for transfer of rights. Hence, it is apparent that this can be a powerful tool for urban land use planning (14).

5.6 Emissions Offsets.

A concept closely related to mitigations which are often a requisite for property development in urban areas, is the allowance of offsets to industries which are required to lower their emissions levels in order to meet air quality standards. By permitting corporations to contribute to transit capital facility construction in lieu of other, often economically unproductive, retrofitting of factory equipment with new emission control devices, a much greater public benefit might be realized in terms of improved mobility, with the same air quality benefits.

Although this could be applied to any industry whose activities result in significant air pollution, a case in point is the electric power generation industry. Utility companies could be allowed to pay for the cost of electrifying transit lines (bus or rail) or railroads that can be used for intercity and commuter passenger services (as well as freight). In the case of existing bus services, this would mean the elimination of NOx, particulates, and other air pollutants from diesel-powered vehicles.

In the case of electrified rail or other fixed guideway transit modes, by contributing to the development of fast, attractive transit services (e.g. on railroad rights-of-way), even greater emissions reductions can be achieved by diverting additional auto drivers to mass transit. A program of this kind could significantly reduce the capital costs that must be borne by transit implementation agencies from other, increasingly scarce sources, and increase the route mileage of rail/fixed guideway transit that can be provided.

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FIGURE 5.1

HYPOTHETICAL EXAMPLE OF ELEVATED RAIL TRANSIT LINE INCORPORATED
INTO NEW COMMERCIAL/OFFICE DEVELOPMENT



Source: Metropolitan Transportation Plan Review,
quoted in Light Rail Transit State Of The Art
Report, USDOT 1976

FIGURE 5.2

INCORPORATION OF LIGHT RAIL INTO
A SATELLITE TOWN IN SWEDEN

Right: View of southern portal
of the tramway tunnel under
the new town of Frolunda, southwest
of Gothenburg.

Below: The transit stop under
the heart of the shopping center
at Frolunda Torg.



6. TRANSIT JOINT DEVELOPMENT EXAMPLES FROM OTHER AREAS

6.1 Transit-Related Development and Transit/Real Estate Joint Development: Rapid Transit Examples.

Much of the information which has been reported on the economic benefits of transit systems has related to the impacts of conventional or high-capacity rapid transit or subway lines on land values around station sites.

Toronto. For instance, rapid transit projects implemented by the Toronto Transit Commission have played an important role in determining the locations of approximately \$ 30 billion in new buildings (Figures 6.1). During the 30-year period from 1954 to 1984, half of all new apartment construction in this city was located within walking distance of rapid transit; and 90% of all new office construction occurred near subway stations both downtown and in outlying locations at Bloor, St. Clair, and Eglinton. For the 10-year period from 1955 to 1965, new assessment for property values adjacent to the subway increased 60%, versus 25% for the city overall. Certain specific developments, such as The Atrium on Bay, a 468,000 square foot shopping/restaurant center, are specifically tied in with the rapid transit system (1).

Montreal. Another example is The Place Ville Marie, a retail development located in a tunnel area on the Montreal Metro, connecting a subway station with a major office building. Rental prices have increased from \$ 3 per square foot per year in 1954 when the facility opened to \$ 70 per square foot in 1985 (2).

Washington Metro. In the United States, the Washington Metro system (Figure 6.1) added \$ 2 billion in property values of adjacent land during its first three years of operation from 1976 to 1979. Metrorail has been given credit for a business renaissance in the downtown area, especially along Pennsylvania and Connecticut Avenues; and for stimulating the revitalization of suburban business/shopping areas such as Bethesda and Silver Spring, Maryland. It has also been instrumental in development of new commercial centers, including the Ballston Common shopping mall with a 175,000 square foot office tower, at a nearby northern Virginia station. In 1986, Arlington County estimated that the Ballston Common will generate \$ 2 million per year in county and \$ 2.5 million in state taxes (3-5).

WMATA has an active joint development program which provides the Washington Metro with revenue from air rights leases on Metro-owned property. One example of this is the Far East Trade Center at the Gallery Place station, including a 596 room hotel, a 220,000 square foot retail plaza including restaurants and a department store, and a 340,000 square foot office tower--all with direct connections to the station. This project specifies a minimum annual rent of \$ 1 million per year, with additional payments based on gross receipts; it generated \$ 3 million in 1986 (6). In the case of the Farragut North Station, the developer of a 12-story office/retail-commercial building pays an annual rent of \$ 248,000 with additional rent after the first two years calculated on the basis of 50% of net project income (7).

A privately funded Metrorail station is also planned on WMATA's Yellow Line, at

the Potomac Greens development. This 38-acre site will contain 2.7 million square feet of building area with 13 commercial buildings, seven residential structures and a hotel. The developers, Savage/Fogerty and the Richmond, Fredericksburg and Potomac Railroad, will pay \$ 19.2 million for the station, which will be operated by WMATA (8).

Atlanta. In Atlanta, an estimated \$ 2.2 billion is being invested to build around five MARTA stations, including Peachtree Center. This includes some 14 million square feet of office space, 6400 hotel rooms, 1500 residential units, and retail, convention, entertainment, governmental, and cultural facilities. To a large extent this has been due to local land use policies supporting development around transit stations, and solid financial support for the transit system (9,10).

Vancouver. In Vancouver, the SkyTrain is serving as a development catalyst. In Burnaby, developers of a \$ C 400 million shopping complex decided to accelerate their plans, and a number of new high-rise condominiums are now planned for sites close to SkyTrain stations. Commercial lease rates close to the New Westminster station increased from \$ C 8 to \$ C 30 per square foot, and a number of new business ventures are appearing. Westminster Quay, a massive condominium/townhouse project overlooking the Fraser River, has also been constructed near this station. Finally, there has been quite a surge in evening and Saturday shopping in downtown department stores, since the line opened (11).

It should be noted that to a large extent the development referred to in the above examples would probably have taken place anyway, but with a much more scattered development pattern. What is significant is that the transit systems in these cities have allowed development to be focused in well-defined centers --encouraging more favorable land use patterns and a shift away from excessive dependency on the private car. Also, it is apparent that policies that promote an increase in commercial activity and bolster land values in the areas served by rapid transit will greatly improve the ability of the jurisdictions concerned to fund these transit systems (which would be needed in any case to provide congestion relief and generally enhance urban mobility).

6.2 Transit Joint Development: Several Light Rail Examples.

San Diego. Development stimulated by the San Diego Trolley was modest during the early years of operation; however, a number of joint venture projects are now underway. One of these is the Starboard Station project, at the present C Street terminus of the San Diego Trolley line, which is adjacent to the Santa Fe Depot and convenient to the waterfront. This will include a 22-story government center/commercial office tower and an 18-story hotel, providing 800,000 square feet of floor space. It will have two triangular-shaped towers, covering two city blocks, and incorporate a San Diego Trolley station and museum space surrounded by an extensive plaza, with a connection to the Amtrak terminal. The light rail line will pass through the street level of the hotel tower, into a three-story depot designed as a galleria for specialty shops (12).

The Bayside rail line has recently been approved; this will follow the

waterfront and connect the C Street line with the East Line. The Bayside route will serve the existing Seaport Village (a popular tourist attraction) and the proposed waterfront convention center and hotel. It will also adjoin the Marina Redevelopment Area above Harbor Drive. North of this, and within easy walking distance of the C Street line, lies the recently-opened Horton Plaza shopping center (noted for its unusual architecture), and just to the east is Gaslight Center. Thus, the light rail system will encompass a major redevelopment zone within downtown San Diego (13).

East of the waterfront and CBD area just discussed is the San Diego Trolley maintenance facility, where the San Ysidro and East Lines converge. This is the site of a joint development project (just completed) at 12th and C Streets, consisting of a \$ 25 million, 10-story office building and the new Imperial trolley station. This provides 180,000 square feet of floor space, a 663-space parking garage, and a 15 story clock tower. Occupants of offices on two sides of the building have a view of the trolley line below (14).

The project has been sponsored by Starboard Developers of San Diego, the Metropolitan Transit Development Board, and San Diego County; it will house the MTDB offices and four county agencies, as well as making available additional office space to the private sector. This facility is unique in that the trolley tracks run right through the ground floor of the building--with the trains continuing to operate all through the construction period.

Additionally, it is understood that six large private real estate developers plan to contribute to the future Mission Valley Line (15).

Portland. The Cities of Portland and Gresham consider that the light rail line can be a tool for shaping growth and restructuring zoning/development practices. In suburban Multnomah County, very comprehensive land use studies were conducted for each station site, including real estate market forecasts, determination of the amount of developable land, and development objectives for each station. Station areas were divided into concentric zones of impact, and a plan laid out for each station, with provision for higher density superblocks, retail areas, pedestrian ways, and protection of existing residential neighborhoods and natural features. Exceptional success has been attained in satisfying the concerns of residential groups along the line (16).

Tri-Met has formed its own Transit Investment Corporation (TIC) to manage mixed-use joint development around stations and leverage private capital. The TIC has been instrumental in stimulating new office and retail construction near the MAX light rail line, and has negotiated lease/sale options for land surrounding several stations. Examples of new development along the line include a new Saks Fifth Avenue store in the downtown core area, as the major tenant in a four-block retail complex (with its own MAX stations), an expanded Gateway Shopping Center, and a \$ 30 million shopping center in Gresham, within walking distance of a MAX station (17).

Building owners in downtown Portland have indicated that MAX is responsible for making their properties along the route easier to lease; with increased sales activity and building activity also reported in Gresham (18). However, as the MAX line opened relatively recently (September 1986), it is too early to make a

comprehensive assessment of transit-related development benefits.

Sacramento. The light rail line has been credited with saving the K Street mall project; as a pedestrian-only mall, new development petered out after commercial projects had built up the western end (which is connected by footpath to Old Sacramento, a major local tourist attraction). With the light rail line in place, redevelopment has commenced along the eastern end of the mall.

Additionally, several new office buildings have opened up along the Folsom Branch, close to the Sacramento CBD. It is understood that there are also joint development plans underway for the depressed Alkali Flat and Del Paso Boulevard sections along the Watt/I-80 transit line (19).

6.3 Transit Joint Development: Busway Examples.

There would be scant opportunities for joint development involving express bus lines operated over HOV lanes without intermediate stops. However, where a bus facility is provided with a number of local stations, there should be much the same potential for transit-related development as is the case with light rail.

In Ottawa, the owners of the St. Laurent Shopping Center (a large shopping mall) have donated land for an important station on the East Busway. At Lincoln Fields, the transitway goes through an area of high-rise apartments, and it is anticipated that additional residential structures will be built right around the station in the future (20).

The other example of busway-related joint development is the Hudson River waterfront development project (see below, section 6.8), which will also incorporate a light rail line.

6.4 Transit Joint Development: Other Bus Examples.

In Orange County, in our region, the Huntington Beach City Council has approved an Orange County District plan to develop a multi-modal transportation center which would include OCTD, Greyhound, and John Wayne Airport shuttle bus services in the same terminal. The new \$ 19 million facility will be located at the Beach Boulevard/I-405 interchange (between the Huntington Center shopping mall and Golden West College), and is part of a city plan to develop a business/hotel district. The terminal would be similar to the Santa Ana Transit Terminal at Fifth Street and Ross Avenue in Santa Ana, and like it will combine a large office building with the transit facility.

The Huntington Beach complex will incorporate OCTD and Greyhound offices and lobbies, a six-level parking structure, and a nine story office building (connected with the terminal by a pedestrian bridge). The office building will have 138,000 square feet; \$ 1.5 million of the development costs will be borne by the OCTD, with the remainder financed by Property Ventures (21).

6.5 The Tandy Subway.

Another example of rail transit joint development is the Tandy Subway line in Fort Worth, Texas: the world's only privately owned and operated subway line

(Figures 6.2,6.3). This was placed in service in 1963 by the Leonard brothers, who wanted to provide a high quality transit shuttle from a 3000 car parking lot on the banks of the nearby Trinity River, to their downtown department store. The philosophy was that free parking combined with a free subway ride would keep customers coming to the store, rather than using suburban shopping malls (22).

The line is 4000 feet long, with 2600' on the surface adjacent to the parking lot and a 1400' cut-and-cover and rock-bored tunnel. Service is provided by streamlined PCC streetcars purchased second hand from DC Transit, converted for high platform operation. There are several station stops in the parking lot, and since there are several at-grade pedestrian crossings on the line, it is considered to be a light rail operation. Owing to the short station spacing, service speed is about 35 MPH (PCC equipment is geared for a maximum speed of 45 MPH); trains run every few minutes. The line has generally carried 10-15,000 riders per day, including shoppers, store workers, and tourists (50,000 on a peak Saturday!). The original investment was only one million dollars.

In 1978, Tandy Corporation (which had purchased the department store in 1967) opened the Tandy Center in downtown Fort Worth: a three-level shopping mall complete with ice-skating rink, combined with twin 20-story office towers (and incorporating the old department store)--the whole occupying eight blocks. Additional bank and insurance buildings have located near the Tandy Center, as well. In conjunction with this, the subway cars were completely rebuilt, with a new picture-window body configuration. The subway station has been thoroughly modernized with three loading bays and an attractive lighting arrangement like that of the shopping mall. The transit line is considered a valuable asset to the development of the Tandy Center, and there have even been proposals to extend it by another mile to provide subway service through the CBD area.

6.6 The Long Beach And Irvine Monorails.

In our area, six of the most influential developers in the City of Long Beach are considering construction of a monorail to link together downtown office buildings, hotels, the Convention Center, and the Queen Mary/Spruce Goose complex. McDonnell Douglas Realty Co., which plans a 35-story office building, and IDM, the developer of the World Trade Center on Ocean Boulevard, are planning to privately fund the line which would connect their respective developments. Cushman Realty and Ratkovich Co., developers of the Landmark Square project, and Walt Disney Co., which has purchased the Queen Mary complex, had been searching for the kind of transportation system that could carry large crowds to the latter site, and may also participate. The Long Beach monorail would tie in with the end of the Los Angeles-Long Beach LRT line (23).

In June of 1989, McDonnell Douglas Realty began building a \$ 3.5 million, half mile monorail linking an Irvine office center with John Wayne Airport. TGI would construct the line, which will employ Alweg technology similar to that used at Disneyland and Disney World. The shuttles would probably operate at about 35 MPH (top speed of the vehicles is believed to be much faster). It is reported that six or seven other projects of this kind may be under consideration in the Orange County/Los Angeles area.

6.7 The London Docklands Case.

One of the world's most ambitious inner-city redevelopment projects combining joint development with a rapid transit system is taking place in The London Docklands (Figures 6.4 and 6.5). The Docklands, part of London's East End, comprise 8.5 square miles of abandoned wharves and tidal basins extending along five miles of river, which was formerly the scene of considerable seaport and port-related industrial activity. This area, which long ago underwent decline as an active port facility because of inaccessibility to large container ships, is strategically located near the heart of London, providing major economic opportunities for new housing developments, offices, and industrial parks, with an emphasis on high-technology jobs (24,25).

The Docklands project entails a public and private commitment of approximately \$ 15 billion, mostly raised by the private sector; including some 250 residential, commercial, and industrial projects. The centerpiece of The Docklands will be the \$ 6 billion Canary Wharf project at the old West India Docks, with 12 million square feet of office, retail, and hotel space being developed on 71 acres of land by Olympia and York. Including the 30-story Canary Wharf Tower and two additional high-rise structures, this project has been likened in scale to Century City in the Los Angeles area. The Canary Wharf project is expected to provide 40,000 jobs.

Some 12,000 new dwelling units were constructed in The Docklands in 1986-87 in a variety of configurations and a broad range of architectural styles, including clustered developments, small single-family homes with a distinctly suburban flavor, and luxury apartments with a river view that are popular with young professionals. At least another 12,000 additional dwelling units are scheduled for completion over the next several years.

Rather than relying upon a master plan or detailed developmental framework, a market-driven approach has been used; each new project is evaluated on the strength of its own merits. There has been creative reuse of vacant wharfs, breweries, and mills for apartments, restaurants, shops, and craft studios. Waterside themes are common, with terraced housing forms based on Dutch and Danish models, and some new buildings imaginatively styled to resemble ships.

It has been estimated that for every \$1 in public funds spent by the Docklands Development Corporation, \$ 7 has been generated in private investment. Government expenditure has been concentrated on roads, a short-takeoff and landing airport, and public transportation.

In order to create permanent transportation links to help attract and maintain the confidence of industry and commerce in the emerging Docklands project, the Docklands Development Corporation in 1981 identified the need for improved public transport to this area. Owing to the high cost of a deep bored tunnel below the water table and the limited number of station sites that could have been provided, it was decided to construct a light rail system instead (26).

In June 1982, a joint report of the Docklands Development Corporation, the Greater London Council, London Transport, and the Departments of Transport, the Environment, and Industry recommended building 7.5 miles of light rail, with a

north-south route and a west-to-south route (Figures 6.6-6.9). The cost was not to exceed 77 million pounds (about \$ 120 million), and the authorized cost figure was based on London Transport planning estimates, using a mixture of extant British Rail track, new and disused viaducts, and an existing open cut.

The Docklands Light Rail (DLR) line which opened in June of 1987 is a fully-automated and grade separated standard gauge rail system, with high platform loading and third rail power collection. The decision to go with conventional steel wheel on steel rail technology was influenced by the fact that light rail cars are produced in quantity in Germany, France, and Italy, and it did not seem cost-effective to develop a completely new design for the initial order of just 11 vehicles.

Therefore, 91'-long, six-axle articulated vehicles are used to equip the line; these have a normal capacity of 210 (seated plus standees) and are capable of being operated in short trains with automatic coupling. An outstandingly popular feature of the DLR is the transit car's large windshield, with passenger seats at both ends that give the rider an unexcelled driver's eye view of the right-of-way and skyline. The aerial section on the Island of Dogs crossing the former West India docks, Canary Wharf, and Heron Quays provides a spectacular view of passing scenery (27).

Maximum operating speed of the line is limited to 50 MPH, because with a total of 16 stations on a 7.5 mile system, station spacing is very close: about 6/10 of a mile on the average. Four trains per hour per direction are provided on each of the two routes (the 15-minute headway, which may be longer than desirable, is due mainly to single track at certain points on the line).

Although the DLR has been billed as a light rail line, it is more appropriately classed as a medium-capacity rapid transit line (28). Stations are constructed with many modular elements such as glass canopies which can be rearranged to suit the needs of individual sites. However, the stations at Tower Gateway and Island Gardens (two of the major line termini) are provided with impressive glass rotundas.

The DLR is a barrier-free system with self-service fare collection: passengers are responsible for demonstrating that they have a validated ticket, with only spot checks by roving inspectors. In this regard, the Docklands line is similar to most LRT systems operating on the continent of Europe. In addition to single ride tickets dispensed by automatic vending machines, a variety of travel cards, passes, and permits are available to accommodate discounted seasonal and monthly travel needs, and there is a 'Docklander' day pass to promote tourist use.

Each run is staffed by a Train Captain, who is free to move about the train, provide passenger information, answer questions, etc., in addition to being able to operate the trains in manual mode in case of emergencies. The DLR has a flexible staffing policy, and Train Captains have additional job functions--including train inspection, some administration, and promotional work. Some management personnel are also qualified to operate as Train Captains, resulting in excellent communications within the organization and enhancing the ability to "trouble-shoot" problems.

Patronage reached 20,000 riders per day in 1988, and is growing steadily: there are already plans to double platform lengths at 11 stations. Commuters use the system for movement both to and from the Docklands area. There has also been considerable shopping traffic to Stratford, an important regional shopping center, and tourist travel to the Tower of London and to Greenwich, south of the Thames (necessitating extra Sunday service); and well as an increasing number of trips to entertainment facilities on the Isle of Dogs. Hence, there are major off-peak destinations at the ends of both lines, as well as within the central area. The DLR even has its own tabloid newspaper delivered door-to-door to Docklands residents.

About two-thirds of the Docklands Light Rail route utilizes former railroad rights-of-way. Beginning at the west end at Tower Gateway, the DLR runs along a new double track viaduct paralleling the British Rail Fenchurch Street line; farther east, the DLR actually incorporates existing track (with heavier 113-lb. running rail) on the south side of the alignment. Continuing east, the DLR operates over the disused 1839-vintage brick arch viaduct of the former London and Blackwall Railway (a cable-hauled transit line during the last century).

The northern branch of DLR operates on new track over the surface right-of-way of the old North London Railway, which was an active single track freight line (with a low volume of traffic) until 1980. At the north end, the line turns east to follow the embankment of the British Rail Fenchurch St.-Stratford Main Line, using a surplus single track on the south side of the BR right-of-way. The northern terminus of the DLR line occupies an unused British Rail platform.

The southern end of the leg down to Island Gardens (where the line is connected to Greenwich across the Thames by pedestrian tunnel) incorporates an old viaduct formerly used by the the abandoned Millwall Park Extension Railway. Thus, the DLR has made use of former railway rights-of-way in a variety of ways.

The crossing of the West India Docks in 1985 caused a considerable increase in local land values on the Isle of Dogs as each of the three docks was crossed. Tight curves on the DLR have allowed the land take for the line to be reduced to a minimum, as future buildings in this area will be constructed right up to the transit line. The developer at Heron Quays financed the transit station in this location, with plans to incorporate the station into its own buildings. There are major projects at other DLR stations, including South Quay and Poplar. At Canary Wharf (see above), direct elevator access will be provided to adjoining developments.

Considerable expansion of DLR is planned. A Canadian land development company desires a direct connection to the center of London, and so a 0.9 mile extension is underway in cut-and-cover subway and bored tunnel, from a point just east of the present Tower Gateway station. When open in 1990, this will give access to the financial district, as well as to three major British Rail and London Transport lines. Ten new cars are on order to serve this first extension. The developer will pay \$ 65 million, approximately half the cost of the extension (29).

A second major extension will be the Beckton line to the east, continuing the development area downstream to the Royal Docks--an area of sprawling water

frontage and even more space than is available at the Isle of Dogs. This line would have 13 stations and serve major housing projects at Beckton as well as a link by minibus shuttle to the newly opened London City Airport Terminal. A four-minute peak headway with two and three car trains will be provided on the new line, and an elaborate new delta junction allowing through-running, together with an across-the-platform transfer will be provided at North Quay Station to permit integration with the existing routes.

No less than seven additional new route extensions have been proposed, including connections to the City Airport and tunnels to the south side of the Thames River.

6.8 The Hudson River Waterfront Project: LRT/Busway Joint Development.

Probably the most important new transit joint development project underway in this country at present and involving light rail as well as busway construction is the New Jersey Hudson River waterfront project. The riverfront property in northern New Jersey lying opposite New York City is a booming real estate area: about 20 miles of shoreline are subject to heavy office, shopping, and condominium development. This has been brought about the growth of financial and service industries in the New York/New Jersey area, leading to a demand for major office expansion and housing space (30-32).

Over 100,000 people are expected to live along the waterfront by the year 2000, and 32.5 million square feet of office space are planned. The waterfront project is on a very large scale; overall it will involve more than 40 private and public developers, 34,900 new dwellings, 2700 acres of land, 3.2 million square feet of retail commercial space, 3200 hotel rooms, and over 10 marinas. Local municipalities eager to replace the jobs and residents lost with the decline in manufacturing, maritime, and railroad activity have aided developers with municipal tax abatements, and in some even cases grants to promote redevelopment. Waterfront property offers a magnificent view of the Manhattan skyline, further increasing the attractiveness of the area.

Much of the land under development is comprised of unused railroad yards and warehouses, lying fallow in the wake of declining freight traffic, financial failures, abandonments and mergers--including incorporation of five of the largest railroad property owners into Conrail in 1976. Rationalization of Conrail's rights-of-way and yards together with sale of surplus land by the trustees of bankrupt railroads have resulted in hundreds of waterfront acres being put on the market.

However, The Palisades restrict landside access to much of the Jersey Shore, and there is little room for parking lots. The Hudson River waterfront is already faced with serious access problems as existing roadways are already clogged with Manhattan-bound commuters and local traffic; much of the area is not even served by bus. Therefore, it has been proposed to construct a 15-mile light rail/busway combination (as well as an eight-mile waterfront boulevard), from Edgewater near the George Washington Bridge south to Jersey City, and possibly Bayonne.

This area is traversed by the Northeast Corridor, on which run New Jersey

Transit commuter trains to Newark and New York's Penn Station, and to Hoboken, where a connection is made with PATH rapid transit trains to Manhattan. It is also served by express bus routes using the Lincoln Tunnel AM peak reserved bus lane to gain entry to the Port Authority Bus Terminal in mid-town Manhattan. While these radial transit lines serving New York are already suffering from capacity constraints, there is virtually no north-south service along the waterfront.

The concept is to utilize Conrail's River Line trackage which follows the east slope of Bergen Hill from Weehawken south to Hoboken; this is wide enough to accommodate a double track LRT line or two-lane busway. At Hoboken, a viaduct would provide access to the important Hoboken rail terminal; south of this point the unused Jersey Central main line would be used by the light rail line. In addition, there would be a western leg from Weehawken to North Bergen, following an underutilized Conrail West Shore tunnel and some newly-created R/W to access the major Meadowlands Sports Complex, which includes a stadium, racetrack, and indoor arena. A large-scale park & ride facility would be located on this branch line.

Also under consideration would be use of the "Bergen Arches"--an old Erie Railroad alignment--to provide LRT or bus access from the Meadowlands to Newport City, south of the Hoboken Terminal. Connections with the Lincoln Tunnel portal and New Jersey Turnpike, to existing rail and bus transit lines, and to new Hudson River ferry services would be a high priority.

The busway component has drawn heavily on experience with the successful Ottawa, Canada busway and Pittsburgh, PA South Hills busway/LRT corridor. The busway would be combined with a European-style light rail system, similar in concept to the Calgary and Portland lines. Initial LRT line ridership is projected to be about 30,000 riders per day on the 15 mile route, with extensive connecting feeder bus service. A portion of the route would incorporate paved trackage for mixed operation with buses, similar to Pittsburgh's South Hills "PATway".

An option is to provide parallel but separated light rail tracks and bus lanes from Bergen to Hoboken, but sharing the Weehawken tunnel with a paved track section as is done at South Hills Junction in Pittsburgh. The total cost for the transit system would be an estimated \$ 1.2 billion, including right-of-way acquisition and engineering.

One element of waterfront land development is the Newport Centre project in Hoboken, with 4.3 million square feet of office space, 1.5 million square feet of retail space (one million of which is a shopping mall), a hotel, marina, and possibly an aquarium; together with 9000 dwelling units. This project is expected to house some 35,000 relatively affluent, upwardly-mobile residents. It is to be developed on a 400 acre site, formerly an Erie Railroad yard. Another major undertaking is the Harborside/Colgate project at Exchange Place (12 million commercial square feet).

Yet another element to be linked to the LRT line is Liberty State Park, a proposed technology center and museum area; this is being developed on the restored (former) Jersey Central Railroad terminus, with additional expansion on landfill now being prepared for extensive landscaping. The LRT will also

guarantee access to several industrial areas.

A number of easements have been obtained from developers who will benefit from the transit network. These include a 0.8 mile continuous way through Newport City, and agreements to furnish right-of-way through the Harborside project and three additional projects. In some localities, provision of transit R/W easement has been a condition for site plan approval, so regulatory powers of the municipal and county governments have been used to secure private sector participation in the transit project.

Development companies anticipate a considerable reduction in parking as well as on-site and off-site roadway costs, as a result of the new transit service. It is understood that air rights development can take place above the easements granted for the LRT line and stations, to reduce the actual loss of developable land. Developers have been far more supportive of light rail than bus technology for the transit system [probably because of air pollution concerns], and have favored LRT alignments which cross the commercial, rather than residential, sections of their sites.

The state has entered into an agreement with Conrail from which a set of benefits will emerge, including the relocation and improvement of their freight operations--in return for which they will vacate the River Line right-of-way. UMTA funds would be used to purchase the former Conrail waterfront tunnel and railroad alignment, to be used by NJDOT for its Riverfront Boulevard and by NJ Transit for the transitway. The Port Authority Bank for Regional Development will fund the Northern Branch upgrade for transit purposes.

6.9 The West Side Transitway Project.

Across the river in New York, a West Side Transitway Study is underway. The alignment which would be most financially feasible under a viable privatization scenario is a river-to-river at-grade LRT line on 42nd Street, and running south along the Hudson River to the Long Island Railroad's Caemmerer Yard site. The proposed line would skirt this on aerial structure east to Penn Station, which is also the focus of some major projects including air rights development over LIRR storage yards. Ridership forecasts indicate that there would be 15,000 riders/peak hour in 2005, and 103,000 daily passengers--with annual ridership forecast at 28.6 million, including over three million trips to/from special trip generators such as Madison Square Garden and the Convention Center (33).

Access to the maintenance facilities at 72nd Street would be via a north-south Amtrak (formerly New York Central) right-of-way which includes open cut, tunnel, and at-grade alignments near the Hudson River. Initially there would be no revenue service north of 42nd Street, but a future stage of system development could extend passenger service up to 72nd Street.

It is felt that a public-private financial structure would prove superior to either a solely private or public structure, because an entirely public enterprise would have very high capitalized interest costs, while an all-private plan would not yield a high enough pre-tax rate of return to attract investors. However, private sector construction costs are expected to be 15% lower than public costs, suggesting that private involvement would greatly improve the

viability of the project.

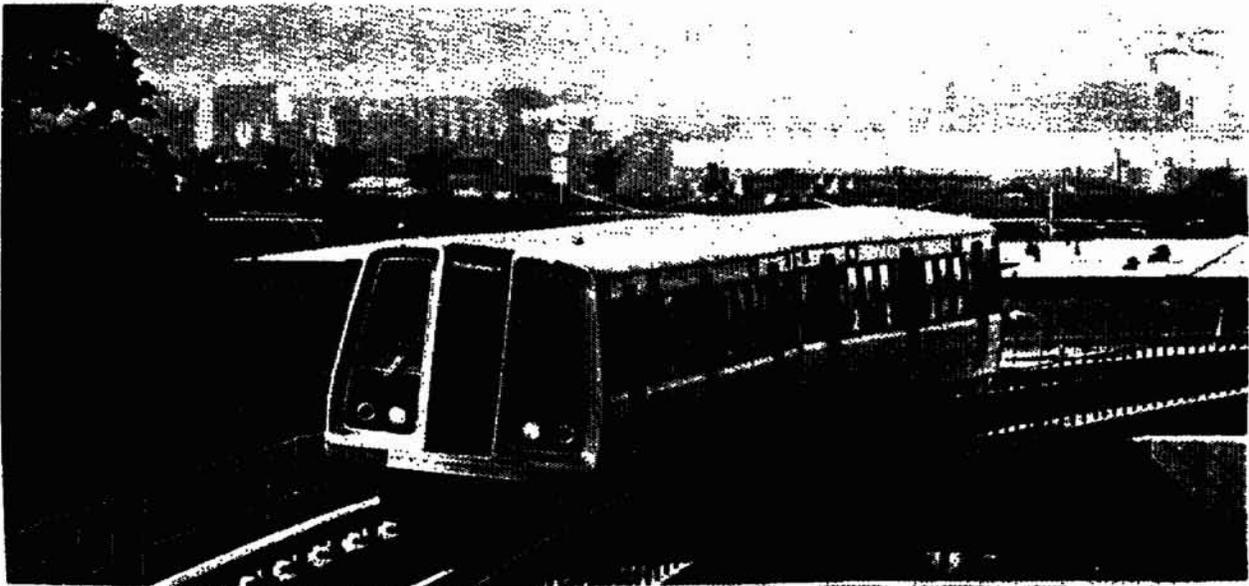
In the public-private financial structure, the transitway would be implemented by means of a service contract between the sponsoring public agency and a private consortium or single company. The private developer(s) would assume all risks for project costs, while the public agency would assume all revenue risks. A negotiated annual service fee would be paid to the provider of the transit service, regardless of operating revenues. Special assessments would be the most logical choice for value capture; the project is expected to generate a 15.4% internal rate of return.

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27. With automation, it is only necessary to provide an emergency operating position at each end of the train, for manual operation. Therefore, it was considered unnecessary (and undesirable) to provide cabs with large bulkheads which obstruct the forward view.
28. Although much of the line uses 80-lb. rail (rather light by U.S. transit standards), at 38 tons each the vehicles are not particularly lightweight. In any case it should be noted that the definition "light rail line" does not refer to rail or vehicle weight, as neither deviates from industry standards established for rapid transit. Light rail lines are considered to be medium-capacity transit lines with some at-grade crossings. By this measure, the DLR is really a rapid transit line, being fully grade-separated. Interestingly enough, a DLR vehicle fitted with a pantograph for overhead power pickup was operated on a disused section of British Rail track in Manchester, in a light rail demonstration: proving that the automated system concept used in the Docklands is indeed light rail-compatible.
29. Passenger Transport, January 19, 1987, p. 5.
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FIGURE 6.1 RAPID TRANSIT SYSTEMS FEATURING JOINT DEVELOPMENT



Above: Washington Metro. There have been a number of commercial joint development projects associated with underground stations like the one shown at right.

Below: Toronto Transit Commission. Joint development in Toronto has included construction of buildings on decking above open cuts such as the one shown here.



FIGURE 6.2 TANDY SUBWAY



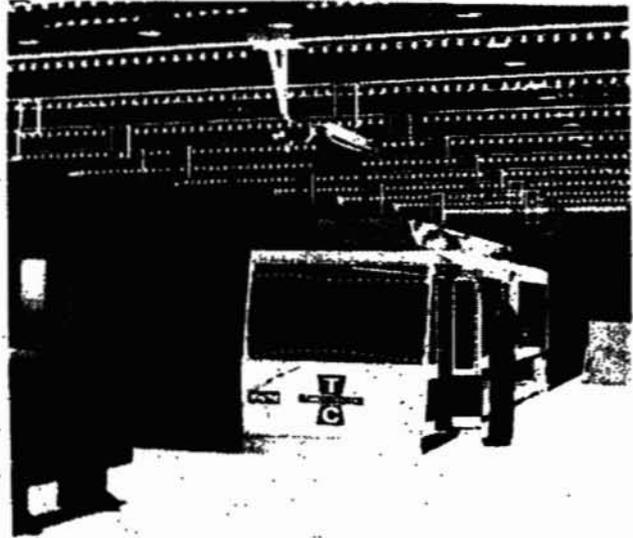
Above and right: Views of the remodeled PCC cars serving massive peripheral parking lots near the Fort Worth CBD.



FIGURE 6.3 TANDY SUBWAY (Cont'd)

Right: The Tandy Center subway station.

Below: The privately-built subway tunnel.



Below and right: Showing the remodeled PCC cars providing service on the Leonards/Tandy subway line.



FIGURE 6.4 LONDON DOCKLANDS REDEVELOPMENT AREA



Above: View of the Isle of Dogs redevelopment area, served by the Docklands Light Railway. The line crosses the West India Docks (center) on aerial structure.

Below: Orientation map of the DLR system.

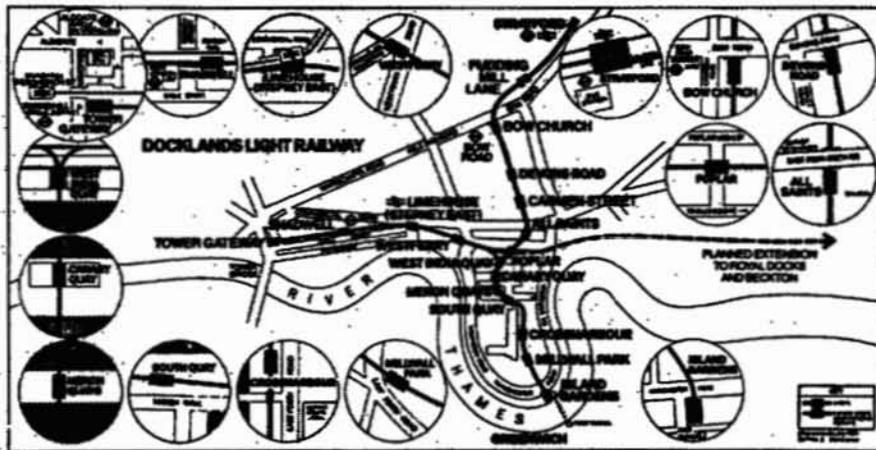
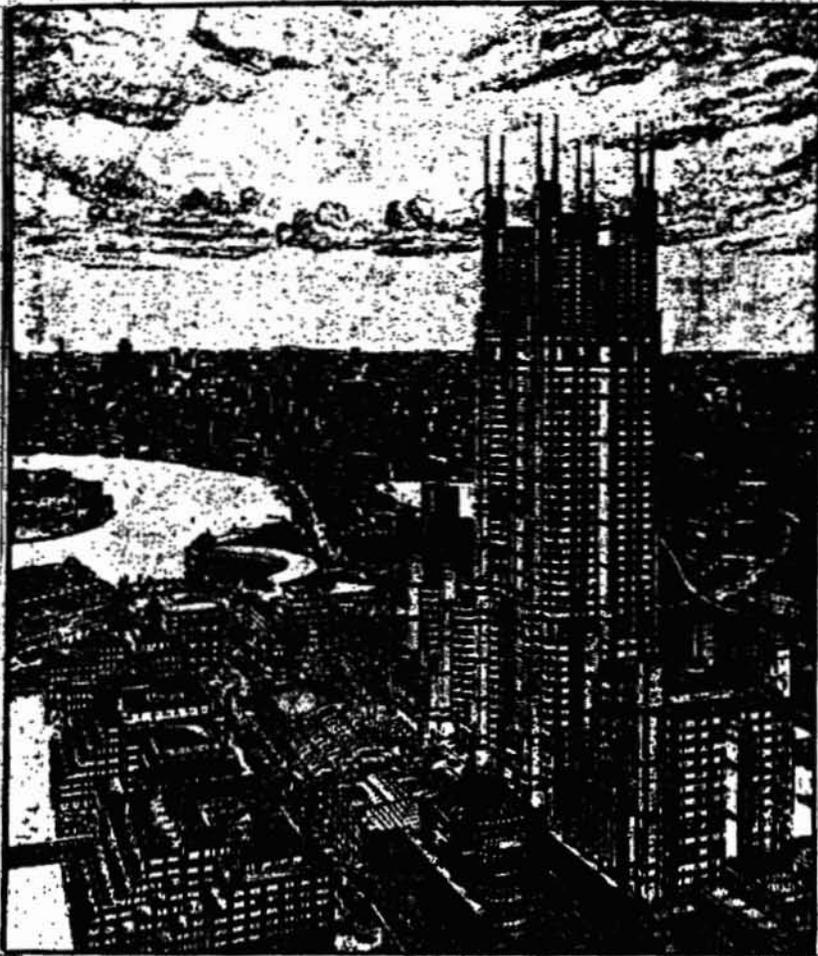


FIGURE 6.5 LONDON DOCKLANDS: CANARY WHARF PROJECT



Left: Phase I of the Canary Wharf project, showing the 30-story office tower and hotel.

Right: Model of the 28-hectare development along the river, showing the plan for the Canary Wharf Project.



FIGURE 6.6 LONDON DOCKLANDS LIGHT RAPID TRANSIT LINE



Left: Tower Gateway Station, showing the impressive domed station architecture at this major transfer point.

Right: On concrete viaduct along the British Rail Fenchurch R/W.



Below: Shadwell Station, along the BR Fenchurch Line.

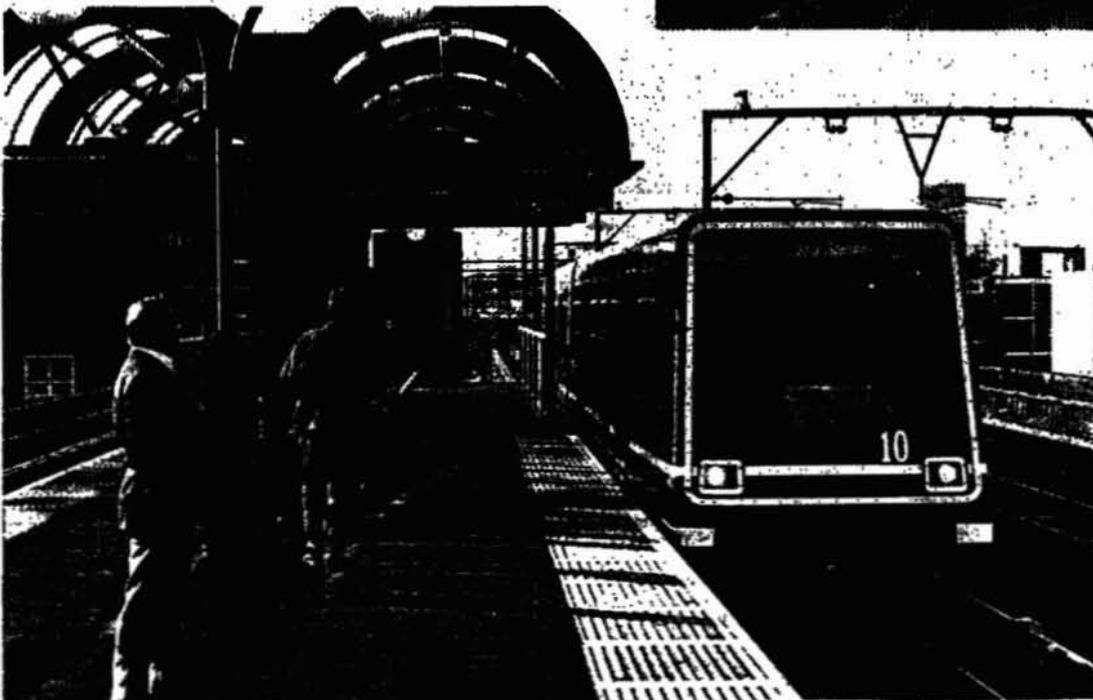


FIGURE 6.7. LONDON DOCKLANDS LIGHT RAPID TRANSIT LINE (Cont'd)

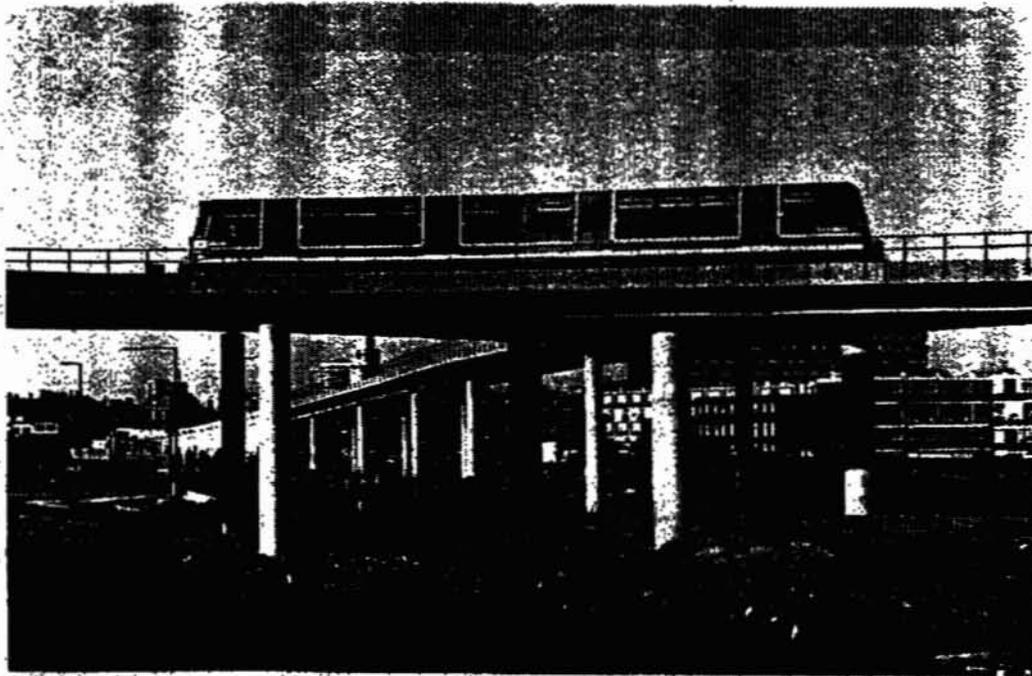


Above: Limehouse Station. Line constructed on disused 1839 brick viaduct of the old London and Blackwell Railway.

Right: Same location before construction, showing R/W and 1855 hydraulic accumulator tower.



FIGURE 6.8 LONDON DOCKLANDS LIGHT RAPID TRANSIT LINE (Cont'd)



Above: North Quay Junction, on aerial structure above former wharfs and basins of the Docklands.

Below: South Quay Plaza, a joint development project.



FIGURE 6.9 LONDON DOCKLANDS LIGHT RAPID TRANSIT LINE (Cont'd)



Left: Stratford Station, using a former BR platform; London Transport train at right.

Below: Sharing the embankment used by the British Rail East Anglia Line.



Right: Bow Curve, on the abandoned North London Line railroad right-of-way.



7. THE REGIONAL RAILROAD NETWORK

The regional railroad network is comprised primarily of three major transcontinental rail carriers: the Southern Pacific Transportation Co. (SP), the Atchison, Topeka & Santa Fe Railway (ATSF), and the Union Pacific Railroad (UP). In addition, there are several smaller railroad operations, including the Ventura County Railway, the LA Junction Railway, the Harbor Belt Line, and the U.S. Naval Railroad. Lines belonging to these railroads are described briefly below, and track mileage for these is indicated on Table 7.

7.1 Lines Of The Southern Pacific.

The Southern Pacific Transportation Co. has the largest number of lines and the greatest extent of route mileage in the urbanized part of the SCAG region. These lines are shown on Figure 7.1 (1).

MAIN LINES

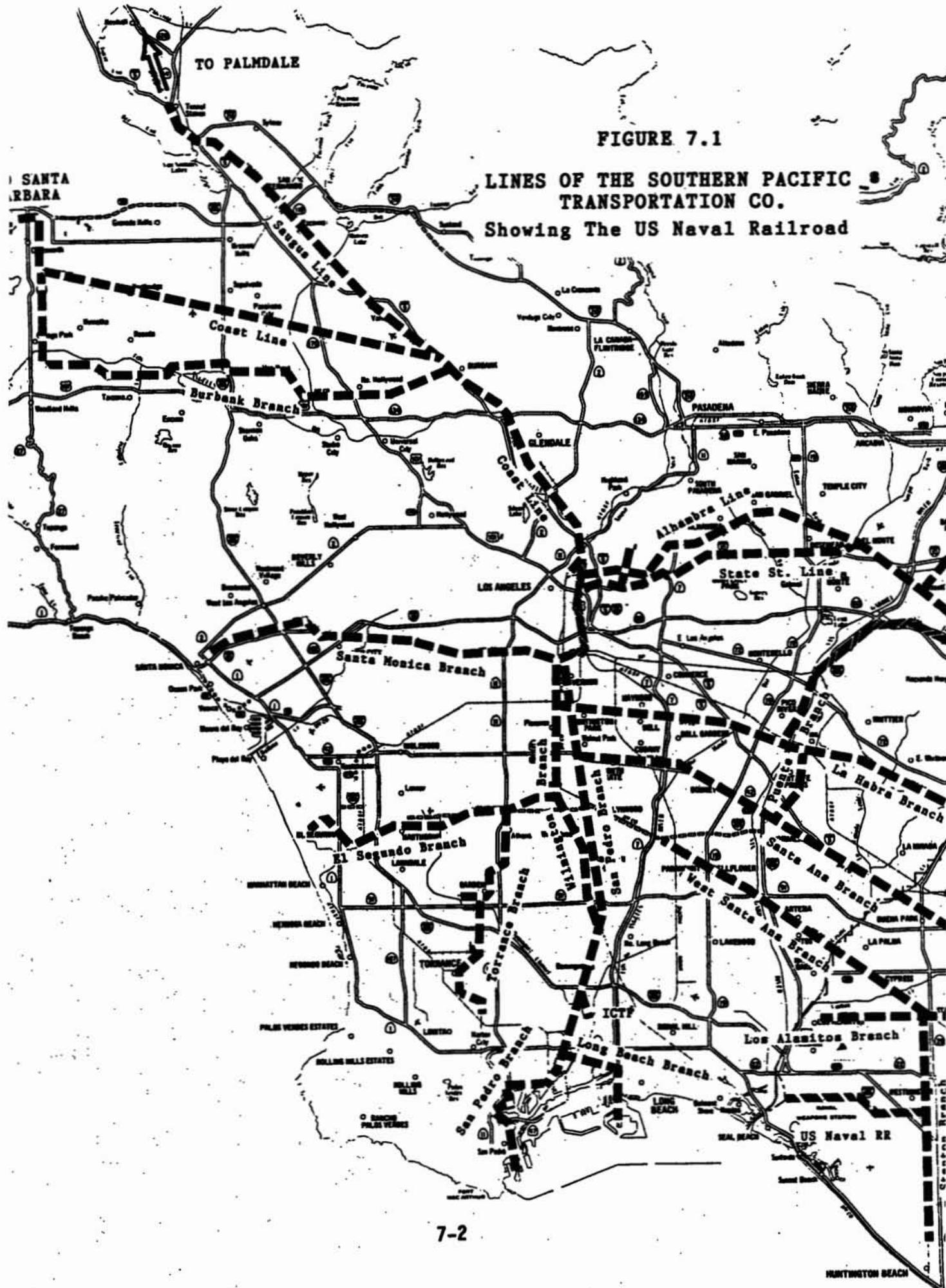
From the west, the Southern Pacific's Coast Line, ultimately originating in the Bay Area, runs through Santa Barbara and other coastal communities, and comes into our region in Ventura County. It passes through the Cities of Ventura, Oxnard, and Simi Valley before entering Los Angeles County at the northwest corner of the San Fernando Valley. It then goes diagonally across the Valley, is joined by several other lines at Burbank Junction, and continues southeast to the Los Angeles CBD.

Taylor Yard, a major yard facility, is located on the Coast Line south of Glendale; several other facilities, including the Bullring and Cornfield Yards, are situated just to the east of Chinatown at the southern end of the Coast Line. There are also some smaller yard facilities along the Coast Line in the San Fernando Valley.

The Saugus Line provides a link via the Colton Line to the San Joaquin Valley. The Saugus Line proper begins in Palmdale, runs southwest to Saugus, and thence southeast across the eastern end of the San Fernando Valley to Burbank Junction where it joins the Coast Line.

The Alhambra Line originates in West Colton and provides the main linkage to the SP's transcontinental route to Houston (via the Yuma Line). In addition, access is provided to the San Joaquin Valley to the north, via the Colton Line. The Alhambra Line serves major SP yard facilities in Colton, and proceeds west through Ontario, Pomona, the City of Industry, and Alhambra, to the LA CBD. At the western end of the Alhambra Line is the Los Angeles Transportation Center (LATC), a major TOFC (trailer-on-flatcar) facility.

The State Street Line begins in El Monte and runs west in a median in the San Bernardino Freeway, reverting to an alignment on the north side of the freeway towards its western end, and also terminating at the LATC. Functionally, the State Street Line provides a short section of second main track paralleling the Alhambra Line.



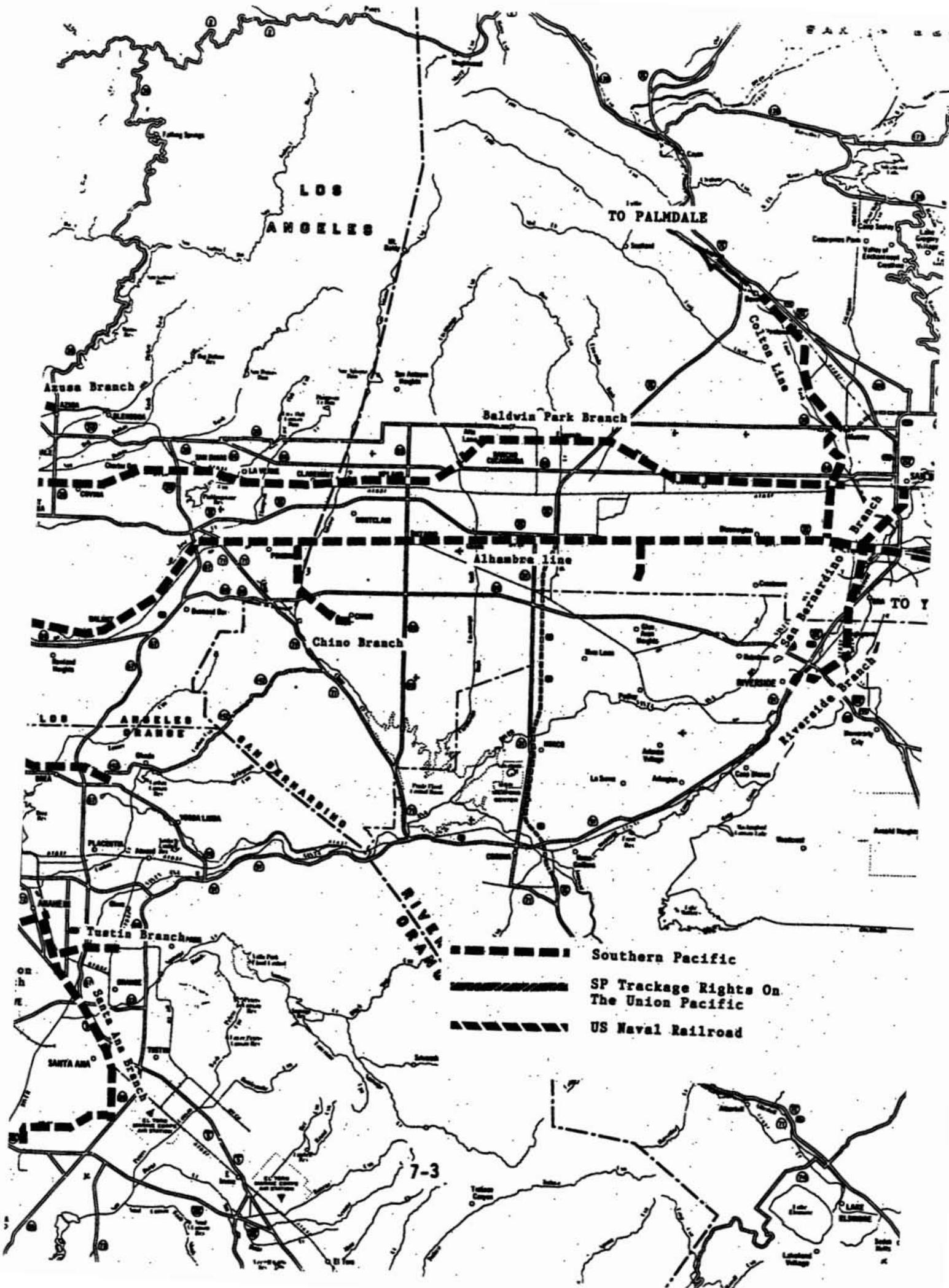
TO PALMDALE

FIGURE 7.1

LINES OF THE SOUTHERN PACIFIC
TRANSPORTATION CO.
Showing The US Naval Railroad

SANTA
BARBARA

HUNTINGTON BEACH



LOS ANGELES

TO PALMDALE

TO Y

LOS ANGELES BRANCH

SAN BERNARDINO

RIVERSIDE

TUSTIN BRANCH

SANTA ANA BRANCH

SANTA ANA

7-3

- Southern Pacific
- ////// SP Trackage Rights On The Union Pacific
- XXXXXX US Naval Railroad

The Colton Line begins in Bakersfield in the San Joaquin Valley, runs southeast to Mojave, south to Lancaster and Palmdale, and thence southeast to San Bernardino and Colton.

The Yuma Line, as noted above, provides the main line to Houston and El Paso. It passes through Niland, Coachella, Indio, Banning, and Redlands, terminating in Colton where connections are made with the Alhambra and Colton Lines.

BRANCH LINES

The Santa Paula Branch (see Appendix Figure C.11) formerly extended from Saugus west to Montalvo, near Ventura. At present, it extends from Piru through Fillmore and Santa Paula, providing access in a westerly direction to the Coast Line. This line is very lightly used, and the eastern third has been abandoned, except for a short segment at Castaic Junction which is owned by a private party and is now cut off from the Saugus Line. The Ventura Branch (not shown) extends a short distance north from the Coast Line at Ventura, to Canet.

The Burbank Branch begins on the Coast Line in Chatsworth at the west end of the San Fernando Valley, extends south to Woodland Hills, turns east and proceeds through Tarzana, Van Nuys, and North Hollywood, ending at Burbank Junction where it rejoins the Coast Line. This branch line is very lightly used, with only a few customers (lumber yards) remaining on it.

The Wilmington Branch begins just north of the City of Vernon near SP's J-Yard, and extends south through Watts and Compton to Dominguez Junction, where it joins the San Pedro Branch. (The track on the west side of Alameda Street south of Dominguez is often considered to be a southerly extension of the Wilmington Branch, paralleling the single San Pedro Branch track down to Wilmington.) The Wilmington Branch currently provides the main route from SP rail yards in the LA CBD area (and from the Alhambra and State Street Lines) to the Ports of Los Angeles and Long Beach.

At the north end, access is provided to the SP main lines via Union Pacific trackage on the east side of the LA River; at the south end, Wilmington Branch trains follow the San Pedro Branch down to Dolores Yard in Carson and to the nearby Intermodal Container Transfer Facility (ICTF), a recently-constructed COFC (container-on-flatcar) facility. The Wilmington Branch is heavily used by SP container and bulk trains.

A strip of former Wilmington Branch right-of-way was purchased by the LACTC for use by the LA-Long Beach light rail line. This extends from Washington Blvd. south to Dominguez Junction and parallels the freight track(s), which were relocated to one side of the R/W to make room for the transit facility.

The San Pedro Branch begins at J-Yard, just above Vernon, and extends south (generally in a median in Alameda Street) to Dominguez Junction and thence south-southwest to Wilmington where it connects to the Long Beach Branch. The San Pedro Branch continues west and finally south to San Pedro itself, and this southern-most segment is used by the Harbor Belt Line. The San Pedro Branch provides a second access route to the ICTF (paralleling rather closely the Wilmington Branch). Under the Alameda Corridor plan, the San Pedro Branch would

be the designated route for through trains of all three major rail carriers between the LA CBD and the San Pedro Bay ports.

The Long Beach Branch extends from Wilmington southeast and south to the Port of Long Beach, and is fairly well used. There was also formerly an East Long Beach Branch extending from Dominguez Junction southeast across the City of Long Beach; part of this line will be used by the LA-Long Beach light rail project to provide the link from the Wilmington Branch to the Long Beach Boulevard alignment.

Several lines originate on the Wilmington Branch at Watts. The Torrance Branch extends southwest and south into Torrance, while the El Segundo Branch runs west to the Standard Oil facility in El Segundo. These branch lines are relatively lightly-used (by liquid bulk trains); and the southern end of the Torrance Branch is expected to be abandoned soon.

The Santa Monica Branch extends west from the vicinity of J-Yard near Vernon, continuing past the USC campus and into West Los Angeles, to terminate in Santa Monica; it generally follows Exposition Boulevard. It is at present very lightly used for freight service, and the western half has been put up for abandonment.

The West Los Angeles Branch, which has been abandoned, formerly extended from West Hollywood southwest along Santa Monica Boulevard to Sepulveda, and thence south to connect with the Santa Monica Branch. The Alla-Inglewood Branches, also abandoned, ran from Venice and Marina del Rey to Inglewood, with a connection to the Santa Fe Harbor Subdivision.

The La Habra Branch connects with the Wilmington Branch at Slauson Junction just west of Huntington Park, and extends east and southeast to La Habra and Brea in northern Orange County. The segment west of Santa Springs/Los Nietos is in fairly heavy freight use; east of this point there is relatively little freight traffic--one SP and one UP train/day, of about a dozen cars each (2). This eastern segment may be a good candidate for abandonment in the not-too-distant future. The Whittier Branch, now abandoned, formerly ran from the La Habra Branch in Santa Fe Springs north to Whittier.

The Santa Ana Branch connects with the San Pedro Branch at Firestone Park, to the west of South Gate, and extends southeast through Norwalk into Orange County. The Puente Branch provides a short connecting link from the Santa Ana Branch at Studebaker Junction in Norwalk, north to the La Habra Branch at Los Nietos; it continues north along the San Gabriel River to the Union Pacific main line in Pico Rivera. SP port traffic and local freights follow the La Habra, Santa Ana, and Puente Branches and the UP line north and east to the SP Alhambra Line at the City of Industry, where the SP has major yard facilities.

Returning to the Santa Ana Branch, this line provides the Southern Pacific with access to Orange County. The Santa Ana Branch follows the 5 Freeway southeast to Anaheim, where it leaves the freeway to run east along Santa Ana Street. At Olive Street it turns south to rejoin the freeway alignment near Katella, and proceeds southeast to about Fourth Street in Santa Ana. An agreement was recently reached with Orange County to abandon the segment from Anaheim south to

Santa Ana, allowing the railroad R/W to be used for transitway development. Track connections with the Santa Fe in Anaheim and near the Amtrak station in Santa Ana will permit SP freights to run down the ATSF Fourth Subdivision instead.

South of the Amtrak station in Santa Ana, the Santa Ana Branch extends along a north-south alignment to a point below Warner Avenue, curving to the west and southwest to a point beyond Fairview; and then turns south to enter Costa Mesa, terminating above the Orange Coast College. The segment of the Santa Ana Branch from Norwalk south and east into Orange County sees a moderately heavy amount of freight use, supplying lumber to the building industry in Orange County and carrying liquid bulk and other cargoes as well.

The Tustin Branch extends eastward from the Santa Ana Branch in Anaheim (north of Katella) to the Santa Fe Fourth Subdivision, providing a track connection to the ATSF at this point. Formerly, the Tustin Branch ran east into Orange and south to Tustin.

The West Santa Ana Branch formerly extended from Watts south and east into Orange County, almost to the Santa Ana CBD. The segment from Watts to Paramount was abandoned some years back, while the section southeast of Stanton was sold to the OCTD about six years ago for transit development. After the abandonment of the western segment, the track connection to the rest of the Southern Pacific system was made via the Stanton and Santa Ana Branches. The West Santa Ana Branch has very little freight traffic at present, and the current plan is to abandon the remaining section.

The Stanton Branch extends from Anaheim, where a track connection is made with the Santa Ana Branch, west to Stanton (just above Katella) and thence south on an alignment to the west of Beach Boulevard, paralleling this major arterial highway. At one time it extended down to the coast, but at present it terminates just to the north of Garfield Avenue/Main Street. The Stanton Branch has a limited amount of freight traffic at present, but it does provide access to the U.S. Naval Railroad in Westminster. The north-south segment below Stanton is often unofficially referred to by SP employees as the "Huntington Beach Branch."

The Los Alamitos Branch originates on the Stanton Branch in Stanton, continuing the east-west Stanton Branch rail alignment (parallel to Katella) in a westward direction to the Los Alamitos CBD. There is very little freight traffic on the Los Alamitos Branch, and the line will most probably be abandoned very soon.

There is a Lincoln Park Spur track originating on the State Street Line near the USC Medical Center and running north along Soto Street. It crosses above the Alhambra Line/Valley Boulevard, terminating just to the south of Mission Road. The segment north of Valley has been abandoned, and the surviving piece appears to have little if any remaining freight traffic.

The Baldwin Park Branch connects at its west end to the Alhambra Line in Bassett (western end of Industry) and proceeds northeast to Baldwin Park. At this point it begins an east-west alignment through Covina to San Dimas, paralleling the Santa Fe Second Subdivision for some distance through La Verne and Pomona; it

finally switches over to the other carrier's track in Claremont. (Baldwin Park Branch trains operate over the Santa Fe to the east end of Claremont.) The Southern Pacific line then diverges from the ATSF R/W, running through Upland (parallel to the other line) and then turning to the northeast and east as it goes through Rancho Cucamonga. Finally it curves southeast and east and runs through Fontana and Rialto, to connect with the Colton Line near San Bernardino.

There is at present very little freight traffic on the Baldwin Park Branch; for many years the eastern end of the line was used for boxcar storage. The Southern Pacific has recently announced plans to abandon the Baldwin Park Branch except for the section from Bassett to Baldwin Park, that would become the lead to the Azusa Branch (which will continue to serve industrial customers). A short piece in San Dimas might also be retained to service a customer.

The Azusa Branch originates on the Baldwin Park Branch at Orange Avenue Junction in Baldwin Park, and runs north and then east into the western part of Azusa. This line has a moderate amount of freight traffic.

The Chino Branch extends a short distance south from the Alhambra Line to the Pomona Freeway, and thence southeast into Chino. There is also a spur track from South Fontana to Declezeville, also originating on the Alhambra Line.

The Riverside Branch extends from the Riverside CBD (originating in a yard area below University Avenue) northeast and north to Highgrove, and thence north to Colton, connecting with the south side of Colton Yard.

The San Bernardino Branch continues north on roughly the same alignment (but without a direct track connection), originating on the north side of the Colton yard facility and extending northeast to the San Bernardino CBD. Formerly it also extended east and southeast through Norton Air Force Base, but this segment has been abandoned. There is very little freight traffic remaining on either the Riverside Branch or the San Bernardino Branch.

The Redlands Branch formerly ran from Bryn Mawr on the Yuma Line east to Crafton Avenue in Mentone, east of Redlands. This line has been abandoned except for a short section at Wabash Avenue in Redlands/Mentone, which functions as an industrial spur attached to the ATSF Redlands Subdivision.

7.2 Lines Of The Santa Fe.

The Atchison, Topeka & Santa Fe Railway is second largest in terms of number of lines and route miles in the urbanized area of the SCAG region. These lines are shown on Figure 7.2 (3).

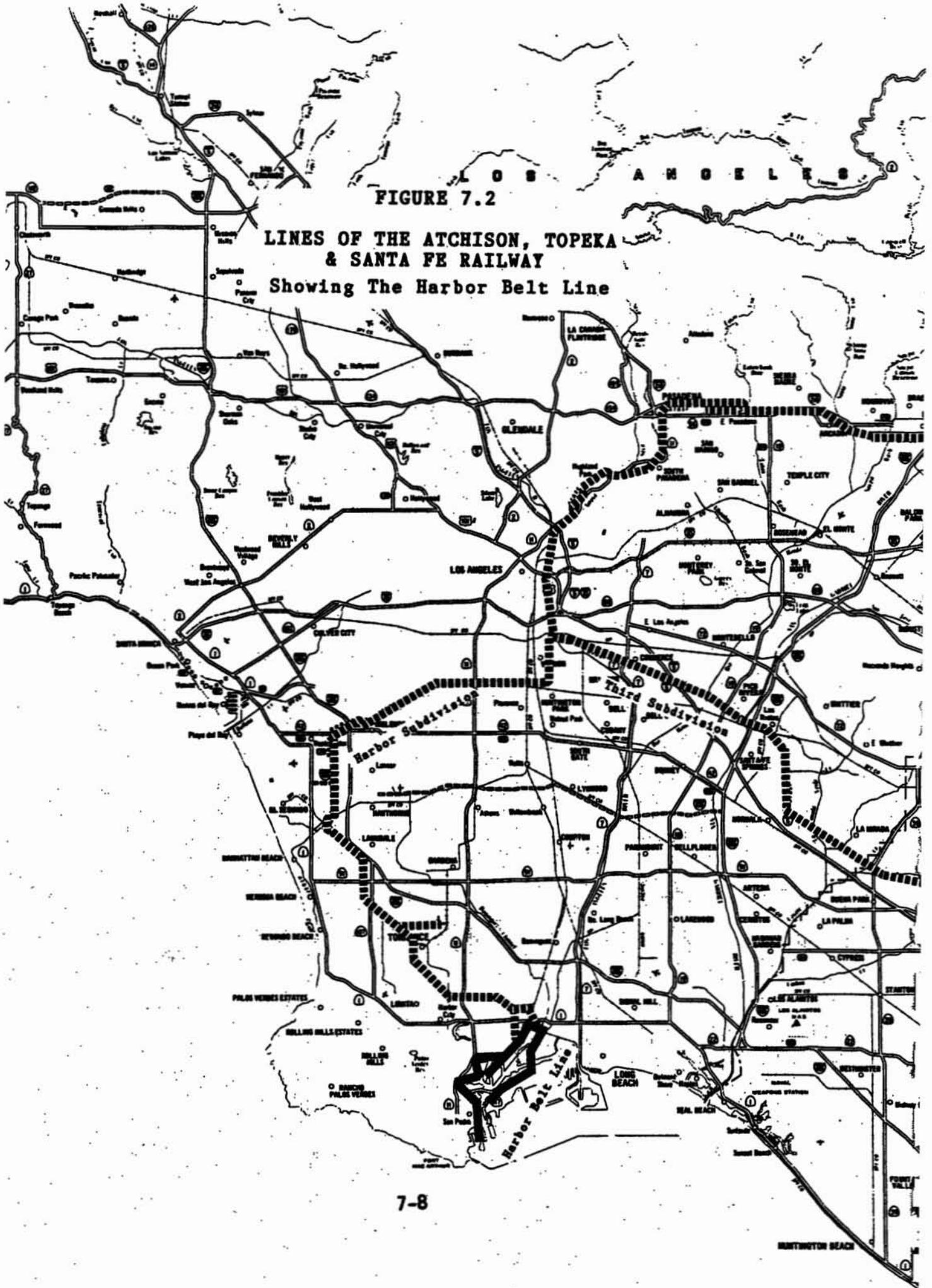
MAIN LINES

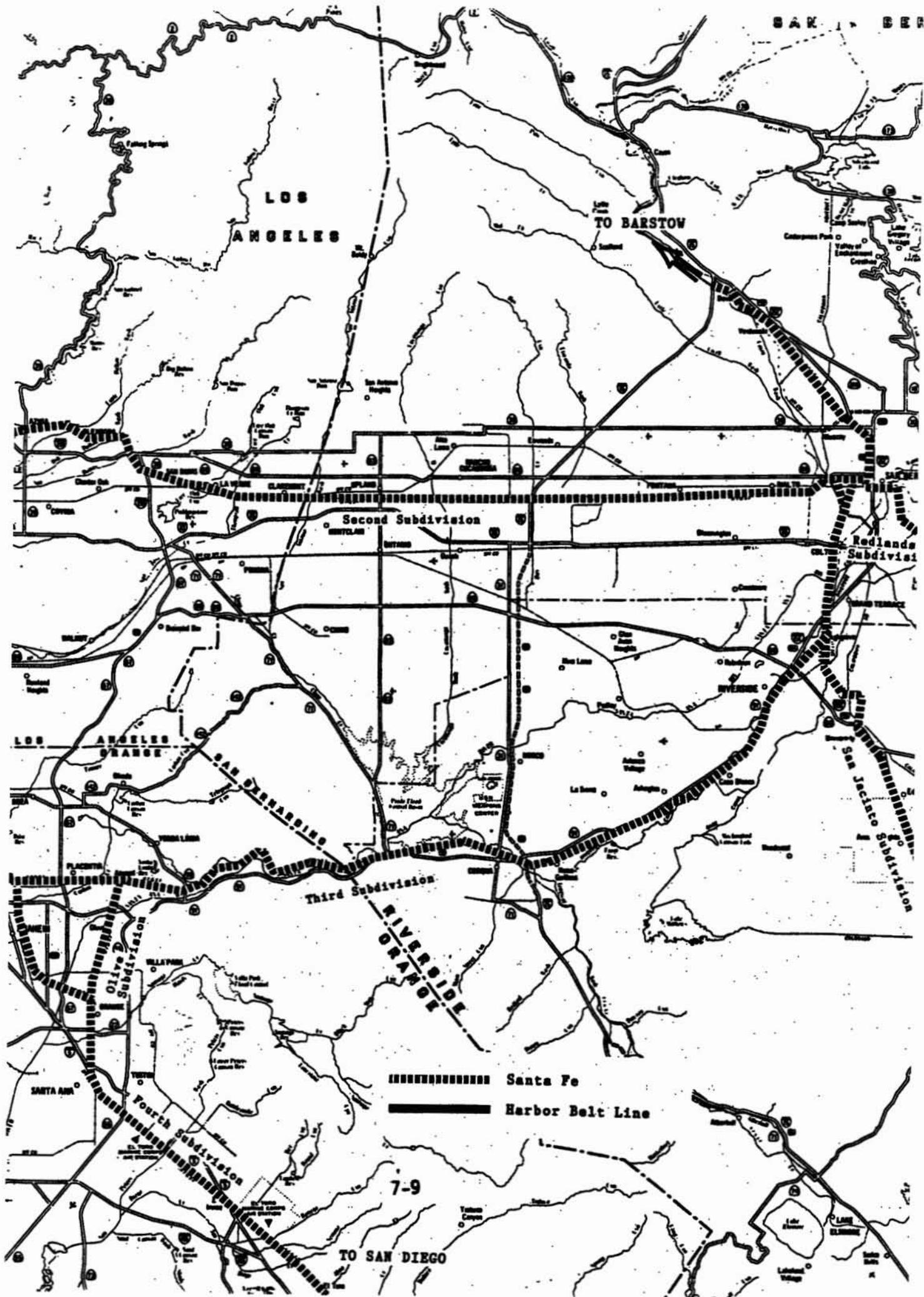
The Santa Fe First Subdivision, which extends from Barstow south to San Bernardino, provides the connection with the railroad's transcontinental routes to Texas and the Middle West. It also provides access to the San Joaquin Valley (via trackage rights over the SP from Mojave to Bakersfield).

The Santa Fe Second Subdivision (recently renamed the Pasadena Subdivision) begins at the major Santa Fe yard facility in San Bernardino and runs west

FIGURE 7.2

LOS ANGELES
LINES OF THE ATCHISON, TOPEKA
& SANTA FE RAILWAY
Showing The Harbor Belt Line





----- Santa Fe
 - - - - - Harbor Belt Line

7-9

through Rialto, Fontana, Upland, and Claremont. In San Dimas it turns to the northwest, continuing on to Glendora/Azusa, and thence west to Pasadena. In Pasadena the line turns south and southwest, passing through South Pasadena and Highland Park, crossing the LA River, and joining the Third Subdivision at Mission Tower, near Union Station.

The Second Subdivision has a moderate amount of through and local freight service, and for years it was used to route certain trains in a westbound direction, with the return trip being made via the Third Subdivision in a one-way loop movement serving the downtown rail yards. As the Second Subdivision and parts of the Third are single tracked, the two lines together functioned to provide double track for east-west train movements. At present, trains are operated in either direction on the Second Subdivision. There is also local freight service to Irwindale, from the direction of San Bernardino.

The Santa Fe has recently proposed consolidation of through freight traffic on its Third Subdivision, which would be double-tracked throughout. The Second would then be put up for sale for transit and commuter rail use.

The Third Subdivision (recently renamed the San Bernardino Subdivision) begins in San Bernardino and runs south to Colton (where there are additional yard facilities) and thence southeast to Riverside and Corona, and west to Fullerton in Orange County. There it turns to the northwest, running through Buena Park, La Mirada, and Pico Rivera and entering the Cities of Vernon and Commerce where Santa Fe's Hobart Yard (a major intermodal terminal) is located. West of Commerce, it turns north to follow the west bank of the LA River, joining the Second Subdivision near Union Station.

The Third Subdivision is heavily used by transcontinental freight traffic, and in addition there is a considerable amount of local freight service between Hobart Yard and Fullerton. There are also eight Amtrak San Diegan round trips operating between LAUPT and Fullerton, where these trains turn to the southeast on the Fourth Subdivision in the direction of Santa Ana and San Diego.

The Fourth Subdivision (recently renamed the San Diego Subdivision) extends from Fullerton southeast through Anaheim, Orange, Santa Ana, Tustin, and Irvine into southern Orange County and thence along the coast to San Diego. This line is used primarily by San Diegan intercity trains, with comparatively little local freight traffic. For this reason the Santa Fe has proposed to sell the line to public entities responsible for developing and improving intercity passenger rail service, and introducing new commuter trains in Orange and San Diego Counties. The Santa Fe would thereafter retain trackage rights for freight purposes on portions of the Fourth Subdivision.

BRANCH LINES

The Harbor Subdivision originates on the Third Subdivision at Redondo Junction, just north of Vernon. After passing through the Malabar Yard facility, it turns west along Slauson Avenue and eventually southwest, passing through Inglewood. Here it curves to the south, passes LAX and enters El Segundo, at which point it turns to the southeast to run through Torrance to Wilmington. It ends just below the major Watson Yard facility in Wilmington. The Harbor Subdivision is

fairly heavily used by freight trains serving the port area and industrial sections of South Bay. It is Santa Fe's only route to the ports, and as such the integrity of this line will be essential until the Alameda Corridor is in place. After implementation of the consolidated rail corridor, the segment from El Segundo southward would have to be retained to service local industries.

The Redondo District formerly branched from the Harbor Subdivision at El Segundo, heading southwest to Manhattan Beach and then turning south-southeast along the coast through Hermosa Beach, to terminate in Redondo Beach. This line has been abandoned.

The Olive Subdivision is a short connecting line which extends from the Santa Fe Third Subdivision (at Atwood) south to the Fourth Subdivision (in Orange). It permits direct train movements from the Third Subdivision to the Fourth, without going through Fullerton. For a short line, it has a fair amount of freight traffic.

The Elsinore District, originating on the Third Subdivision, formerly ran southeast from eastern Corona to Lake Elsinore, roughly following Route 15. This line has been abandoned, and part of the right-of-way sold to real estate developers.

The San Jacinto Subdivision extends from San Jacinto southwest to Hemet, and continues west and northwest to Perris, thence north-northwest to connect with the Third Subdivision at Highgrove, just above Riverside. This line has little freight traffic, and it has been proposed to sell it to a short line freight carrier.

The Redlands Subdivision originates at Santa Fe's San Bernardino yard facility, running just to the south of the San Bernardino CBD and extending southeast, east, and northeast through Redlands to Mentone. At one time it curved northwest to Highland (and beyond), but the section above Mentone has been abandoned. There is relatively little freight traffic on the Redlands Subdivision, and the Santa Fe has proposed its sale to a short line freight operator.

7.3 Lines Of The Union Pacific.

The Union Pacific is third largest in terms of freight lines serving the SCAG region. These lines are shown in Figure 7.3 (4).

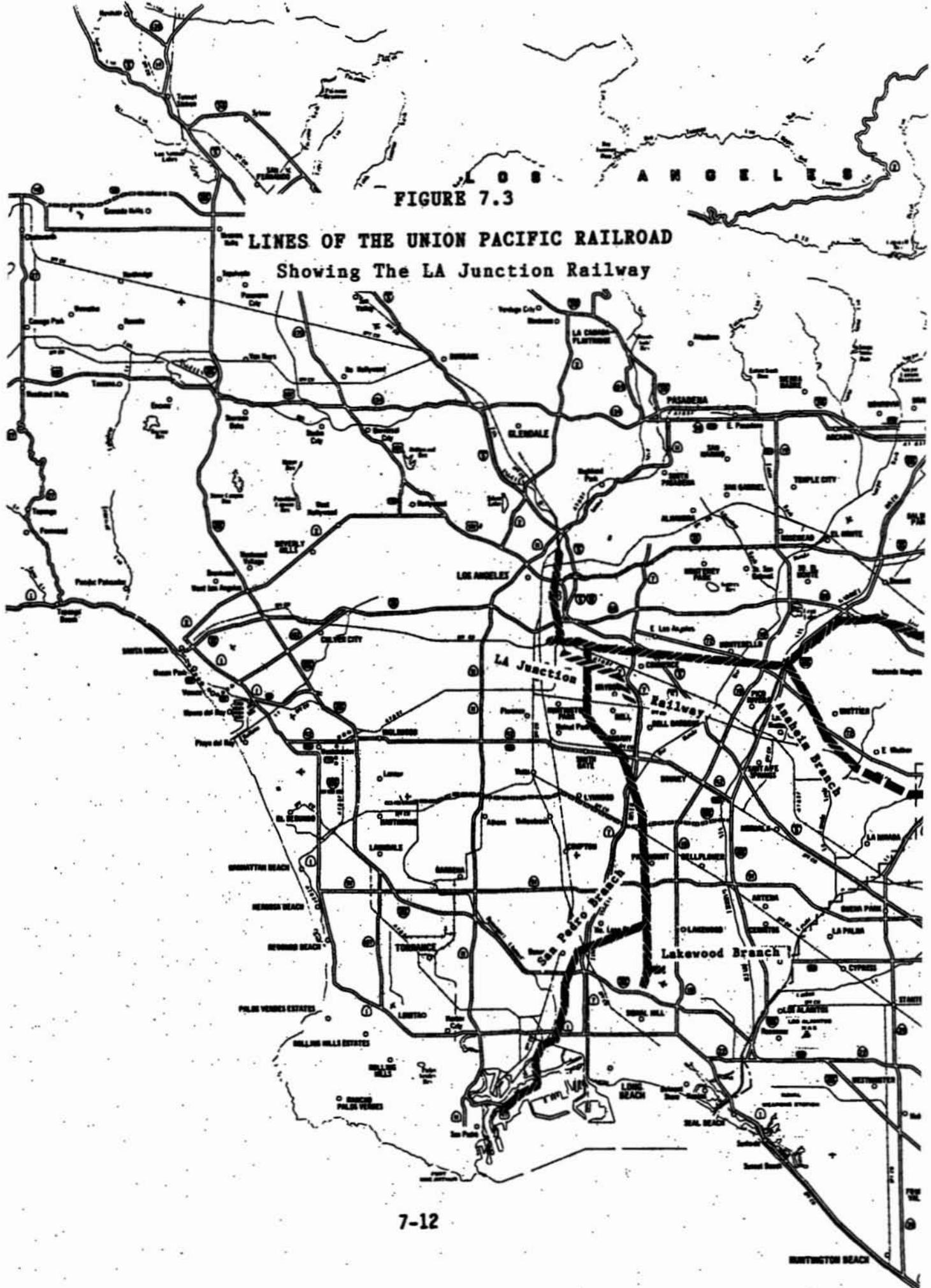
MAIN LINES

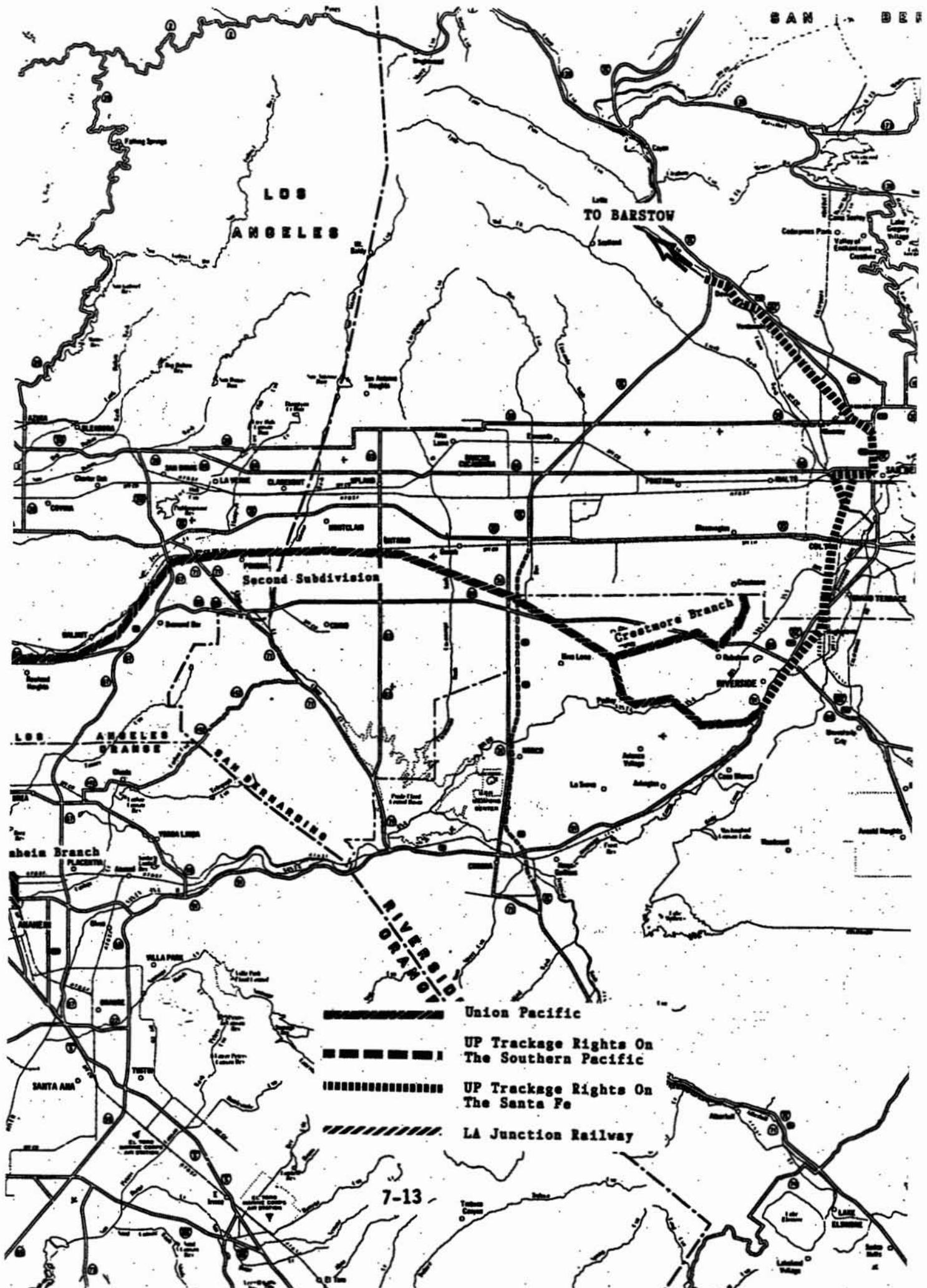
The Union Pacific's transcontinental line from Omaha and Salt Lake City comes into southern California at Barstow. Here the UP has trackage rights to operate over the Santa Fe south to Riverside (some years ago, the Union Pacific tracks in Riverside were abandoned as part of a local track consolidation plan).

The Union Pacific's Second Subdivision is its main line within the urbanized part of the SCAG region. After following the Santa Fe track south to Riverside, UP through freights enter Second Subdivision trackage south of the Riverside CBD area. The Second Subdivision extends northwest to Ontario, and thence west

LOS ANGELES
FIGURE 7.3

THE LINES OF THE UNION PACIFIC RAILROAD
Showing The LA Junction Railway





LOS ANGELES

TO BARSTOW

Second Subdivision

The Greatmore Branch

LOS ANGELES BRANCH

SAN BERNARDINO

RIVERSIDE

the Main Branch

SANTA ANA

-  Union Pacific
-  UP Trackage Rights On The Southern Pacific
-  UP Trackage Rights On The Santa Fe
-  LA Junction Railway

through the City of Industry and Pico Rivera, serving the UP's East Los Angeles Yard (a major intermodal facility) in the City of Commerce. The line then continues west to the LA River, running north along the east bank of the river to Pasadena Junction, opposite the Union Station area.

BRANCH LINES

The West Los Angeles Branch extends a short distance across the LA River from the main line at Bridge Junction, just across from the Amtrak roundhouse. It provides a track connection with the SP's J-Yard and industrial trackage to the south of the LA CBD. The Pasadena Branch (now abandoned) paralleled the Santa Fe's Second Subdivision for a short distance to the west of the Pasadena CBD.

The Glendale Branch extended from the north end of Taylor Yard across San Fernando Road, turning northwest to parallel San Fernando Road (running about a block to the east of the highway) up to the Los Angeles/Glendale city line. This line was abandoned very recently.

The San Pedro Branch extends from Hobart Tower near the west end of East LA Yard, south through Paramount to northern Long Beach, and thence southwest and south to the Ports of Los Angeles and Long Beach. At its southern end, it crosses the Henry Ford Blvd. drawbridge and enters Terminal Island. This line experiences fairly heavy freight use, providing the UP with its only access to the ports. There is considerable local freight on the line, and a yard facility is located in Paramount. The Harbor Belt Line operates over UP San Pedro Branch track along the southern end of this line, onto Terminal Island.

The Lakewood Branch originates on the UP San Pedro Branch at Douglas Junction, and continues south to a point just above the Long Beach Municipal Airport.

The Anaheim Branch originates on the Second Subdivision at Whittier Junction in Pico Rivera, and runs southeast to Mills Avenue in Whittier where it joins the SP La Habra Branch. At this point UP locals enter Southern Pacific trackage, continuing on the SP east to La Habra. Here the UP Anaheim Branch track again begins, curving to the south and southwest through Fullerton, and then reversing direction to head southeast and cross the ATSF at Commonwealth Avenue (This segment of the line has the configuration of a huge "reverse-S" curve.)

It then runs east (parallel to the ATSF Third Subdivision) for some distance east to the Amtrak Station (Fullerton CBD), turning south to follow the west side of the ATSF Fourth Subdivision to a point just below the 91 Freeway in Anaheim. Formerly it extended down to Santa Ana Street in the Anaheim CBD. There is relatively little freight traffic on this line.

The Crestmore Branch originates on the Second Subdivision at Jurupa Road in Glen Avon, northwest of Riverside. It proceeds northeast to Sunnyslope, then follows the Riverside & Jurupa Canal on a winding route east and northeast to a cement plant in Crestmore, near the San Bernardino County Line. The cement plant is the sole customer served by this branch line.

7.4 Other Railroad Companies And Joint Operations.

The Ventura County Railway Co. (not shown) is a short line carrier operating solely in the Cities of Oxnard and Port Hueneme. It connects with the SP Coast Line in Oxnard, and has two branches. The north branch parallels Wooley Road west to Patterson Road, and continues south along Patterson to the U.S. Naval Construction Battalion Center in Port Hueneme. This branch line carries long trains of auto rack cars used to import Mazda cars through the Port of Hueneme.

The south branch handles traffic to chemical plants, and has taken cargo to oil supply companies in the past. It runs south on an alignment that lies to the east of Saviers Road, curves to the southwest to Pleasant Valley and west along a R/W below Hueneme Road, to the port (5).

The Los Angeles Junction Railway (Figure 7.3) is subsidiary of the Santa Fe, but provides a neutral switching terminal operation for the SP, ATSF, and UP. It comprises an extensive network of trackage, mainly in the City of Vernon. The main track connection for all three railroads is at A-Yard along Downey Road, south of Hobart Tower. There is a connection with the ATSF at C-Yard near 26th Street, and a connection to the SP La Habra Branch at the Walker Street Transfer, at Randolph Street. (The map illustrates only the trackage along the LA River, from Bandini Blvd. south and east to the La Habra Branch.)

The LA Junction Railway has four locomotives of its own, providing for the considerable amount of local switching activity which takes place in Vernon and surrounding cities (6).

The Harbor Belt Line (Figure 7.2) is jointly owned by the SP, ATSF, UP, and the City of Los Angeles. It rents locomotives from the three parent railroads, and operates over trackage owned by the SP and UP in the port area--as well as on track belonging to the Los Angeles Municipal Terminal Railway (7). This includes the extension of the SP San Pedro Branch below B Street, southeast along John S. Gibson Boulevard, and south along Harbor. Harbor Belt Line trains also run over UP trackage on Terminal Island.

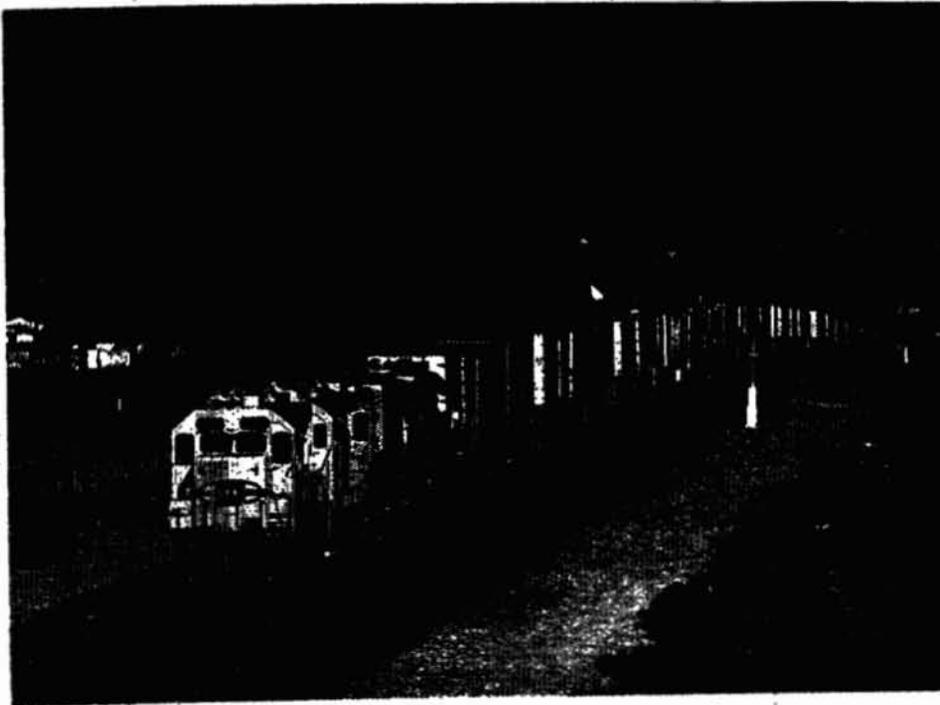
The Port of Long Beach is served instead by the Southern Pacific on track which partially belongs to the SP, and part of which is the property of the City of Long Beach (8).

It will be noted that the lead from the ATSF, SP, and UP tracks on both sides of the LA River in downtown Los Angeles to the Los Angeles Union Passenger Terminal (LAUPT) is jointly owned by all three railroads, each of which has a share in the Union Station property.

The U.S. Naval Railroad (Figure 7.1) originates on the SP Stanton Branch in Westminster, running west through the U.S. Naval Weapons Station along Westminster Boulevard in Seal Beach, and terminating in Long Beach on the east side of the San Gabriel River. It provides service to a utility company in the latter location, as well as to the navy facility.

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8. Ibid.



Above: Trailer-on-flatcar (TOFC) intercity train, typical of expedited line-haul freight service today.

TABLE 7. LENGTHS OF MAIN AND BRANCH LINES
OF RAIL CARRIERS IN THE SCAG REGION

Carrier And Line	Mileage	Notes
<u>Southern Pacific Transportation Co.</u>		
Coast Line	102.6	Santa Barbara to LA
Saugus Line	68.7	Palmdale to LATC
Alhambra Line	56.6	
State Street Line	15.5	
Colton Line	181.3	Bakersfield to W. Colton
Yuma Line	75.2	Indio to W. Colton
Santa Paula Branch	45.5	(14+ miles abandoned)
Ventura Branch	5.4	
Burbank Branch	21.7	
Wilmington Branch	10.9	(south to Dominguez Jct. only)
San Pedro Branch	21.3	J-Yard to San Pedro
Long Beach Branch	2.1	
East Long Beach Branch	6.5	Abandoned
Torrance Branch	9.9	
El Segundo Branch	10.8	
Santa Monica Branch	14.1	
West Los Angeles Branch	4.8	Abandoned
Alla-Inglewood Branches	7.2	Abandoned
La Habra Branch	22.1	To Brea Chemical
Whittier Branch	2.3	Abandoned
Santa Ana Branch	33.9	

TABLE 7 (Cont'd). LENGTHS OF MAIN AND BRANCH LINES

Carrier And Line	Mileage	Notes
<u>Southern Pacific (Cont'd)</u>		
Puente Branch	15.5 (8.9 1.6)	Total to City of Industry (including UP main line) Studebaker-Bartolo and Puente Jct.-COI on SP track)
Tustin Branch	4.8	To Villa Park
West Santa Ana Branch	11.7	Paramount to N. Stanton only; remainder abandoned
Stanton Branch	13.6	
Los Alamitos Branch	3.8	
Lincoln Park Spur	1.7	(0.8 abandoned at N end)
Baldwin Park Branch	40.5	
Azusa Branch	5.0	
Chino Branch	5.7	
Declezeville Spur	1.8	
Riverside Branch	7.4	
San Bernardino Branch	2.8	Colton to San Bernardino
Redlands Branch	3.3	Abandoned
<u>Atchison, Topeka & Santa Fe Railway</u>		
First Subdivision	83.3 81.3	N. track Barstow to S. track San Bernardino
Second Subdivision	58.7	
Third Subdivision	71.7 70.8	Westward Eastward
Fourth Subdivision	101.2	San Diego to Fullerton

TABLE 7 (Cont'd). LENGTHS OF MAIN AND BRANCH LINES

Carrier And Line	Mileage	Notes
<u>Santa Fe (Cont'd).</u>		
Harbor Subdivision	28.0	
Redondo District	5.4	Abandoned
Olive Subdivision	5.8	
Elsinore District	23 (Approx.)	Abandoned
San Jacinto Subdivision	38.3	
Redlands Subdivision	13.4	
<u>Union Pacific Railroad</u>		
Second Subdivision	59.1 (151.1)	Riverside Jct. to LA to Barstow, partly on ATSF)
West Los Angeles Branch	1.4	(Approximately)
Glendale Branch	4.2	Abandoned
Pasadena Branch	1.8	Abandoned
San Pedro Branch	22.2	
Lakewood Branch	2.8	
Anaheim Branch	20.1	total (14.5 on UP track)
Crestmore Branch	6.9	
<u>Jointly-Owned By SP, ATSF, and UP</u>		
Mission Tower-LA Union Station (LAUPT)*	0.6-0.8	Figure varies from 0.6 (ATSF) to 0.8 (UP)

* The short segment from LAUPT to Mission Tower on the LA River is generally included on company timetables as part of the route mileage of rail lines approaching the LA CBD. This segment has been deleted from the mileage figures shown above, and indicated separately here.

TABLE 7 (Cont'd). LENGTHS OF MAIN AND BRANCH LINES

Carrier And Line	Mileage	Notes
<u>Ventura County Railway</u>	18.0	Total, both branches and SP connection
<u>LA Junction Railway</u>	64	Total (2.8 from Downey Road to Randolph St. along LA River)
<u>Harbor Belt Line</u>	-	Does not own its own track
<u>U.S. Naval Railroad</u>	5.6	



Typical railroad classification/storage yard, exhibiting a wide variety of railroad power and freight cars.

8 FIXED GUIDEWAY/BUSWAY TRANSIT PLANS IN THE SCAG REGION

Existing and adopted plans for rail, other fixed guideway, and busway transit development by the five urbanized counties in the SCAG region are of major relevance to the evaluation of railroad rights-of-way for transit purposes. This chapter will begin with a discussion of SCAG's Regional Mobility Plan. This will be followed by a review of Los Angeles County's transit program, which has been under continuous development for the better part of a decade. After this we will review the evolution of Orange County's fixed guideway and transitway program, and plans in Riverside, San Bernardino, and Ventura Counties.

8.1 SCAG's Regional Mobility Plan.

The adopted Regional Mobility Plan outlines the development of a three-tiered transit program which includes a line-haul system, a feeder network, and a local circulation element. The longer-distance, line-haul system will serve major flows and connect significant regional centers. While not mode specific, it is envisioned include a mixture of rail, other fixed guideway, and express bus services on dedicated rights-of-way. The Plan identifies nine high-capacity corridors (with a capacity of up to 40,000 riders per hour), and 16 medium-capacity corridors, connecting 57 identified activity centers in the metropolitan portion of our region (1).

The feeder network would use lower-capacity vehicles including buses and vans (which allow more flexible operation). It is intended to provide service between localities, and to connect with the line-haul system at designated transfer points; as well as accessing other attractor/generators of regional significance. The feeder network would also incorporate park-and-ride facilities. The local circulators are intended to operate within subregional areas, and may be comprised of short-distance fixed-guideway shuttle, small transit bus, and paratransit services (such as dial-a-ride, operating in a demand-responsive mode).

In addition to regular transit, commuter rail lines and intercity passenger train services are included in the Plan. The interregional service area includes eastern Ventura county, Los Angeles and Orange Counties, and western Riverside and San Bernardino Counties. The attainment of a 19% mode split is heavily dependent on development of the three-tiered system described above. Line-haul components are discussed below, for each county.

8.2 The Los Angeles County Proposition A System.

History. In November, 1980, the residents of Los Angeles County voted to increase the countywide sales tax by 1/2 percent to finance an extensive rail transit system. This measure, generally referred to as Proposition A, gave the Los Angeles County Transportation Commission the mandate to construct a 150-mile rail transit network serving approximately 13 corridors (Figure 8.1), subvent 25% of the funds to local jurisdictions, and reduce bus fares as an interim measure.

The ballot measure required that a rail rapid transit system be constructed serving at least:

- o The San Fernando Valley
- o West Los Angeles
- o South Central Los Angeles/Long Beach
- o South Bay/Harbor
- o The Century Freeway Corridor
- o The Santa Ana Freeway Corridor
- o The San Gabriel Valley

The accompanying ordinance defined "rail rapid transit system" as "all land and other improvements and equipment necessary to provide an operable, exclusive right-of-way, or guideway, for rail transit" (2), a definition supported by subsequent legal opinions by the Los Angeles County Counsel.

Corridor And Network Definition. The LACTC began the process of refining the ballot map into a system of rail lines and busways (convertible to rail) in 1983. By 1984, a network of thirteen corridors had been identified (Figure 8.2). These included eight radial routes serving the LA CBD directly:

- a) A Metro Rail route from North Hollywood south and east to the LA CBD via Wilshire Blvd.
- b) A Metro Rail west route serving the Santa Monica/West Los Angeles area via Wilshire Boulevard.
- c) The Harbor Busway, following the Harbor Freeway alignment southward, with an eventual extension to San Pedro.
- d) The Los Angeles-Long Beach line, to the south-southeast.
- e) A southeastern Metro Rail extension roughly paralleling the 5 Freeway.
- f) The El Monte Busway, to the east.
- g) A line serving Pasadena, to the northeast.
- h) A line north to Glendale.

The system included four crosstown routes:

- 1) A north-south route from Sylmar south to Westwood/Culver city, generally following the I-405 Freeway corridor.
- j) A Coastal Corridor from Marina Del Rey past LAX through the South Bay.
- k) The I-105/Century Freeway line, from the LAX area east to Norwalk.
- l) An east-west segment from South Bay to Long Beach (as a coastal corridor extension).

Finally, one additional feeder route was identified:

- m) An east-west San Fernando Valley route from Canoga Park to North Hollywood, where a connection would be made with Metro Rail.

It should be noted that during this period, the LACTC investigated the possible use of a number of railroad corridors for transit, in the course of its route refinement work. Some of these are shown in Figures 8.3 through 8.5.

Priorities. By 1984, the highest priorities were determined to be: the three Metro Rail routes; the Long Beach, Pasadena, Century, and Coastal (South Bay) light rail lines; the Harbor Busway; and the San Fernando Valley LRT feeder line. (The El Monte Busway was already operational.)

Progress To Date. The Proposition A network is currently envisioned as in Figure 8.6. The following are the elements of the Proposition A system which are either in operation, under construction, or for which substantial preliminary planning, engineering, or environmental work has been completed:

- 1) The El Monte Busway. This facility was placed in service incrementally from 1973 to 1976. It is an 11-mile long, double lane HOV lane/busway combination, with two on-line bus stations and a major terminal in El Monte. (A final link from the busway's original western terminus to the LA CBD at the Los Angeles Union Station is currently nearing completion.) Most of the bus routes utilize a contraflow bus lane on Spring Street in the CBD for access to the busway. The El Monte Busway, which is largely in the median of the I-10 San Bernardino Freeway, was built along the Southern Pacific railroad right-of-way which later became the SP State Street Line-- a main line which remains in operation as a single track separated by barriers from the HOV lanes (3,4).
- 11) The Los Angeles-Long Beach Rail Transit Project. The LA-Long Beach LRT line will be a largely at-grade facility, operated with six-axle articulated light rail vehicles with power collected from overhead wires. The 22-mile line will begin in the LA CBD at 7th and Flower Streets in subway and operate on a surface alignment along Washington Boulevard, east to Long Beach Avenue. Here it will join the Southern Pacific's Wilmington Branch, running south through Watts and Compton (and sharing the R/W with the generally single track freight line). Below Dominguez Junction (which is just north of Carson), it will follow part of the abandoned East Long Beach Branch to Long Beach Boulevard. It will continue south along Long Beach Blvd. in a median alignment and use a one-way loop arrangement to access the Long Beach CBD area. The Long Beach Line will begin operations in 1990 (5).
- 111) The first Metro Rail line to open will originate in the LA CBD at Union Station, run south along a Hill Street alignment, curve west on Seventh, and transition to Wilshire Boulevard west of the CBD. It will follow Wilshire over to Vermont Avenue; there to turn north, extending along this major arterial to Sunset, where it will curve to the west and generally parallel Hollywood Boulevard through the Hollywood district. It will then turn northwest and enter the San Fernando Valley at Universal City, with a planned eventual terminus at Lankershim and Chandler in North Hollywood.

The 17.4-mile Metro Rail line will utilize four axle rapid transit cars, with third rail power supply. The entire route to Universal City will be in tunnel. The minimal operational segment (MOS-1) will extend from LAUPT to Wilshire and Alvarado, and will become operational no earlier than 1993. A previous plan to route the line north to Hollywood along Fairfax Avenue was abandoned as a result of concerns that the mid-Wilshire section may be a high-risk area because of underground oil and gas seepage (6,7).

- iv) The Norwalk-El Segundo Rail Transit Project is being built in the median of the I-105 Glen M. Anderson Freeway (also called the Century Freeway) from Norwalk west to Aviation Boulevard near LAX. It will then proceed south on aerial structure to about Compton Boulevard at the border of Redondo Beach/Hawthorne/Lawndale. This route includes the south branch of the Coastal Rail Transit Line. The I-105 Freeway segment through Lynwood is being built on the former SP West Santa Ana Branch, and for a short distance the facility follows the partially relocated SP El Segundo Branch between Broadway and Western Avenue. From a point near Douglas Street and Park Place in El Segundo and south to Compton Blvd., the rail transit line will be on structure over the R/W of the ATSF Harbor Subdivision.

After evaluation of various manual and automated control options, it was decided that the I-105 line is to be fully automated light rapid transit. It is expected to begin service in 1993 (8,9). (For simplicity, this line will generally be referred to below as the Century Freeway line.)

- v) Coastal Rail Transit Line, North Branch. The 5.3 mile extension of the Coastal Corridor northward, serving Westchester (near LAX) and Marina Del Rey, is currently under study. This route would follow Aviation Boulevard north to Century Boulevard, and run west and north to connect with LAX Parking Lot C. There it will follow an alignment to the east of Sepulveda and turn to the west just above Lincoln Boulevard. Finally, it will go on a northwesterly course paralleling Lincoln to Marina Del Rey, and curve to the northeast along Culver Boulevard. The segment west to Parking Lot C could open as early as 1993 (10).
- vi) The Pasadena Light Rail Line. Study is currently underway of two alternatives for providing transit service from the LA CBD to Pasadena. One alignment would follow Main Street, Mission Road, Huntington Drive, and the SR 710 Freeway extension north to Pasadena; the other would utilize the Santa Fe Second Subdivision along Marmion Way through Highland Park. Several alternative subway alignments in the LA CBD are also under study, which will connect the Pasadena line to the Long Beach line; one of these would provide a tie-in with Union Station. In Pasadena, the line will follow the ATSF Second Subdivision down the median of the I-210 Freeway. The Pasadena line could become operational as early as 1993, pending certain funding decisions (11).
- vii) The San Fernando Valley rail transit corridor. The San Fernando Valley line was, until recently, conceived as a light rail line, extending 14.3 miles from Warner Center to the North Hollywood Metro Rail station. This project has been in dispute owing to objections by citizens' groups to several of the original five alignments under study in the EIR, including the SP Burbank Branch, which was originally the preferred alternative. The Los Angeles City Council was asked to determine which alignments should be studied, and in the spring of 1988 a Citizen's Advisory Panel was convened to study the original five (and other) alternatives and make recommendations to the City Council.

At the time of writing, it is understood that the following will be

included in EIR work, on the Burbank Branch: (a) a fully mitigated light rail alternative with shallow trench/berm, deep trench, and deep bore tunnel options in residential areas, and (b) a subway/aerial Metro Rail extension or automated [medium capacity] rail transit option. On the Ventura Freeway route: (c) a mitigated aerial rail line on the south side of the freeway with subway adjacent to residential areas, including Metro Rail and automated rail transit alternatives. Monorail and Maglev technologies are also to be considered as possible substitutes for a Metro Rail extension along this corridor (12).

- viii South Bay rail extension. The cities of Torrance, Redondo Beach and Lawndale are helping the LACTC fund a study of an extension of the Coastal Corridor automated light rapid transit line down to the southern part of Torrance.
- ix) Glendale Light Rail Line. The City of Glendale and the LACTC have begun a study of the Glendale Proposition A line, with funding assistance by Glendale.
- x) Harbor Freeway transitway project. Caltrans has allocated \$ 56.2 million for the first contract to double-deck the Harbor Freeway between Slauson and Martin Luther King, Jr. Boulevard, beginning in March of 1989. A second segment will be built between Jefferson and 37th Street. The facility will serve both express/limited stop buses and high-occupancy vehicles; it will be placed on aerial structure above the shoulders of the freeway (13).
- xi) Metro Rail extensions. The LACTC has applied for federal grant assistance for a detailed study of a western branch of Metro Rail towards Westwood and an easterly extension through Boyle Heights and East Los Angeles.

In addition, there is support in LA County for the development of a Southwest Corridor providing intercity rail passenger service between San Diego, Los Angeles, and Santa Barbara; and interest in developing a Los Angeles-Pomona Valley-San Bernardino commuter service.

Technology Considerations. There has been some recent criticism of the fact that Los Angeles County appears to be developing three separate rail modes: a Metro Rail rapid transit system, a Long Beach-Pasadena light rail line, and an automated Century Freeway line (14). The Century car will have the same basic dimensions as the Long Beach car; the critical difference is that the Century car is to have third rail power pickup, while the Long Beach car collects power from overhead wires, using a pantograph.

The Long Beach car will not be able to operate over the Century line because the underbody of the car does not provide enough clearance from the third rail on curves. However, it is planned that both cars would share a number of common components, permitting some common use of maintenance facilities.

An automated Century Freeway car would in concept be very similar to the London Docklands vehicle, which has been experimentally fitted with a pantograph in a light rail demonstration in Manchester, England. Hence, it is entirely feasible

to develop a vehicle of the same general type as the Long Beach and Century cars, but able to operate on either third rail or overhead power. New York's Metro North Cosmopolitan commuter rail cars collect DC power from a third rail and AC power from overhead wires; this is a far more difficult feat than developing a light rail vehicle with both third rail and overhead pickup of 750 Volt DC current.

Assuming that a lightweight car can be designed to meet the crashworthiness standards of the Long Beach LRV, yet be equipped with pantographs and third rail shoes for current collection, it should be possible for Los Angeles County to develop a future "universal car" capable of being operated in automated mode over fully grade separated lines and in manual mode over surface rights-of-way with grade crossings.

A viable alternative, however, would be to equip the Century line with overhead catenary and provide service with LRVs of the Long Beach-Pasadena type. There is no reason why a future variant of the Long Beach car could not be equipped for driverless (automated) operation over the Century line. This would permit maximum flexibility in planning future surface branches and route extensions, and in providing interline service. Under this scheme, the train operators would simply exit the cars upon entering automated territory and switch over to the automatic train control system. Personnel would then re-enter other cars leaving the automated line section, climb on board and "key in" to begin manual operation.

This would still leave two basic rail modes: the Century/Long Beach system and the Metro Rail system. The most critical difference is the height and width of the platforms, as all of the lines planned thus far would have high platform stations. The Long Beach car has a floor height of 39" and a width of 8' 8 3/4" (almost 105"). The Metro Rail car will have a floor height of 44", and a width of 10' 3" (123"). This will effectively preclude operation over the same track (15-17).

Since the Century car is basically a rapid transit version of the Long Beach car, with the same platform height and width, the question arises whether a Metro Rail compatible car (built to Metro Rail standards for platform height and width) could be developed to operate on surface rights-of-way with gated crossings in LRT fashion. This would permit feeder lines to be through-routed into the LA CBD using the Metro Rail tunnel. Although this would require development of a new type of car for such feeder routes, it appears to be feasible and could permit greater flexibility of operation of the Metro Rail system (18).

8.3 Orange County Rapid Transit And Transitway Plans.

Early Rail System Plans. The Orange County Transit District began planning a fixed guideway transit system in the early 1970's. By the late 1970's, a medium capacity rail system was anticipated; by 1982, two technologies were identified as most appropriate: light rail, and an automated guideway transit system (monorails were also investigated). While various alignments were studied (see for instance Figure 8.7), the final plan (Figure 8.8) included the following (19):

a) A north-south line, largely on aerial structure. This route would have begun at Orangethorpe Avenue in Fullerton, and extend south to Katella Avenue (Disneyland), continuing east to the Anaheim Stadium, and south along State College Boulevard to the UC Irvine Medical Center in Orange. It was then to run east along La Veta (north of the 22 Freeway) to Main Street, south along Main (and passing the Santa Ana Civic Center) to about MacArthur Blvd., west to Bristol, south past the South Coast Plaza in Costa Mesa, and east along Anton Boulevard (just north of the 405 Freeway) and Main Street into Irvine.

A branch was to have gone south along MacArthur Boulevard past the John Wayne Airport, looping around Jamboree and Campus Drive in the northern end of Newport Beach. A second branch would have continued east along Main to Harvard, north to Barranca Parkway, and east generally following the San Diego Creek, to the Irvine Center and the proposed Multi-Modal Transportation Center near the intersection of the 5 and 405 Freeways and the El Toro Marine Corps Air Station.

b) An east-west line, making use of the surface railroad right-of-way provided by an abandoned segment of the SP West Santa Ana Branch (the former Pacific Electric Santa Ana line). This route would have begun at the 5 Freeway in Buena Park, running south along Beach Boulevard (passing Knott's Berry Farm and the Buena Park Mall) through Anaheim to Stanton. Just above of Katella, it would have turned to the southeast to follow the West Santa Ana Branch/PE right-of-way through Garden Grove and all the way to western Santa Ana, turning east at Raitt Street (the end of the PE R/W) to continue along Santa Ana Boulevard to the Civic Center.

It would then have continued past the Santa Ana Amtrak station to the 5 Freeway. Following the freeway alignment, it was to extend southeast through Tustin to Irvine, passing the Multi-Modal Transportation Center, to terminate in the Irvine Industrial East area.

The OCTD began its efforts to purchase the PE right-of-way from Stanton to Santa Ana in 1976, and finally acquired it in 1983. This would have been a fundamental part of the east-west line. However, Orange County's June 1984 Proposition A, which was to have locally raised the sales tax one percent to finance transportation improvements (highways as well as transit) failed at the polls. A decision was made to postpone indefinitely further work on the 38-mile rail transit system and to concentrate instead on express bus transportation (20).

The Transitway Program. The next system planned (which has been incorporated into the current program) called for "transitways" to be closely integrated with commuter lanes on freeways. The commuter lanes are to be reserved high-occupancy vehicle (HOV) lanes in the medians of existing freeways, allowing operation of buses, carpools, and vanpools. A painted buffer of variable width will be provided to separate the HOV lanes from mixed-flow traffic. For purely commuter lane sections, no exclusive ramps are to be installed to connect these lanes with adjacent streets: access will be via the freeway interchanges, in mixed traffic.

The transitways will be barrier-separated, reserved lanes generally constructed along freeway rights-of-way; their use will be open to buses, carpools, and

vanpools as is the case with the HOV lanes. The transitways are to be connected with freeway lanes at selected points; ramp connectors will be provided between transitways and commuter lanes on intersecting freeways. Ramps will also connect the transitways with selected local streets. Express buses on the transitways are projected to carry 22,100 daily riders in the year 2010, requiring about 140 buses. In addition, if the HOV lanes were restricted to three or more persons, an additional 30,600 people could be carried in private vehicles on the transitway/HOV lane system (21).

The original transitway plan has been revised slightly, now relying upon more miles of HOV lanes (22). The transitways will effectively be superimposed on a basic HOV lane network which will include commuter lanes on the 5 Freeway from Los Angeles County to the junction with the 405 Freeway in Irvine, the 405 Freeway from Los Angeles County to the same point, the 57 Freeway from Yorba Linda south to I-5, and the 55 Freeway from Route 91 south to the 405 Freeway.

The I-5 transitway will replace the HOV lanes from the 57 Freeway in Orange (Santa Ana Fashion Square) to the 55 Freeway in Tustin; an SR 55 transitway will replace the HOV lanes from MacArthur Blvd. south to the 405 Freeway, while a 405 transitway will replace the HOV lanes from Bear Avenue (South Coast Plaza) just west of the 55/405 intersection to Von Karmen Ave. (John Wayne Airport) to the east of MacArthur Blvd.

The I-5 commuter lanes and transitway from the Anaheim Stadium area to the vicinity of the Amtrak station in Santa Ana will follow 4.5 miles of former SP Santa Ana Branch right-of-way, which has recently been purchased by the OCTD for purposes of freeway widening and transitway construction (23). The I-5 transitway is therefore to be an approximately three mile segment connecting the Route 57 and Route 55 HOV lanes, while the I-405 and Route 55 transitways will be shorter segments extending about one mile west, north, and east of the congested 55/405 interchange.

Initially, at least, no en route stations will be provided on the transitway system; buses will have to exit the facility if it is desired to serve local points along the way.

Recent Developments. At present, Orange County lacks a dedicated source of revenues to support fixed guideway transit development. However, a recent public opinion poll released by the Orange County Transportation Commission has indicated that a majority of residents would be willing to support a half percent sales local sales tax increase if part of the revenues were used to finance a new rail transit system. The use of the former Pacific Electric right-of-way (West Santa Ana Branch) is again under serious consideration, with the expectation of linking such a line to the LA CBD and with LAX via the LA-Long Beach and Century Freeway transit lines, now/soon to be under construction in Los Angeles County (24).

The OCTC has recently adopted a 20-year, \$ 11.6 billion traffic improvement and growth management plan including \$ 400 million for rail projects (Figure 8.10). Parsons, Brinckerhoff, Quade and Douglas, consultants for the OCTC, have recommended eighty miles of rail lines, including diesel powered commuter trains and electric trains drawing power from overhead wires, seventy miles of

automated guideway transit or monorails running elevated or below grade along city streets/across open land, and 100 miles of carpool lanes in freeway medians together with 20 miles of transitways for bus and vanpool use (25-27).

The commuter rail element (see also Appendix H) is envisioned to include Los Angeles-Orange County and Riverside-Irvine commuter lines (including both Olive Subdivision and Fullerton routes), double and triple tracking of portions of the LA-San Diego rail corridor, and eventually electrified, all-day train service. The Pacific Electric right-of-way (West Santa Ana Branch) from Stanton to Los Angeles County would be acquired and the segment from Stanton to Santa Ana preserved for future transit use; it would eventually be linked to the LA-San Diego rail corridor at the Santa Ana Regional Transportation Center.

The automated systems might include an Irvine monorail along the Barranca Parkway and a people mover loop in Anaheim (the Transpark elevated busway system has also been proposed in the latter city). Beyond 20 years, additional lines would be developed from Fullerton to Costa Mesa and Irvine, along Beach Boulevard, from Stanton to Anaheim along Katella, from Westminster to Costa Mesa on Edinger and Harbor, and along the San Joaquin Hills tollway.

It is envisioned that the system as described above would provide linkage to most of the major activity centers in Orange County.

Technology Considerations. If Orange County were to develop a fixed guideway transit system to provide through service into Los Angeles County on the SP West Santa Ana Branch/PE right-of-way, it would need to adopt a rail technology compatible with either the Metro Rail rapid transit system (which will approach Orange County along the I-5 corridor), or the Century Freeway/LA-Long Beach system. Cars for the Century line and the Long Beach line will have the same basic dimensions, differing in that under current plans, the underbody of an automated Century Car would be reconfigured for third rail clearance on curves (see Section 8.2).

Orange County appears to be leaning in the direction of Century Freeway/Long Beach line compatibility. This is because there is strong emphasis on an LAX connection, and because the Metro Rail southeastern line will almost certainly not be completed within the next decade (while the LOSSAN intercity rail corridor already provides some service to the LA CBD). Although the Long Beach and Century cars will be narrower than the Metro Rail rapid transit vehicle, the same basic design should prove satisfactory for the West Santa Ana Branch line from a capacity viewpoint.

Orange County could consider developing a "universal vehicle" which would have the same basic dimensions as the Century and Long Beach cars, but would be capable of collecting power either from a third rail or from overhead wires: that is, equipped with third rail shoes and a pantograph. This would allow through-routing over both the Century line and the Long Beach line; and would permit at-grade operation on certain sections of a future Orange County system (28).

If Los Angeles County decides to operate the Long Beach car on the Century line, Orange County would have the option of using a similar vehicle. A decision by

the LACTC to construct the Century line with overhead catenary would not, however, prevent Orange County from operating with third rail power pickup on portions of their own system, should they decide to adopt a "universal vehicle" of their own design but with the same basic dimensions, under this scenario.

A possible constraint upon designing such a "universal vehicle" with the same length, width, etc. as the Century car is that structures developed for the Century Freeway line may be barely strong enough to carry a rail vehicle of the same approximate weight as the Long Beach car. However, as the empty weight of the Century line's proposed automated car would be 85,000 lbs. as compared to 90,000 lbs. for the Long Beach car (only be 5000 lbs. heavier), it is doubtful that this difficulty will actually occur (29).

In the event that an Orange County transit line were to feed into the Los Angeles County Metro Rail system, a Metro Rail compatible light rail car might be an alternative to the current RTD Metro Rail car design. This technology option is discussed above in Section 8.1 and in footnote 17.

If it were desired to operate the West Santa Ana Branch with an electrified commuter rail technology, conforming to FRA safety standards and compatible with LOSSAN corridor intercity passenger rail and Santa Fe freight operations, of course the line would have to terminate at Cerritos or a nearby point, and passengers would need to transfer to the Los Angeles County light rail/rapid transit system.

8.4 The Riverside County Proposition A Network.

In November 1988, Riverside County passed its Measure A, half-percent sales tax increase for transportation purposes, including commuter rail. A preliminary feasibility study has been conducted on commuter service from the City of Riverside to Irvine in Orange County, with four round trips per day. It is proposed to use the Santa Fe Third, Olive, and Fourth Subdivisions for a direct service, with stops also in Corona, Anaheim, and Orange. Another route would operate over the Third and Fourth Subdivisions to Irvine via Fullerton and Anaheim. Estimated patronage for the Year 2010 would be 8500 riders per day (30). Further details on this proposal are included in Appendix H.

As the degree of congestion on the 91 Freeway corridor considerably exceeds what could be handled by four commuter rail round trips per day, it seems likely that transit demand on this corridor would also have to be met by express buses operating on the 91 Freeway HOV lanes. The latter will eventually tie in with HOV lane extensions in Orange County. Together with the trains, such an express bus service could provide considerable area coverage along this corridor (with the buses also furnishing some off-peak service). If an agreement cannot be reached with the Santa Fe on the use of the Third Subdivision for commuter rail (using a track sharing arrangement), Riverside County might want to consider building its own high-speed interurban railway along the 91 corridor, using some combination of a strip of railroad right-of-way, freeway R/W, or both (depending upon location).

There is also interest in a commuter rail extension from the City of Riverside to San Bernardino, in a possible direct Riverside-Los Angeles commuter rail

link, and in commuter or light rail service on the ATSF San Jacinto Branch, connecting Hemet and Perris with Riverside.

8.5 San Bernardino County Transit Plans.

San Bernardino County does not yet have a dedicated source of tax revenues to allow development of a rail or busway transit system. However, a Commuter Rail Committee has been formed, and there is considerable interest in a commuter rail or interurban train service between San Bernardino and Pasadena/Los Angeles. Further details on the San Bernardino-Los Angeles corridor are provided in Chapter 13 and in Appendices H, I, and J.

8.6 Ventura County Transit Plans.

Ventura County also lacks a dedicated source of revenues to allow development of a rail system. However, there is strong interest in further expansion of San Diegan intercity rail service to Santa Barbara, serving Ventura, Oxnard, and Simi Valley; and in the initiation of a commuter rail service from Ventura to Los Angeles. Further details are provided in Appendix H.

In conclusion, elaborate plans have been developed, and are continuing to be developed, within individual counties for a line-haul public transportation network of some size, including light rail, rapid transit, busways, monorails, commuter rail, and intercity rail. A number of issues remain to be addressed regarding choice of mode, linkages between modes and between major transit corridors, and modal compatibility allowing through service on transit routes that cross county lines.

The question of how to achieve this system and modal integration, therefore is a major regional issue which will have to be addressed in fulfilling the goals of the Regional Mobility Plan. (The related issues of jurisdiction over, and responsibility for right-of-way protection and acquisition, and of funding a major expansion of transit facilities as called for by the Plan are addressed in Chapter 16.)

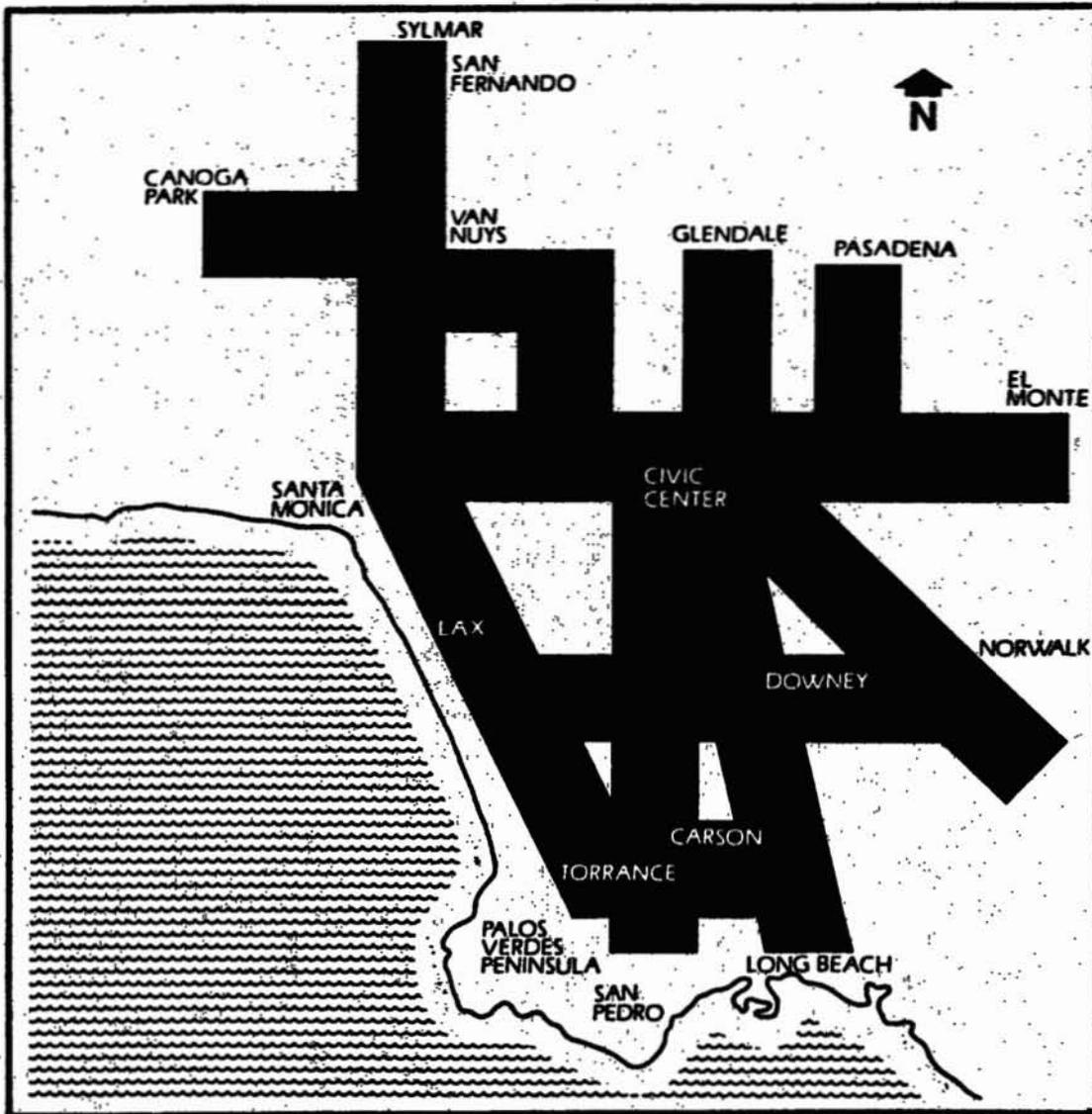
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14. Rich Connell, "Automated Trolleys May Be OKd for Century Line," Los Angeles Times, May 25, 1988, pp. 1, 22-22.
15. Request For Technical Proposal. Light Rail Vehicle Procurement. Vol. 1 - Technical Requirements. Long Beach-Los Angeles Rail Transit Project. LACTC procurement document, Contract No. R01-T05-P865. Prepared for LACTC by Southern California Rail Consultants and LTK Engineering Services. WBS No. K010, Feb. 1986.
16. The Metro Rail car specification is essentially the same as that for the Miami and Baltimore cars. See for instance Budd Universal Rapid Transit Car (BURT), undated brochure by The Budd Company. 4 p.
17. It might be possible to share some short sections of track if platforms were provided with both a 39" and a 44" section (connected by a ramp). In this case, the light rail cars would probably be shunted onto an off-line siding to provide access to the lower platform section. The LRV would clear the platforms used by the wider Metro Rail cars, while off-line loading would allow the Metro Rail cars to clear LRV sidings. Gauntlet track, to laterally shift the LRV 9" over to accommodate the difference in car width, would also be possible. However, placement of the third rails used for power pickup might cause problems with either scheme. Because of the complication involved, it is hardly worth pursuing this idea.
18. The Metro Rail cars now on order cannot be fitted with pantographs for overhead power pickup, because of limited headroom in the tunnels, especially on curved sections. Development of a Metro Rail compatible LRV would require a new car design (perhaps articulated) equipped with third rail shoes and pantograph. The currently popular "human arm" type pantograph could not be used. Instead, a true pantograph with a diamond-shaped support frame on each side would be required. The pantograph in locked-down position would need to be flush with the roof of the car. This in turn would mean a lower ceiling above the laterally-placed cross seats (not over the car aisle); the footings for the current collection device would be mounted in this space.
19. Orange County Rapid Transit Concept Design, Report On Initial Set Of Alternatives, prepared by Parsons Brinckerhoff Quade & Douglas, Ind. et al for the Orange County Transit District. Feb. 1982. 46 p.

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25. News Release, OCTC, April 25, 1989.
26. 20-Year Master Plan of Transportation Improvements, OCTC, March 7, 1989. 139 p.
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28. Although the Century car is a little narrow (at floor level) for kind of seating usually provided on long commuter runs, it may be possible to build a curved-side car with the same floor width, to permit wider seats and armrests (styling the double seats like those of the Long Island Railroad's M-1's and M-3's). Another option would be to provide comfortable 2-1 cross seating and more aisle space for standees. Assuming an operator's cab on the left side at the front end, the double seats could be on the right side of each section of the articulated vehicle, allowing passengers to look out the front. The single seats, which are always very popular with passengers who prefer more privacy, could be placed on the left side, resulting in good dispersion of passengers within the vehicles.
29. In the event that problems arose with total weight or axle loadings, it might be necessary for an Orange County vehicle using this guideway to be either a four-axle car, a shorter six-axle car, or an eight-axle car with body segments of reduced length (the latter are very popular in Europe).
30. Preliminary Feasibility Assessment. Riverside-Orange County Commuter Rail Service. Prepared by Sharon Greene and Associates and Schiermeyer Consulting Services for the OCTC and RCTC, June 1988.

FIGURE 8.1
LOS ANGELES COUNTY 1980
PROPOSITION A BALLOT MAP



Rail Transit Implementation Strategy
Stage 2
Alternative Rail Routes

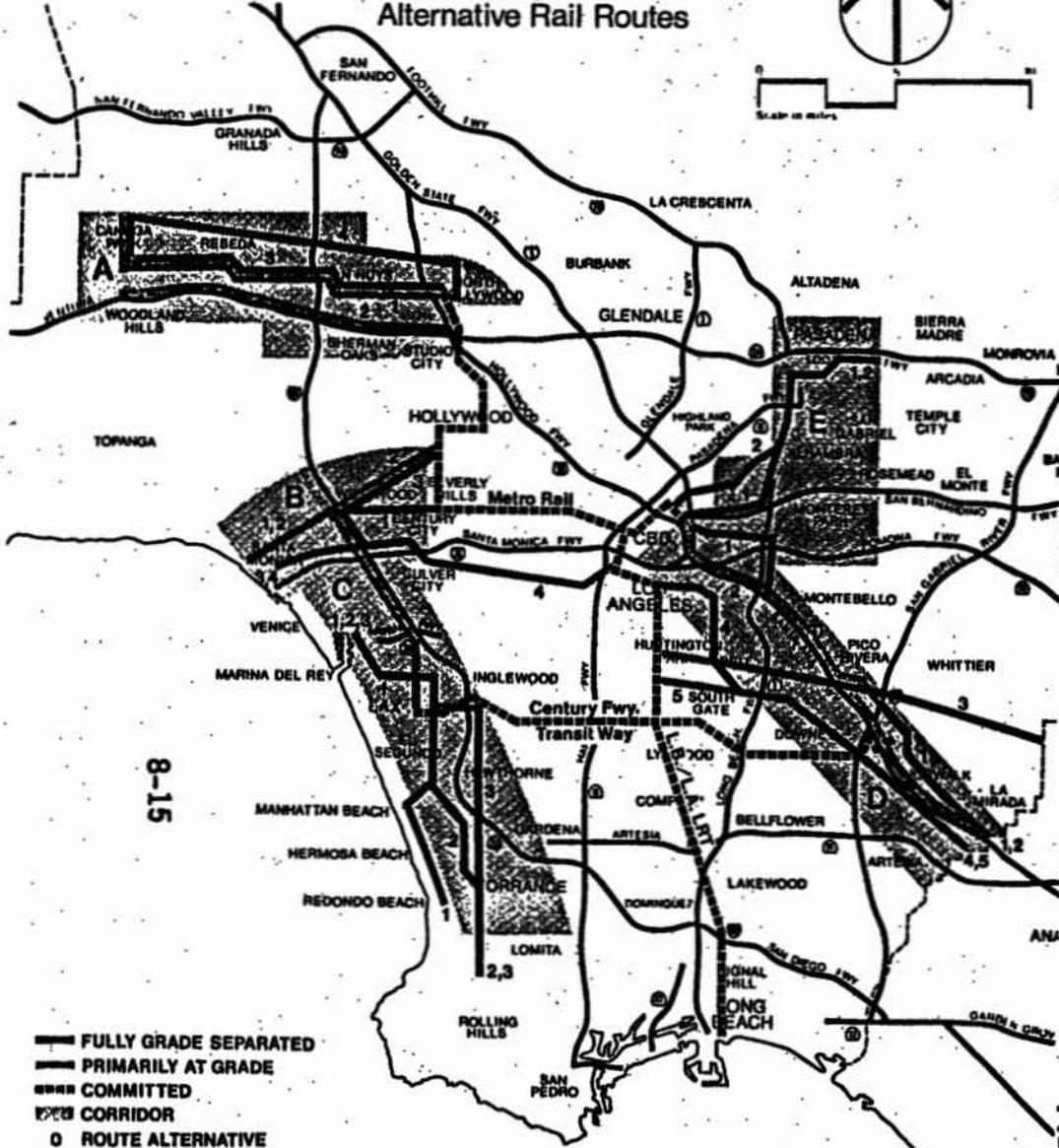


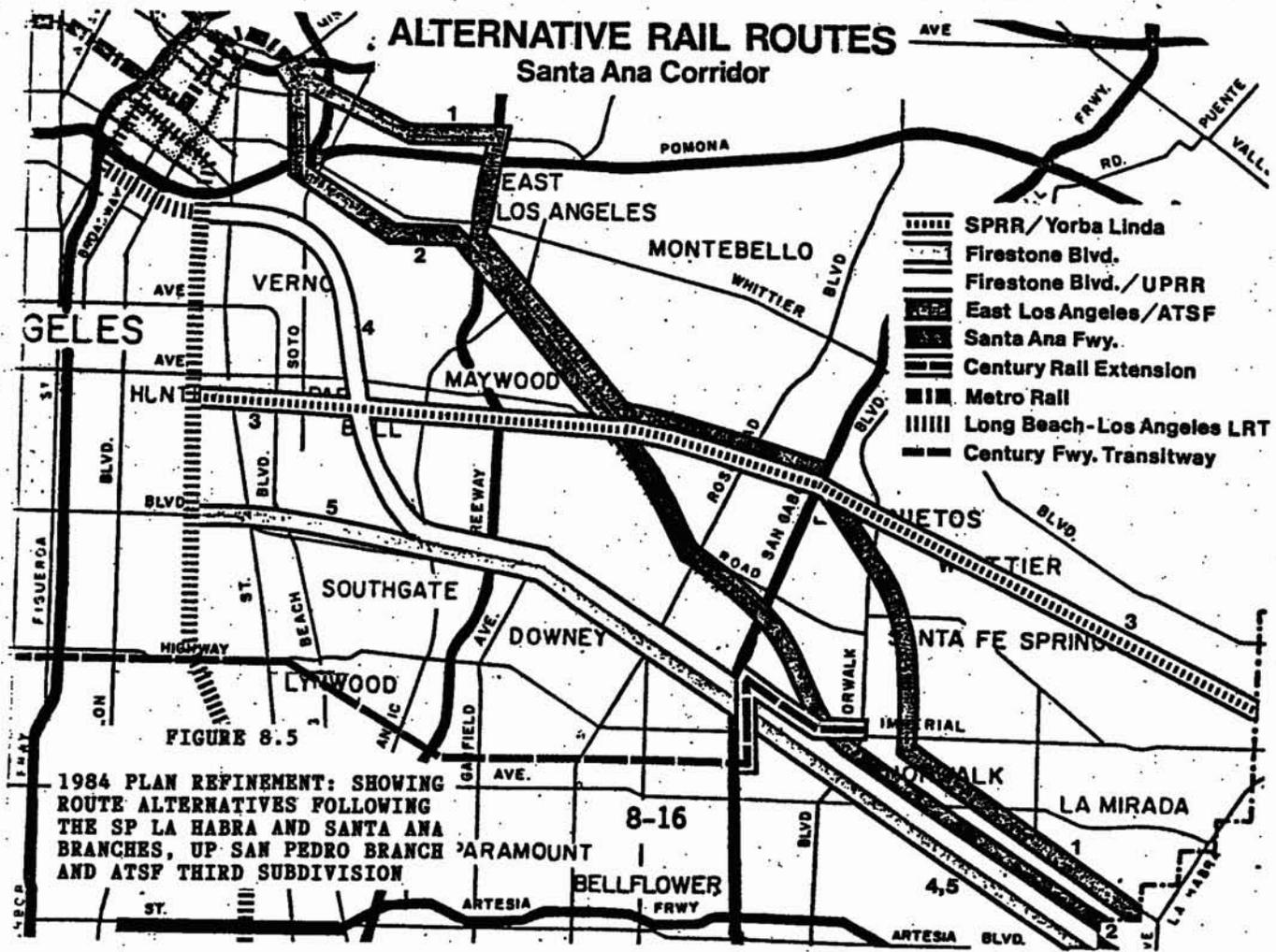
FIGURE 8.2
LACTC 1984 PROPOSITION A PLAN REFINEMENT

ALTERNATIVE RAIL ROUTES
West Los Angeles (N/S)/South Bay Corridor



FIGURE 8.3
1984 PLAN REFINEMENT: SHOWING ROUTE ALTERNATIVES FOLLOWING THE AT&SF REDONDO AND HARBOR SUBDIVISIONS

8-15





Transit Development in Los Angeles County

LOS ANGELES COUNTY TRANSPORTATION COMMISSION

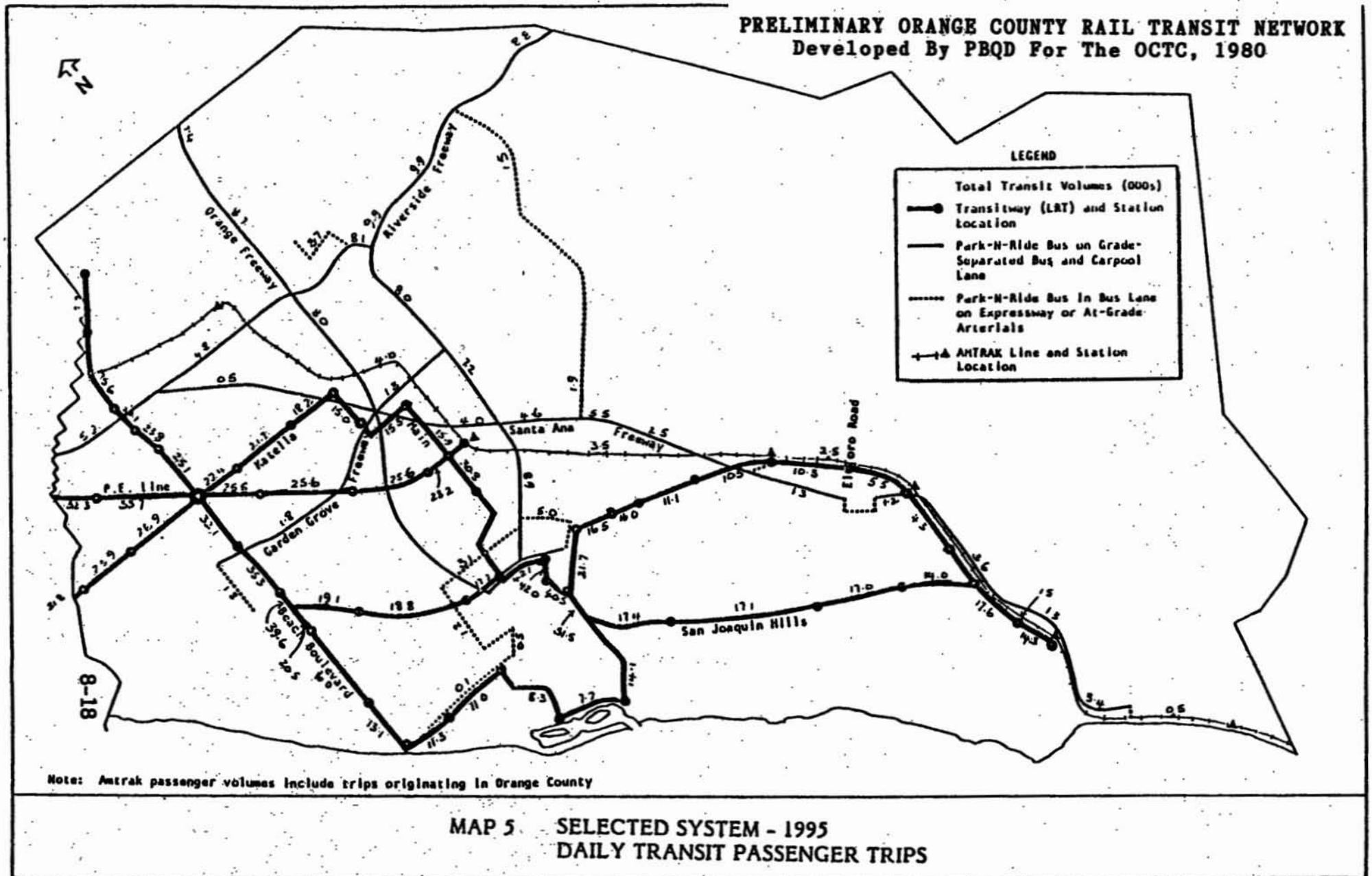


FIGURE 8.6

CURRENT LACTC PROPOSITION A
TRANSIT NETWORK

FIGURE 8.7

PRELIMINARY ORANGE COUNTY RAIL TRANSIT NETWORK
Developed By PBQD For The OCTC, 1980



MAP 5. SELECTED SYSTEM - 1995
DAILY TRANSIT PASSENGER TRIPS

FIGURE 8.8

ORANGE COUNTY RAIL TRANSIT CONCEPT DESIGN
 Developed By PBQD For The OCTD, 1982

FIGURE 1

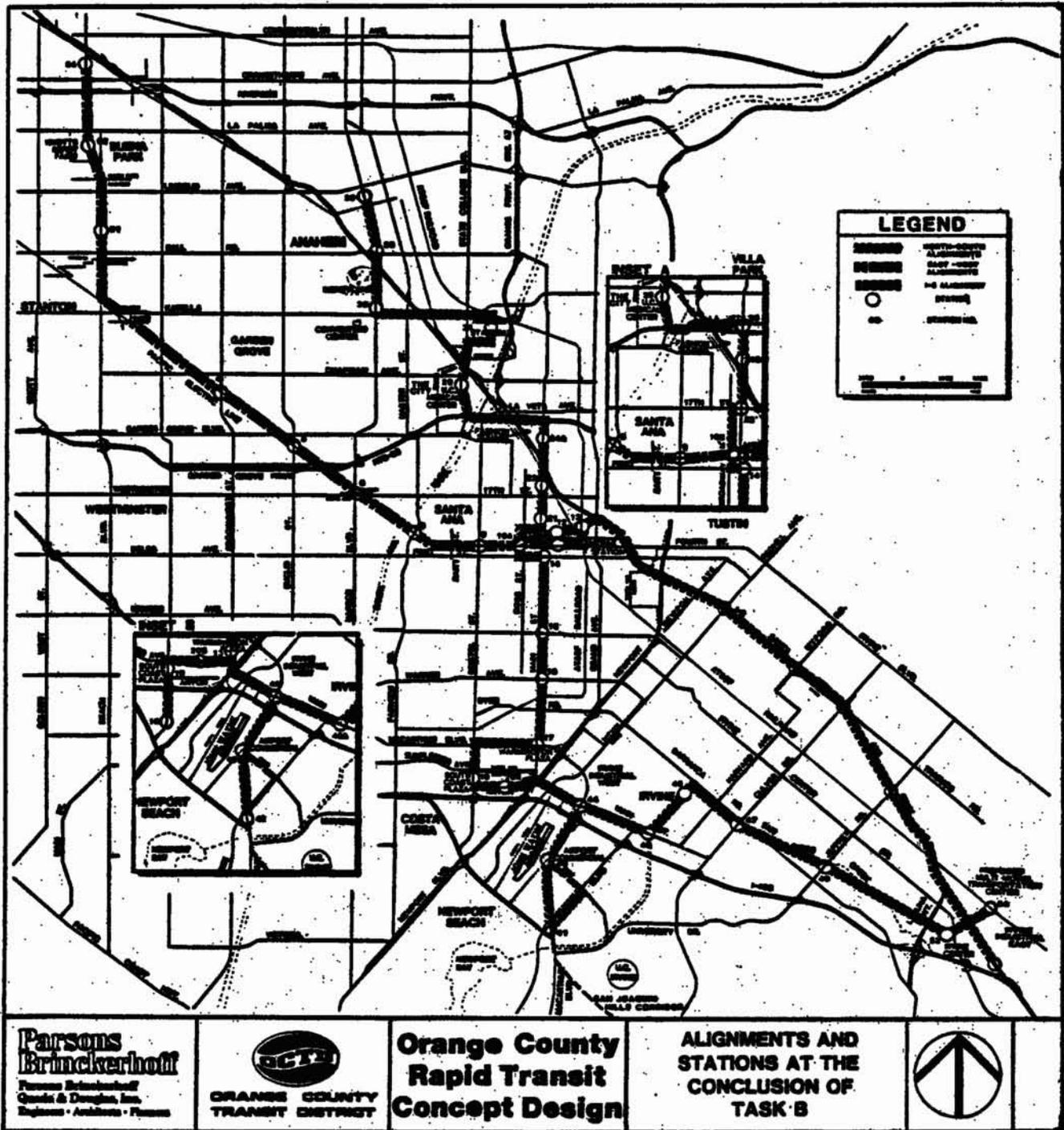


FIGURE 8.9

ORANGE COUNTY TRANSITWAY/COMMUTER LANE SYSTEM, 1986

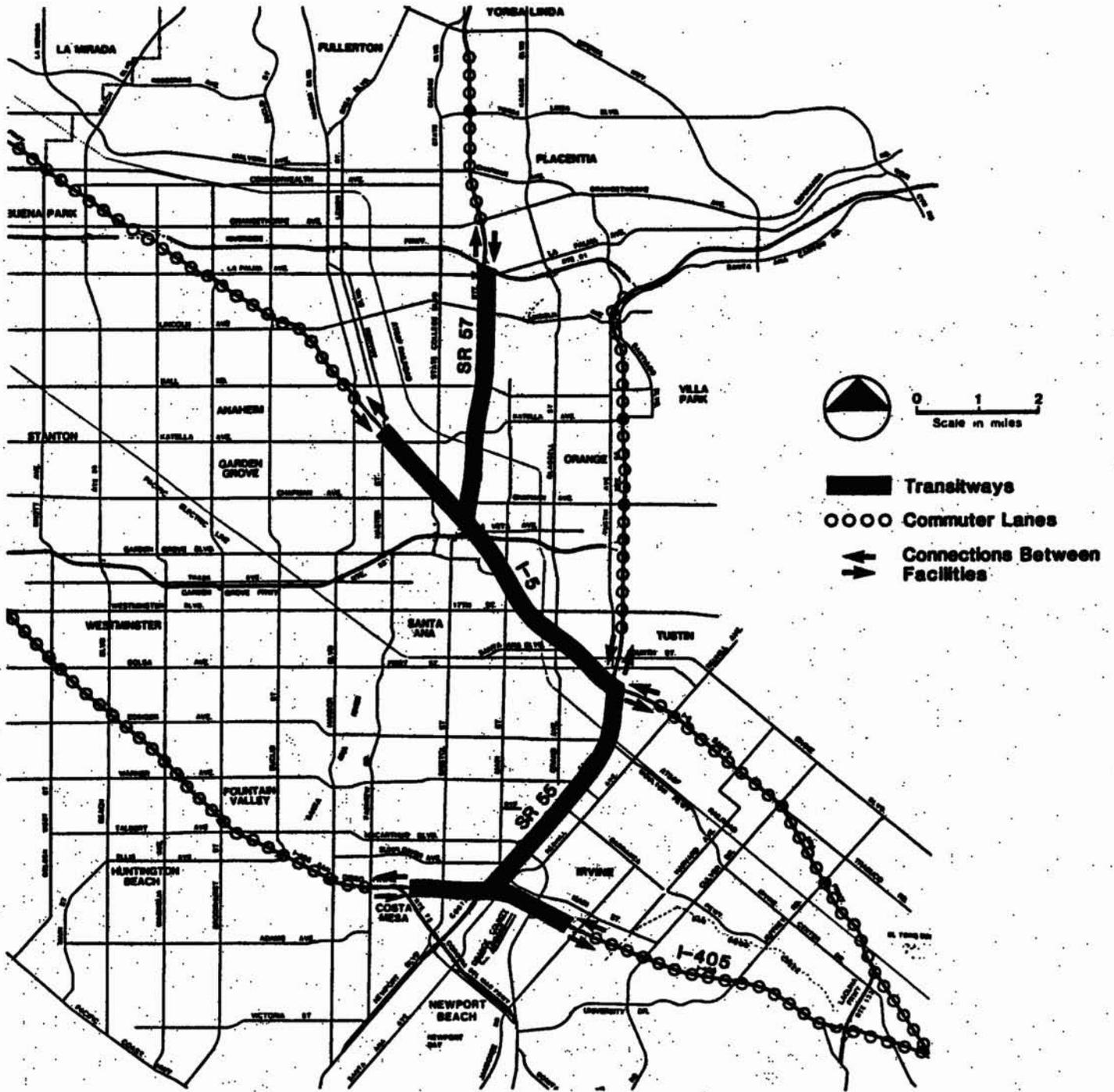


Figure 9

Transitway and Commuter Lane System

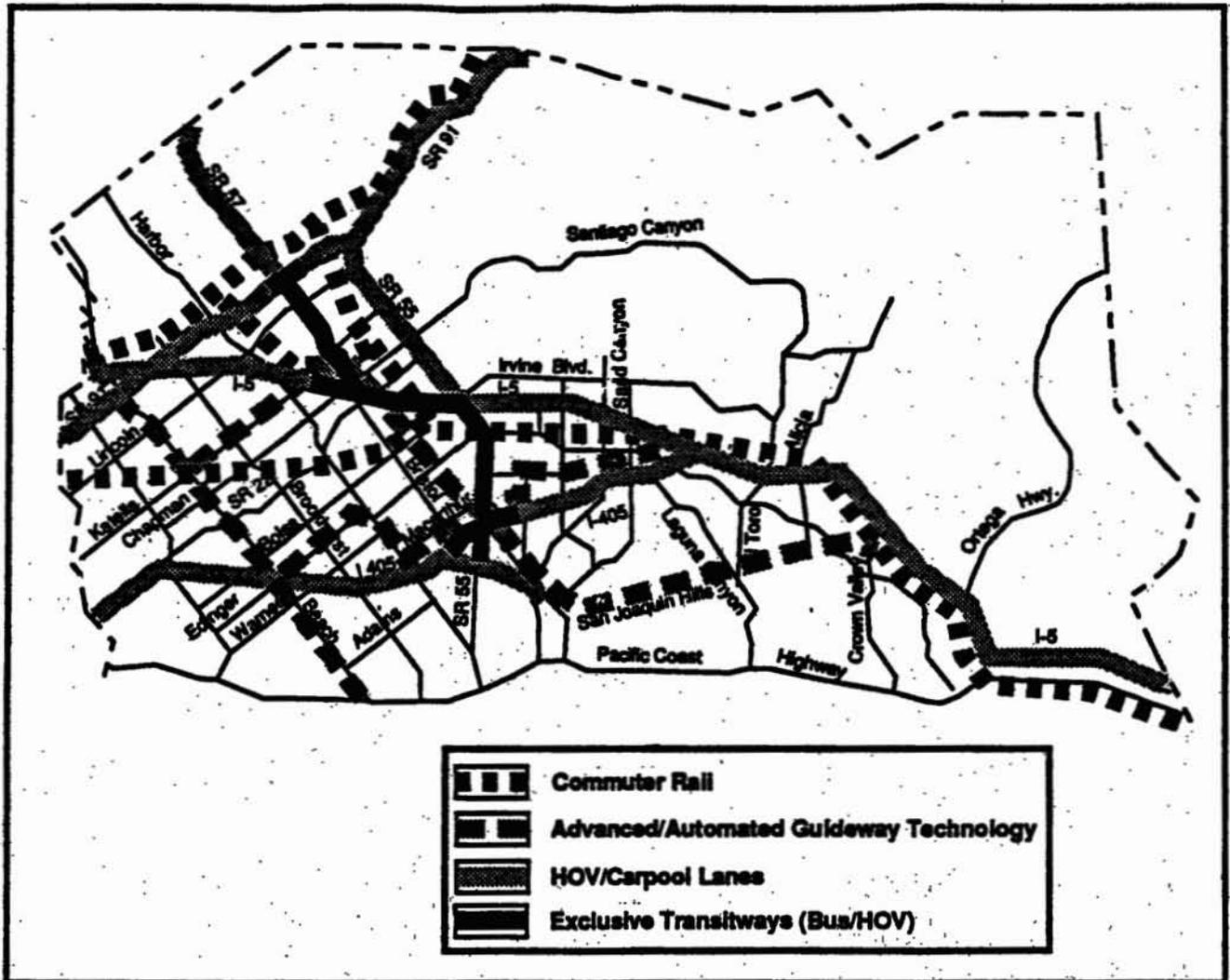


Figure 1
Long Range Transit Vision

FIGURE 8.10

ORANGE COUNTY FIXED GUIDEWAY AND EXPRESS BUS TRANSIT SYSTEM
Preliminary Long Range Plan As Conceived In 1989

9. THE IDENTIFICATION OF RAILROAD LINES WITH HIGH TRANSIT POTENTIAL

9.1 Introduction And Phase I Criteria For Selection.

During Phase I of SCAG'S Railroad Right-of-Way Evaluation Project early in 1987, a number of railroad main and branch lines in the urbanized area of southern California were surveyed to determine which lines (or logical combinations of lines) might provide promising opportunities for transit development.

The following evaluation criteria were of primary importance in making this determination:

a) A critical qualification was correspondence with transit corridors already identified as having a high priority in regional transportation plans. This would include identification with elements of the Los Angeles County Proposition A network, and with lines which had been studied by the OCTC and OCTD in Orange County, for fixed guideway or busway development.

b) Another crucial criterion was availability of right-of-way: whether the railroad freight lines in question were expected to be abandoned soon (or were in imminent danger of being broken up and thus lost for transportation purposes), or whether there would be sufficient space for parallel freight and transit operation on the same right-of-way.

c) Trip generation potential. Railroad lines passing through areas with higher residential population and employment density (either spread out across a number of communities, or concentrated in one or more CBD areas), would be very promising for transit. The greater the population and employment, the greater the number of potential work trips expected. While maps projecting Year 2010 population and employment were key to this analysis, reference was also made to 1984 demographic data.

d) Potential for service to special trip generators such as commercial centers, airports, educational and institutional facilities, and recreational areas. It was felt that if service could be provided to shopping malls, civic centers, colleges and universities, restaurants, theatres, parks, museums, and such, there would be excellent prospects for generating mid-day, evening, and weekend ridership, which would in turn improve the financial viability of transit lines on these rights-of-way (with a high percentage of operating expenses met from cash fares).

e) Evidence of latent transit demand as evidenced by freeway conditions and the current levels of transit service on the same corridors. This included, for parallel freeways: traffic volumes, recurrent congestion, and accident rates which will cause frequent but intermittent congestion. The operation of a number of express and limited stop bus routes along the same corridor was also considered to be an indicator of high potential transit demand. Another related factor was layout of the rail lines in relation to the freeway and arterial network: e.g., potential for developing new diagonal transit routes in areas where most of the highways are oriented in cardinal directions.

f) Development potential. Much of the emphasis during Phase I of the study was upon identification of underutilized railroad-owned land such as old rail yards (or other other vacant or marginally-used light industrial property nearby) which could serve as the focus for major new joint development projects involving the railroad industry.

9.2 Brief Summary Of Phase I Findings.

The result of the Phase I evaluation process was the identification of five railroad corridors which appeared to have a high potential for transit development: the Southern Pacific Santa Monica, West Santa Ana, and Burbank Branches (the latter in combination with sections of the SP Coast Line), and the Santa Fe Harbor and Second Subdivisions. These rail corridors will be discussed in some detail in the five chapters that follow.

The Santa Monica Branch and the western part of the Second Subdivision both correspond to a single LA County Proposition A corridor; the Harbor Subdivision and Burbank/Coast Line combination each correspond with two Proposition A corridors. The Burbank Branch was undergoing detailed study for light rail use by the LACTC at the time, and there were also plans to use Harbor Subdivision R/W for portions of the Coastal Corridor; while the Santa Monica Branch had been included in earlier west side corridor analysis work by the LACTC. The West Santa Ana Branch corresponds to a major rail transit corridor which had been studied for a number of years by the OCTD, and figured prominently in earlier Orange County plans.

During 1987, discussions with railroad industry representatives indicated that the Southern Pacific Santa Monica, Burbank, and West Santa Ana Branches had very little remaining freight service and were likely to be let go; hence they would become available for transit in the relatively near term. In addition, it was revealed that the Santa Fe, which owns the Second Subdivision, had long been interested in consolidating its freight operations on another corridor. Finally, portions of the Harbor Subdivision either have wide enough R/W to permit transit development, or may become available pending development of a central corridor for rail freight serving the ports, along Alameda Street.

The five transit routes studied in detail during Phase I have a strong orientation towards the LA CBD or to other major regional centers, are paralleled by very congested highways, and serve a large number of commercial and other special trip generators. The Santa Monica, the Burbank/Coast Line combination, the Harbor Subdivision, and the western end of the Second Subdivision also pass through a number of intermediate areas of high population and employment density.

The middle and eastern segments of the Second Subdivision are of particular interest because of the large number of people buying homes in the eastern San Gabriel Valley and commuting to Pasadena and the LA CBD; and the West Santa Ana Branch is of special value because it furnishes an additional diagonal right-of-way in an area where all of the arterials have a north-south/east-west orientation. The Harbor Subdivision is similarly of interest because it could provide a more direct (diagonal) route between the LA CBD and LAX, a very major trip generator.

9.3 Phase III Evaluation Criteria.

During the year or so that intervened between Phase I and the preparation of the Final Report, the railroad corporate situation had altered significantly. The most important change was that after the denial by the ICC of the Santa Fe-Southern Pacific merger application, both the Southern Pacific and Santa Fe railroads have determined that sale of certain lightly-used, relatively unproductive lines to public agencies is a higher priority than railroad involvement in transit/real estate joint development.

For this reason, greater importance is currently attached to existing commercial development (and plans for new commercial projects) adjacent to the rail lines, than to possible railroad industry involvement in transit joint development. It was deemed desirable during Phase III of the study to conduct detailed field surveys of a large number of rail lines in the SCAG region (see Chapter 15). This made it possible to corroborate the earlier conclusion that transit development along the five Phase I corridors would be viable from the viewpoint of service to commercial centers. At the same time, note was made of any plans for new land development in the vicinity of these rail lines. Also, in preparation for writing the Final Report, the available population and employment data were re-examined, and equal weight was attached to the 1984 and 2010 demographics.

Chapters 10 through 14, which will discuss the five high-opportunity lines identified during Phase I, therefore represent a composite of information gathered during Phases I and III of the study. The narrative presented in each of these chapters will begin with a description of the railroad alignment(s), followed by consideration of potential transit routes which could utilize the railroad rights-of-way in part or in their entirety (certain technology issues being included here). Following this there will be a discussion of factors indicating high potential transit demand, including demographic characteristics, surrounding land use/commercial development, conditions on parallel freeways, etc.

Areas where there may be potential for joint development projects on redeveloped or vacant land contiguous with these lines will also be identified. The current status of each corridor will be reviewed, and comments will be made on possible transit routing variations, especially those involving intercounty connections. Finally, other transit development issues relating to these lines will be considered.

(More detail is presented in Appendix K on demographic data, freeway conditions, and parallel bus services (based on information prepared in 1987). Data on right-of-way width and the size of contiguous railroad properties such as railroad yards is presented in Appendix L.)

Recent events have underscored the urgency of addressing the right-of-way protection issue with regard to these railroad rights-of-way. The Southern Pacific transportation Company announced in May of 1989 that three of these lines--the Santa Monica, Burbank, and West Santa Ana Branches--would be put up for sale (together with the Baldwin Park Branch). The LACTC has expressed

interest in purchasing these lines [as well as the Santa Fe Second Sub-division] in order to protect the rights-of-way for possible future transit development (1).

9.4 Additional Notes On Criteria Used In Assessing Potential Transit Demand.

Considerable importance is attached to residential population and employment densities for areas potentially served by each line. The density scale used in the current study is as follows:

<u>Density in Persons/Acre</u>	<u>Population</u>	<u>Employment</u>
Very High Density	40 plus	50 plus
High Density	30 to 39.9	35 to 49.9
Medium Density	20 to 29.9	20 to 34.9
Moderate Density	10 to 19.9	10 to 19.9
Low Density	0 to 9.9	0 to 9.9

It is obvious that population and employment densities in the area served by a transit line will have direct bearing on the volume of home-to-work trips that may be generated. For this assessment, characteristics of the general area surrounding each line have been used, rather than densities within walking distance. This is because commuters will use park-and-ride and bus access to travel a reasonable distance to line-haul transit stations. Bus or shuttle transfer services would also be used for distribution at the destination end.

Service to policy growth areas where higher-intensity commercial development is allowed is another factor of importance. A number of such areas were proposed under the Garfinn Ordinance by the LA City Council; restrictions were later imposed on the number and extent of these areas by Proposition U. The fact that the single largest area set aside for high-intensity commercial development in Los Angeles is the central business district (2,3) will place a premium on transit connections to downtown Los Angeles.

The following considerations were particularly important during the Phase III work, not only in evaluation of the five lines studied during Phase I, but also in the investigation of other rights-of-way:

Activity centers such as retail commercial areas adjacent to potential lines are important in evaluating transit potential. Although smaller commercial areas are likely to be of primarily local significance, major shopping malls, specialty shopping areas, and large membership stores are likely to draw people from a considerable distance, increasing the likelihood that transit will be used for access. (However, local shopping centers do improve the amenity of transit riding by providing convenience shopping near transit stations).

Areas specializing in auto dealerships will have much less of a draw, not because people will not use transit to shop for new cars, but for the reason that automobiles represent a high-valued item, infrequently sold as compared to many other commodities. These localities tend to be much lower in overall level of trip-generating activity than many other retail areas such as big shopping plazas. Grocery stores are also less likely to generate heavy levels of transit

patronage, because most families require an automobile to carry multiple bags of groceries.

Municipal buildings, museums, and major parks will obviously increase transit potential; so will major sports stadiums (which may be subject to severe parking constraints during major events). Colleges and universities will attract students and visitors from a considerable distance; high schools are more local in nature, but some students will commute by transit and others will use it to access entertainment areas after school.

The presence of apartments, condominiums, and clustered housing in general within walking distance of a transit line will also increase its viability. High-rise apartment towers and senior citizen housing projects would similarly be a plus, as would a high percentage of transit-dependent people in the surrounding area.

Multi-story office buildings adjacent to rail lines will have considerable potential for generating patronage; followed by modern office/industrial parks and big industrial plants or concentrations of heavy industry.

Finally, a mixture of office buildings, industrial parks, retail-commercial development, higher density housing, and educational, institutional, and recreational facilities along a prospective transit corridor will mean considerable off-peak as well as rush hour ridership. As a result, a higher operating ratio (meaning reduced operating subsidies) can be attained than for a line bordered primarily by residential property and serving a single major employment center. It follows that service to multiple centers (accessing outlying, smaller CBD areas) will have potential for generating ridership in both directions, again improving economic viability of the transit line.

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10. SOUTHERN PACIFIC SANTA MONICA BRANCH

Railroad Route. The Santa Monica Branch begins in the City of Santa Monica at 16th Street north of Olympic Boulevard, crossing Olympic between 20th and Cloverfield (Figure 10.1). It then follows an easterly alignment into West Los Angeles (paralleled by Exposition Boulevard on the south side of the R/W), crosses Pico Boulevard and goes under the 405 Freeway. It continues east and then turns southeast at Overland Avenue to pass beneath the 10 Freeway near National and Motor Avenues in the Palms section of Los Angeles. It again continues in an easterly direction, from Cheviot Hills to Culver City (on an alignment lying between the freeway and Exposition Blvd.).

East of this point, the Santa Monica Branch crosses Venice and Washington Boulevards to run along National Boulevard for a short distance through Culver City, and enters the City of Los Angeles again near La Cienega, where it is on the south side of Jefferson Boulevard. At La Brea it is again paralleled by Exposition Boulevard, which it follows east to Figueroa, passing between Exposition Park and the U.S.C. campus. It then goes under the 110 Freeway, crosses the SP Wilmington Branch, and joins the SP's J-Yard near Alameda Street and Washington Boulevard.

Possible Transit Uses. The Santa Monica Branch has been considered both for an Exposition Boulevard light rail line extending from Santa Monica to the LA CBD (see Figure 10.1), and for use as part of a Metro Rail extension to the West Side.

An Exposition Boulevard light rail line would most probably begin on aerial structure across from Santa Monica Place in Santa Monica's CBD area, and extend on surface alignment down Olympic Boulevard (which has a wide, grassy median) from Lincoln Boulevard to a point east of 20th Street where it would join the Southern Pacific right-of-way. It would continue east following the railroad line all the way to the University of Southern California.

From this point on there would be several options:

a). Connection with the fast-growing west side of the LA CBD via a partially-aerial line northward along Flower Street and the Harbor Freeway, coming down to the ground in Flower St. near 23rd Street and following a surface alignment which would cross Washington Boulevard to tie in with the LA-Long Beach line. It would initially terminate at 7th Street in the Flower Street subway (now under construction as part of the LA-Long Beach project). At this point, a transfer to Metro Rail would provide connectivity with other parts of the CBD and with the Wilshire Blvd. and Vermont Avenue corridors. [Eventually, the light rail subway would extend north and east to the Chinatown and/or Union Station area, providing a link to Pasadena and Glendale.]

The above is the alignment which has the broadest support at present. Options (b) through (d) below would allow a possible future connection to the east side of the LA CBD:

b). A route continuing east along the Santa Monica Branch to the City of

Vernon, and then following Alameda Street north to Union Station. This was a suggestion made by the Santa Fe Pacific Realty Co.

c). Under another Santa Fe Pacific Realty proposal, the line would follow the LA River corridor north to serve the east side of the LA CBD.

d). However, a better way to provide a connection to Union Station and the Little Tokyo area, in a way that would maximize the use of existing rights-of-way, might be to follow the Santa Monica Branch east from the USC campus to Long Beach Avenue (SP Wilmington Branch), there to join the LA-Long Beach line and follow this transit facility for a short distance up to Washington Blvd., crossing Washington to run over the former PE R/W which follows the same course as the Wilmington Branch, in a northerly direction under the 10 Freeway.

This right-of-way continues up to Olympic, where it is cut off by the new Produce Market truck terminal. However, it would be easy to jog the transit line a little to the south/east, following Mc Garry Street on aerial structure one short block over to Alameda Street, and continue north along the west side of Alameda to Bay St. This section of Alameda St. has a very wide separation between the street and nearby buildings associated with the Produce Market; there should be no objection to an elevated line here (should aerial construction be required).

At Bay St. the line could turn east and follow any one of a number of old rail sidings over to Wilson, there to again continue east along the freight spur just to the north of Violet. Condemnation of an old warehouse would bring the line out on the west side of the Amtrak facility, which is part of the huge ATSF yard complex on the west bank of the LA River. The line would then turn north, following the ATSF up to 4th Street where the SCRTD is developing its Metro Rail maintenance yard facility.

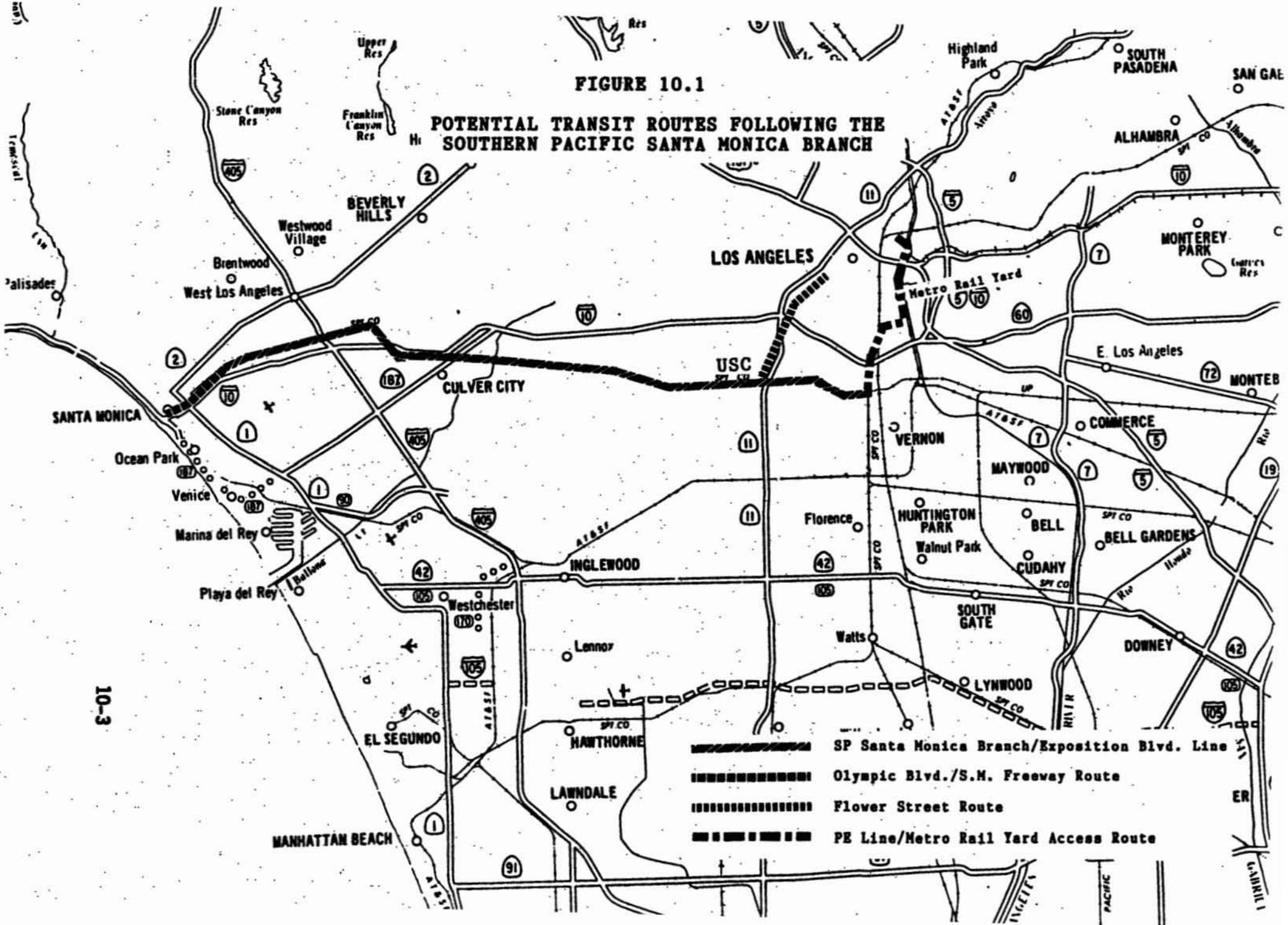
A combination LRT/Metro Rail station would facilitate joint development in this location (see below). The line would then continue north along the Metro Rail right-of-way past First Street, and access Union Station. As a secondary branch of an Exposition/Santa Monica line, this might present a longer-term opportunity to facilitate growth along the east side of the LA CBD.

(A number of variations are possible on the CBD east side alignment just described. One would be to follow a spur track north of 7th Street, which could permit use of a number of nearby warehouse buildings [one is eight stories high] in a transit joint development project. This alignment would come out in the ATSF yard area north of the Amtrak facility, but would still permit service to the Metro Rail property.)

Although option (d) above addresses possible east side CBD revenue service, a similar alignment (with almost exclusively surface construction) could also be utilized to provide a non-revenue, at-grade maintenance connection from the LA-Long Beach Line to the Pasadena LRT line should funding constraints prevent timely progress on a west side subway link.

FIGURE 10.1

POTENTIAL TRANSIT ROUTES FOLLOWING THE SOUTHERN PACIFIC SANTA MONICA BRANCH



10-3

If incorporated into the western extension of the Metro Rail project, only the section of Santa Monica Branch railroad R/W from Santa Monica to the 405 Freeway would be utilized. This Metro Rail route would presumably turn north along the freeway, pass through the Westwood area in tunnel, and run east to Century City and Beverly Hills, there to either continue northeast to Hollywood via Santa Monica Boulevard, or to go east generally paralleling the Wilshire corridor (route not yet determined).

Population. Beginning in Santa Monica, the 1984 population maps indicate that an Exposition Boulevard transit line following the Freeway/Olympic Blvd. and continuing east onto the Santa Monica Branch would be bordered on the south side by a large medium density area near the ocean, and, farther east, would be within walking distance of a second large medium density area. The remainder of the line in Santa Monica would pass through moderate density neighborhoods. Conditions in 2010 would be largely the same.

In West LA/Culver City, the 1984 maps indicate that the line would touch on a large medium density residential area; in Palms and Cheviot Hills, it would penetrate substantial medium and high density areas. The 2010 maps show both medium density areas increasing in extent. Farther east, the 1984 maps indicate the line entering a moderate density area, with a small medium density section on the north side and pockets of high density residential land adjoining the line in Baldwin Hills. The 2010 maps suggest that the medium density area to the north of the line will gain in size.

West of the USC campus, the 1984 maps show the line passing through a mix of moderate and medium density areas; by 2010, this area will be medium and high density. The 1984 maps indicate that a link from USC to the LA CBD via the Flower Street/Harbor Freeway alignment would pass a mixture of moderate, medium, and high density residential sections on the west side of the freeway; by 2010, infilling would have occurred and the mix would be medium, high, and very high density (with the area east of the freeway remaining low density).

Alternatively, 1984 maps indicate that a route extension following the Santa Monica Branch over to the east side of the LA CBD would pass through a mixture of low to high density residential areas, increasing to a mix of moderate to very high density by 2010.

Employment. 1984 employment maps indicate that the western end of an Exposition Boulevard line would serve a fairly large area of medium density employment, in Santa Monica's CBD. Farther east, a moderate density employment area parallels the line, with a medium density strip just to the north in eastern Santa Monica. In West LA, the line would pass through a large medium density employment area. 2010 maps show the Santa Monica CBD increasing to high density, and most of the remaining area of Santa Monica surrounding the line becoming medium density.

For the section from Venice Blvd. to La Brea, 1984 maps show the line to be surrounded by a linear strip of moderate density employment. By 2010, the section from Venice to La Cienega would become a large medium density employment zone.

At USC, the line would serve a large area of medium and very high density

employment (1984 and 2010). For the access route to the LA CBD via the Harbor Freeway, the 1984 maps indicate that a mixture of moderate, medium, high, and very high density areas would be served, with a great increase in the extent of very high employment density in the CBD by 2010. For the alternative routing east along the Santa Monica Branch, and accessing downtown LA from the east side, moderate density employment areas would be served to the south of the CBD.

Commercial Areas And Other Activity Centers. Beginning in downtown Santa Monica, an Exposition Boulevard transit line would serve the Santa Monica Place (a major shopping center), the Third Street pedestrian mall, and a number of stores, restaurants, and office buildings to the north of the line. It would also provide access to the Santa Monica Pier (which is to be refurbished and improved), Santa Monica State Beach, Palisades Park, and hotels and high rise apartments facing the Pacific Ocean; and to Santa Monica's Civic Center (including City Hall, the County Court Building, and the Civic Auditorium), Santa Monica High School, and the Lincoln Boulevard commercial strip to the south.

Farther east in Santa Monica, the line would provide easy access to Colorado Place, a major \$ 550 million, 28 acre development at Colorado and Cloverfield; Phase 1 of this project, which was completed in 1984, includes The Market (a 45,000 square foot indoor pavilion/restaurant center), while phases 2 and 3 will include a total of 1,541,000 square feet, including offices, a hotel, housing, retail space, a cinema, parks, and recreational facilities (1).

Another major development will be The Water Garden, a \$ 300 million, 1.26 million square foot development on a 17 acre site at Olympic and Cloverfield, right next to the proposed transit line. This will include four six-story office towers (including medical suites) in a heavily landscaped area along a two-acre pond, which is intended to serve as a community gathering place (2). The line could also provide access to existing industrial parks in this local, and to Santa Monica College, which is already served by a shuttle from line haul buses on the Olympic corridor.

In West Los Angeles, the Exposition line would serve existing commercial development and apartment buildings along Pico, Bundy, and Sawtelle west of the 405 Freeway (including office buildings on Olympic). However, the 10-block area along Olympic between Bundy and the freeway (just north of the rail line), currently the scene of substantial office building development, will be the focus of urban renewal. An international design competition, sponsored by LA City Councilman Marvin Braude and by developers, will seek to create a "Garden District" which will combine mid-rise commercial structures with an architectural master plan, parks and landscaping, and pedestrian amenities. Fish ponds, suspension bridges, arches, towers, and a "Gate of Angels" connected by cable cars with an Olympic arch are among the proposals made for this area; it is anticipated that there will be a series of interconnected courtyard spaces, forming linear parks behind commercial buildings (3-5).

The line would also serve a major commercial section of Pico and Westwood east of the 405 Freeway, including the Westside Pavilion, a major shopping mall at Overland. Although there is controversy over plans to expand the mall (6), even at the present level of development, the transit line could help to alleviate

the shortage of parking in this area.

Farther east, in the Palms section, the line would access an existing commercial section around National/Motor (with numerous apartment complexes here and on nearby Overland). At Venice/Robertson/Washington, it would serve Helms Bakeries, The Antique Guilds, other commercial development, and industrial parks; and feeder buses from a station located here could provide access to Metro Goldwyn Mayer Studios, the Brotman Medical Center, older high rise office buildings, and apartments in Culver City (the old Red Car station, a historic landmark, is also nearby). Further redevelopment can be expected in this area.

At La Cienega, the line would serve Fedco (a very heavily used membership store complex), as well as nearby industrial facilities. At La Brea, access would be provided to commercial establishments, the Care Unit Hospital of LA, Dorsey High School, and the Rancho Cienega Sports Center; and at Crenshaw and Western, the line would cut across additional commercial strips. Although there are at present fewer commercial trip generators along this eastern segment of the transit line, it should be noted that a higher percentage of transit-dependent people would be served than elsewhere; recycling of old warehouses and marginally-used light industrial land can be expected in this section.

At the eastern end of Exposition Boulevard, the line would serve a number of major trip generators: the University of Southern California, Los Angeles County Natural History Museum, Aerospace Museum, Museum of Science and Industry, Coliseum, and L.A. Memorial Sports Arena. It would also serve the University Village shopping center, Shrine Auditorium, and Department of Motor Vehicles.

At this point, the route north along Flower Street and the Harbor Freeway shows the most promise in terms of special trip generators. A stop near Adams would provide access to the Orthopedic Hospital, LA Trade Tech College, several Los Angeles County offices, Mount St. Mary's College, and the Automobile Club of Southern California.

It should be noted that the entire corridor along the proposed Flower Street transit route, between the Harbor Freeway and Broadway and extending from Martin Luther King Jr. Boulevard north to the CBD, is a policy growth area.

At Washington, under this routing option the Exposition line would join the Flower Street alignment now under development for the LA-Long Beach line. This would provide access to the California Medical Center and the Los Angeles Convention Center, north of the 10 Freeway.

There are already plans for a \$ 390 million expansion of the Convention Center on the 58 acre site: calling for a 350,000 square foot exhibition hall, twin, illuminated glass and steel pavilions which will serve as the lobby areas, forty new meeting rooms, a 240' bridge over Pico with a spectacular skylight, prisms and a light sculpture (also housing a restaurant and smaller halls), and a plaza with green space on Figueroa Street for outdoor exhibitions. The enlarged convention center is one of the largest public works projects ever undertaken in Los Angeles, and is expected to inject \$ 504 million into the local economy by 1994 (7-9).

Another major development which would be served by a Flower Street routing of the line is South Park, encompassing an area from Flower to Olive, and from Ninth to Eleventh Streets. This will include six square blocks of office and commercial space, apartments, a fashion institute, parks and plazas, and a public art program (10). Nearby, at 9th Street next to the Harbor Freeway, will be the City Centre Development, a \$ 500 million mixed-use project incorporating offices, cinemas, shops, restaurants, a hotel, condominiums, and apartments (11).

The section of the LA CBD which would initially be served by a 7th and Flower terminus is the focus of a major downtown office/commercial building boom at the present time (12). Additionally, CBD-area commercial and residential growth is spreading to the west side of the Harbor Freeway, reinforcing this pattern (13).

It is apparent that an Exposition Boulevard transit line linked to the west side of the CBD via Flower Street, would serve a large number of commercial, educational, recreational, institutional, and medical facilities. These activity centers would generate a high level of off-peak ridership, resulting in higher a farebox return and enhancing the viability of the line.

For options to route a Santa Monica Branch transit line to the east side of the LA CBD, such as the hybrid LA-Long Beach Line/Alameda Street/LA River route, the most important special trip generators would be the Vernon light industrial section and the Produce Market. There may be future development opportunities both along Alameda Street and using air rights over the railyards in the long term. The north end of the LA River alignment would come fairly close to Little Tokyo--a growing business, commercial, residential, and tourist section; and at there are major plans for redevelopment of LAUPT, the proposed northern end of this route (discussed in more detail in Chapter 13).

Finally, it should be noted that under the slow-growth initiative, Proposition U, which applies certain restrictions to commercial development over most of the City of Los Angeles, the LA CBD is by far the largest growth area in the city (14). Proposition U may have the effect of concentrating local development in the LA CBD, thus reinforcing the tendency for downtown LA to be a future transit hub, as compared to previous policies. From this viewpoint, an Exposition Boulevard/Santa Monica Branch transit line, and others passing through the downtown area, will have an excellent chance for growth of patronage.

Development Potential On Rail Yards Or Excess Right-Of-Way. For the currently preferred routing between the LA CBD and Santa Monica, there are few opportunities for joint venture projects using primarily railroad property. Most of the right-of-way is not over 100' wide, and much of it is only 30' or 60' wide. There are several short sections of 200' width at Motor (where the line passes under the 10 Freeway) and at Overland/Westwood which might have potential for station/park-and-ride development (in the latter location, there would undoubtedly be neighborhood opposition to any major development along the right-of-way).

In addition, assuming the transit line is routed down Olympic Blvd. in Santa Monica, the 100' right-of-way between Olympic and 17th could be used for a maintenance facility or for a short turn/peak hour park-and-ride station.

However, there may be many opportunities for air rights development in places where other nearby property will be undergoing growth. This would apply especially to the section just south of Olympic Boulevard and west to Bundy in West LA, and to the section at Olympic/Cloverfield in Santa Monica; it might also apply to other locations such as the La Cienega, La Brea, and Crenshaw highway crossings.

An alternative route following the Santa Monica Branch east of the Harbor Freeway would pass by J-Yard, an approximately 8-acre site at Santa Fe/Alameda; however, this will be on the future route used by container trains and other freight traffic from the ports to access the Union Pacific and Santa Fe main lines (with SP access to the UP trackage along the LA River). It is desirable to wait until preliminary engineering work on the Alameda Corridor has been firmed up before making any other plans for this property. (Air rights development over the Amtrak maintenance facility, an approximately 33 acre site, would be another possibility.)

The most promising idea for a transit route serving the east side of the LA CBD as noted above would be use of the hybrid LA-Long Beach line/SP spur/Alameda Street/LA River alignment, as this would tie in with the Metro Rail maintenance facility. The latter is currently under construction and extends from 4th to 1st Street along the LA River on former ATSF yard property (the ATSF still owns some land peripheral to the site). A joint venture may be possible here using air rights over the Metro Rail facility (40 acres) and involving the Santa Fe, which retains ownership of nearby property. This could include a Metro Rail transfer station, commercial development, and peripheral parking serving the downtown area.

The line would then continue on to serve LAUPT and perhaps connect with other developments on former railroad yards north of this point. There may in fact be as much as 60 acres of property between 7th and 1st Streets along the west bank of the LA river (including the Metro Rail yard) to which air rights development may be applicable.

Freeway Conditions. The basic route closely parallels the Santa Monica Freeway, which is very heavily used. Peak hour volumes on this freeway are 15-18,000 between the Harbor and San Diego Freeways, and 10,000 west of the San Diego Freeway. Caltrans has recently reported that the Santa Monica Freeway carried 315,000 vehicles per day in 1987, making it the busiest in Los Angeles, and one of the busiest highways in the world; with the section between Normandie and Vermont Avenue the most heavily traveled (15).

The Santa Monica Freeway, and the section of the Harbor Freeway which links the Santa Monica Freeway to the LA CBD, are subject to very heavy congestion during peak hours, with a volume/capacity ratio over 1.0 (Level of Service F) for more than two or three hours in an eastbound direction in the morning and in a westbound direction in the evening. (Congestion is also encountered in the reverse direction.)

These freeways are also subject to high accident rates, which further increase congestion. The accident rate increases from 32 per mile per year on the Santa Monica Freeway west of the San Diego Freeway to over 60 per mile per year on the

more heavily used section east to the Harbor Freeway; with a very high accident rate of 269 per mile per year on the Harbor Freeway in the CBD area.

The combination of high volumes of traffic, heavy recurrent congestion, and high accident rates suggest that there is excellent potential for diverting commuters who presently drive the Santa Monica Freeway, to patronize an Exposition transit line, using a combination of park-and-ride, local bus, and walk-on access to the line.

Transit Service. The areas bordering the Santa Monica Branch are served by about 10 express and limited-stop bus routes that provide transport to the LA CBD. These include the Santa Monica express line from that city's CBD area east to Centinela, RTD express routes serving Santa Monica, Pico/Overland, Venice and Culver Boulevards, Marina Del Rey, and La Cienega, and RTD limited stop buses from the Santa Monica CBD to San Vicente. The fact that considerable transit service can be supported under unfavorable traffic conditions provides additional evidence that an Exposition transit line would be viable.

Status. The Southern Pacific Transportation Co. plans to sell the Santa Monica Branch, and has already been granted permission to abandon the section west of Culver City. The City of Santa Monica is extremely interested in developing a light rail line on this corridor; and strong support for this line has been also been shown by Culver City and the City of Los Angeles Community Redevelopment Agency (CRA).

An early patronage analysis of an Exposition Boulevard LRT line conducted by SCAG for LACTC in 1983 suggested that 36,600 daily trips would be generated (16). However, a maximum speed of 38 MPH was assumed in this analysis. Modern LRVs have a much higher speed than this, with the top speed of at least 65 MPH (often governed down to 55). With higher performance equipment, it is likely that greater patronage could be generated. Nevertheless, this conservative estimate of patronage is higher than either the San Diego or the Portland light rail line--and both of these systems are considered to be successful.

The follow-up study by LACTC in 1984 suggested that the Exposition route could be constructed for \$ 263 million (1983 dollars); it was the lowest-cost alternative for service to the West Side, and the most cost-effective option evaluated at that time (17). A more recent study of light rail potential by consultants for Santa Monica has estimated that the line could cost up to \$ 300 million to build, and would carry about 50,000 riders per day (18).

The L.A. Rail 2000: A Blueprint For Action, a document recently prepared for Supervisor Schabarum (Chairman of the LACTC in 1988) has suggested construction of a 6.7 mile light rail starter line on this corridor from 7th and Flower to USC and out to La Brea Avenue, with the work commencing in 1995; and with the line eventually extending to downtown Santa Monica (19).

Other Possible Routing Combinations. There are several possible additional routing options using portions of the Exposition/Santa Monica Branch line, and serving other parts of the West Side of LA County.

One possibility might be a branch south along Crenshaw Boulevard, serving a

major commercial street and redevelopment area, and continuing down to Inglewood and thence to LAX via the ATSF Harbor Subdivision. This was of the alternatives investigated in SCAG's Airport Southwest Study. Crenshaw has some very wide sections which should permit surface operation; in other places aerial structure or tunnel might be required. A Crenshaw route would provide access to the recently renovated and expanded Baldwin Hills-Crenshaw Plaza, a major shopping mall (20). The section of the ATSF R/W used will certainly not become available for surface transit operation until after the Alameda Corridor is implemented. From the viewpoint of right-of-way preservation, such a route would thus be on a lower order of priority; however, as it would run through a transit-dependent area, high ridership can be expected.

Another option would relate to either a Pico Boulevard Metro Rail route to the West Side or a southerly extension of Metro Rail via the Crenshaw corridor, either of which would connect with the proposed Mid City Center at Pico/San Vicente/Venice, just east of La Brea. The latter would use the current 50 acre Mid-Towne Center site as the focus of new development with offices, commercial space, housing, hotels and entertainment facilities (21,22).

In this case, it would be possible to use the section of Venice Boulevard from Pico/San Vicente to Exposition Boulevard to provide a transit link to the Exposition-Santa Monica transit line. Ample right-of-way is available along this section of Venice Boulevard: a former interurban railway line in the median was converted to roadway, with the excess R/W taking the form of wide lawns and all building structures set back a considerable distance from the highway.

Yet another possibility would be to provide a branch from an Exposition Blvd. transit line west along Venice Boulevard to the Venice section of Los Angeles. This would provide better access to Culver City. Right-of-way conditions along this section of Venice Blvd. are largely the same as for the section farther east, except that in a few places buildings have been allowed to encroach on the margins of the right-of-way. Near Washington Boulevard, Venice Boulevard bifurcates leaving a broad median for several blocks.

Since all of this Venice Boulevard right-of-way is publicly-owned, preservation of R/W for future transit use may not be a major problem.

The possibility of routing a line from Exposition down to Marina del Rey via Culver Boulevard is occasionally cited; however, the right-of-way no longer exists through the Culver City CBD area. The segment of Culver Blvd. which has excess right-of-way begins nearer to the 405 Freeway. This is more likely to be used as part of a link from the Coastal Corridor to a north-south 405 Freeway route, than to be tied into an Exposition line.

However, the City of Santa Monica is interested in a southerly link to the Marina Del Rey/LAX area. This might be accomplished by extending the Exposition transit line south from the Santa Monica Civic Center (perhaps in tunnel?) to join the right-of-way of the abandoned SP Alla-Inglewood Branches. The latter run from a point near Venice Boulevard south into Marina Del Rey, the Hughes Airport/Playa del Rey redevelopment area, and the Fox Hills Mall. The link to LAX could be via the ATSF Harbor Subdivision. The Alla-Inglewood Branches are discussed in some detail in Appendix E.

Intercounty Connections. The Pacific Electric formerly provided through service from San Bernardino to Santa Monica, Redondo Beach, and Long Beach, via the LA CBD. A modern Los Angeles-San Bernardino electric interurban railway (as opposed to commuter rail) tying in with the Pasadena LRT line, and operated over the Santa Fe Second Subdivision (see Chapter 13 and Appendix J) might, after completion of the LRT tunnel along the west side of the CBD, make it possible to duplicate this feat: provision of some through service from San Bernardino County to Santa Monica, via an Exposition Boulevard line.

Additionally, the OCTC is planning to develop a transit facility on the SP West Santa Ana Branch, with the possibility of direct service to the LA CBD and to LAX. A related option therefore could be a connection from Orange County to Santa Monica via the LA-Long Beach line, the SP Santa Monica Branch west to the USC campus, and the proposed Exposition Boulevard transit line.

The West Side Corridor Issue. The question is often raised whether an Exposition transit facility will conflict with the desired extension of Metro Rail to the West Side. A Wilshire Boulevard subway serving Hancock Park, Beverly Hills, and Westwood was at one time the preferred option. However, the prohibition on using federal funds to tunnel through the oil- and methane-rich Park La Brea section (23), together with community opposition to an elevated railway over Wilshire Boulevard has caused other alternatives to be considered.

The present concept is either to bring the western extension of Metro Rail out of Hollywood, following Sunset Blvd. (probably via Sunset Strip) and Santa Monica Boulevard to Beverly Hills; or else to use a southerly alignment, either along Olympic to San Vicente and thence to Burton Way in Beverly Hills, or via Pico (by way of Mid-Towne Center) and Olympic to Century City and Westwood (24).

Maps of population and employment density very strongly suggest that the section of Los Angeles west of the CBD and east of Santa Monica will support more than one major transit facility. Although it is not in the purview of this study to recommend a western Metro Rail alignment, it should be noted that the northerly alignment alternative (Sunset/Santa Monica Boulevard) would very clearly serve a different area than an Exposition transit line. (However, many would argue that this is also true of the Olympic and Pico alignments.)

Early LACTC evaluation of the Exposition Boulevard corridor as compared with a Metro Rail extension to the west side, found that a transit line on the Santa Monica Branch would serve a completely different sub-corridor than the then-proposed Wilshire subway route (25). The document, L.A. Rail 2000: A Blueprint For Action also states that a western extension of Metro Rail does not duplicate the proposed Exposition Boulevard LRT project (26).

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11. SANTA FE HARBOR SUBDIVISION

Railroad Route. This branch line begins at Redondo Junction near Washington Boulevard and Santa Fe Avenue (Figure 11.1). It extends south through the City of Vernon to Slauson Avenue in Huntington Park, and curves west along Slauson, going through the Florence section of LA County and crossing south-central Los Angeles. At Western Avenue, the line turns southwest; at West Boulevard it enters the City of Inglewood, following Florence Avenue.

At Manchester Avenue, the line curves to the south, paralleling Aviation Boulevard in the Westchester section of Los Angeles, and passing near the Los Angeles International Airport. It continues south along Aviation to the City of El Segundo. After curving west to Douglas Street, it turns southeast, passing through Hawthorne and briefly paralleling the 405 Freeway in Redondo Beach. At Manhattan Beach Boulevard it turns south again, running through Lawndale; at 182nd Street it turns to the southeast, entering Torrance.

The Harbor Subdivision turns south again at Torrance Boulevard, and at Carson Street it again runs in a southeasterly course, going through Harbor City and the adjacent strip of County unincorporated area. Curving to the east at Normandie Avenue, it passes below the 110 Freeway to enter the City of Carson and then the Wilmington section of Los Angeles at Avalon Boulevard. After this it turns southeast to connect with the north end of Watson Yard, a major freight yard in the port area. Near Watson Yard, track connections are provided in an easterly direction to the SP Wilmington Branch at Alameda Street, and southeast (crossing Alameda Street) to link up with SP trackage serving the Port of Long Beach.

Possible Transit Uses. There are four possible ways to connect a Harbor Subdivision transit route with the LA CBD (Figure 11.1):

a). Access could be provided via the Harbor Freeway Transitway: if a busway, or guided busway, were operated over the northern segment of the Harbor Subdivision, it could tie in directly with the Transitway. However, it is possible that the Transitway will eventually be converted to rail, and in this case access might be gained to the west side of the CBD via the Flower Street subway.

b). A second alternative would be to follow the Harbor Subdivision east to the LA-Long Beach line, and gain access to the east side of the CBD via Alameda Street.

c). A third alternative would be to follow the Harbor Subdivision north to Vernon and gain access to the ATSF Third Subdivision R/W along the west bank of the LA River at Redondo Junction (south of the Amtrak roundhouse).

d). A fourth alternative would be to use a combination of the LA-Long Beach line, Alameda Street, and the 7th Street sidings to gain access to the Amtrak/ATSF/SCRTD yard areas and right-of-way on the west bank of the LA River. (This more complicated route is similar to the one described in the last chapter.)

Regardless of which of these CBD access alternatives were chosen, several

route structures would be possible for a transit facility developed on the Harbor Subdivision between the Harbor Freeway, LAX, and the Long Beach area:

i). One possibility is to construct one long curving route from the CBD south and west to LAX, and thence southeast and east to Long Beach.

ii). A second possibility is to break the service into two or three separate transit components. In a sense this has already been done, as the Proposition A Coastal Corridor is expected to be built along the mid-section of this railroad line, from Century to Aviation, and from about 135th Street to Hawthorne (with a gap south of LAX where the line will follow a parallel street). This service will be tied in with the development of the Century Freeway route.

The LAX area may form a logical break point, as several distinct travel markets would be served: commutation from South Bay to the LA CBD, from the central area to industries around LAX, and from the South Bay area to industries around LAX and to Long Beach; and transport of airport users from both the LA CBD and from South Bay/Long Beach to LAX.

Hence, it would be feasible to develop a separate line on the northern segment of the Harbor Subdivision, from the LA CBD south and west to LAX, and another line beginning near LAX and following the Coastal Corridor (or a transit alignment using the abandoned SP All-Ingleswood Branch R/W) from Marina Del Rey south to Hawthorne, and continuing south and east to Long Beach. However, to the extent that commuters would need to travel to areas both north and south of the airport from either direction, if the line were broken in this way, considerable overlap would have to be provided.

A transit route from the LA CBD to the airport area could operate south of the airport as well: for instance, such a route could be extended down along the Coastal Corridor Hawthorne Boulevard extension. Likewise, a Long Beach route would probably originate in Marina del Rey, following the northern section of the Coastal Corridor; if the latter is someday extended to Santa Monica as is desired by the City of Santa Monica, a Santa Monica-Long Beach route could even be provided.

Long Beach access from a transit line on the Harbor Subdivision would require an extension along other rail and highway corridors in the port area. The most probable route is as follows. South of Carson Boulevard, the line would run along the west side of Watson Yard (a major port-area rail yard used by the ATSF). This would put it in reach of residential sections of Wilmington. From this point eastward, it would follow the course of an abandoned PE right-of-way just south of I Street (north of Anaheim) between McFarland Avenue and Alameda Street.

At Alameda, it would fly over the highway and come out in an alignment on the south side of Anaheim Street (an area currently used to store imported cars). After crossing over the future Alameda Corridor rail line and Dominguez Channel, it would continue east along the north side of the Union Pacific yard, go under the Terminal Island Freeway off-ramp, and cut through some marginally-used industrial land (storage yards, etc.) to gain access to an SP spur track

(the former PE Long Beach-San Pedro line) along 12th Street, following this from Jackson Ave. over to the 710 Freeway.

[The suggestion has been made that potential flooding along the south side of Anaheim St. may favor an eastward continuation along the old east-west PE right-of-way north of Anaheim, instead (1).]

The line would then fly over the Long Beach Freeway and cross the Los Angeles River on a new bridge, coming out on an SP spur track on the east bank of the flood control channel. It would follow this spur under the 710 Freeway 7th Street off-ramp, and cross over to the median of the freeway, which is presently a wide grassy area. From here, several possible routes into the CBD may be possible (see below). The existing "horseshoe curve" wooden bridge west of 6th Street might be used to store equipment during off-peak hours.

Access into the Long Beach CBD itself may be difficult, as the preferred surface route along Ocean Avenue is congested and there is little room left between new buildings in this location and the edge of the street. A tunnel option is possible, as well as an alignment following the 710 Freeway extension/Shoreline Drive and Seaside Way in combination with parking lots, cleared areas, etc. (no mean engineering feat), possibly in combination with a short tunnel north to the present Transit Mall. Yet another option might be an extension east from the LA River along an east-west street, to the north of Ocean (perhaps in transit mall configuration, in conjunction with a redevelopment project), to connect with the LA-Long Beach line in the vicinity of the Long Beach Plaza.

However, possible access into downtown Long Beach would require further, detailed feasibility studies.

Population. As noted above, one option for gaining access to a transit line using the Harbor Subdivision would via be the Harbor Freeway Transitway. 1984 population maps show that the transitway segment south to Slauson (and the Harbor Subdivision) would pass by a mixture of moderate, medium, and high density residential areas on the west side of the freeway, and moderate density areas on the east side. 2010 maps indicate that this section will experience considerable infilling, with some additional areas of very high population density.

An alternative route following the Harbor Subdivision/Slauson from the east side of the LA CBD would border medium density neighborhoods on the south side, and moderate density areas north of the line, with generally the same pattern for 1984 and 2010.

West of the Harbor Freeway, in the Hyde Park section, the 1984 maps show the Harbor Subdivision passing through through two large medium density neighborhoods, and some moderate density areas; with the same pattern for 2010. In Inglewood, the 1984 maps show it penetrating a large medium density area; the 2010 maps indicate that this medium density area will expand, and that part of the area will become high density. In Westchester, moderate densities are shown for both 1984 and 2010. The section through LAX and south and east through El Segundo and Hawthorne is industrial in land use, with only sparse population.

Farther south in Lawndale, the 1984 maps indicate that the line would go through a large medium density area, and still farther down, in Redondo Beach, a moderate density section. By 2010, the medium density area is shown to have expanded considerably. For the remainder of the route following the Harbor Subdivision, conditions are indicated to be much the same for 1984 and 2010, as follows:

The segment in Torrance is for the most part industrial, but there are some neighborhoods of moderate density right along the line between Torrance Blvd. and Carson Street. The line would also penetrate additional moderate density residential areas farther south and east in Torrance, in Harbor City (with the contiguous county unincorporated area), and again in southern Carson/northern Wilmington. However the line would also pass through several industrial/vacant sections of Carson and Wilmington.

Finally, 1984 maps indicate downtown Long Beach to have a mixture of medium and high residential density; the 2010 maps project a large CBD area of very high residential density.

Employment. 1984 employment maps indicate that use of the Harbor Freeway to access the Harbor Subdivision would connect the latter not only with the large expanse of medium, high, and very high density employment in the LA CBD, but also with large medium and very high density employment areas around the USC campus. An alternative route via the east side of the CBD would serve mainly areas of moderate density employment, such as Vernon, south of downtown Los Angeles. The 2010 maps indicate an increase in the extent of very high density employment areas in the LA CBD.

West of the point where the rail line crosses under the Harbor Freeway, the 1984 maps show that a Harbor Subdivision transit line would access a moderate density employment area along Slauson; and quite large medium density areas in Inglewood, Westchester/Lax, and El Segundo. The 2010 maps indicate an additional high density area bordering the west side of the line in Westchester, with a large expanse of moderate density employment surrounding this.

Farther south, the 1984 maps show the line serving a large medium density employment area in northern Redondo Beach and Hawthorne; on the 2010 maps a large moderate density area appears in eastern Torrance (this development is already underway).

Finally, according to the 1984 maps, an extension to the southeast connecting the line with downtown Long Beach would serve a fairly large area of moderate, medium, and high density employment in that city's CBD; by 2010, this area would be largely high density in character.

Commercial Areas And Other Activity Centers. A transit route accessing the ATSF Harbor Subdivision from the LA CBD via the Harbor Freeway Transitway would serve the same trip generators on the west side of the CBD, and in the Convention Center and USC areas as would the Santa Monica Branch line discussed in Chapter 10. (There are few commercial trip generators of any note along the Harbor Freeway route between Martin Luther King and Slauson.)

For options using Alameda Street to reach the SP Wilmington Branch (and thence south via the LA-Long Beach line), or following the ATSF Third Subdivision down the LA River to Redondo Junction to access the Harbor Subdivision, no major commercial trip generators would be served after leaving LAUPT and Little Tokyo. The Alameda St. and hybrid routes would on the other hand serve the Produce Market, while the all-ATSF route would access the light industrial area in Vernon. For the most part, such routes would be intended to fuel completely new development, either along the Alameda Street on the east side of the CBD or using air rights over rail yards along the LA River. From this standpoint, they might provide opportunities for growth in the more distant future.

For all of these route variations entering the east side of the LA CBD, the same path would be followed along Slauson from Long Beach Avenue west. There is one major development planned for this general area: the new Main Post Office facility to be located at Gage and Central in the Goodyear Tire And Rubber Co. building, about half a mile to the south of the Harbor Subdivision (an area with rail freight service provided by spurs from both the Harbor Subdivision and the SP Wilmington Branch). The new \$ 152 million, 1.1 million square foot postal facility will occupy 74 acres of land, and have a work force of 5,500. It is expected to boost the local economy, encouraging the development of "satellite" businesses and increasing property values in the surrounding area (2,3).

The remainder of this discussion will deal with land use and commercial trip generators along a hypothetical transit line following the Harbor Subdivision, from the point where the present railroad line crosses the Harbor Freeway at Slauson down to LAX, and thence to Long Beach.

There are few special trip generators on the segment following Slauson west from the 110 Freeway. There are some small commercial areas along Slauson at Broadway and Figueroa (just east and west of the Harbor Freeway), at Vermont Avenue, and at Western; as well as at Crenshaw on the diagonal section of the line. In addition a policy growth area has been designated for the block east of Vermont Avenue, extending over to the South Hoover Hospital.

Other than the above, no special trip generators would be encountered until the line reached Inglewood. However, it should be noted that this segment would serve a higher percentage of transit-dependent people than would be the case farther south.

Just east of the Inglewood CBD area, the line would pass Centinela Park (a heavily used recreational area), the St. Mary's Academy, and the Daniel Freeman Memorial Hospital. The Inglewood CBD is centered at La Brea; here the line would serve City Hall, medical and bank buildings, the County Courthouse, and an open shopping mall area. Additionally, a bus shuttle or possibly a new spur track along Prairie (bordering the Inglewood Memorial Cemetery) could be used to provide access to The Forum and Hollywood Park (major recreational trip generators to the south of the line), and the Airport Park Hotel.

Returning to the Santa Fe right-of-way, the Harbor Subdivision transit line would provide access to a commercial section at Manchester, Northrup University at Arbor Vitae, and hotels, banks, office buildings, recreational facilities and the LAX cargo terminals along Century; as well as providing a link to the

passenger terminals themselves via a bus shuttle, people mover system, or direct airport transit loop. The section west of Aviation Boulevard (on the ATSF) and north of Century Boulevard is a policy growth center.

It is the possibility of a direct connection between the LA CBD and the Los Angeles International Airport that would be the strongest selling point for the use of this northern segment of the Harbor Subdivision.

From Century Boulevard south, the route would presumably coincide with the Coastal Corridor (currently under development), following an alignment to the west of Aviation Blvd. along Douglas. This would provide access to a number of banks and office buildings along Imperial, and aerospace industry manufacturing plants farther south. Along Aviation itself south of Imperial there is a small commercial strip, including motels, bars and restaurants; at El Segundo Blvd. to the south, there are additional aerospace office buildings and industrial parks.

At Rosecrans in Manhattan Beach, the line would access a number of office buildings and a large hotel to the west, and part of the huge TRW complex and the new Federal Building in Hawthorne. Just to the south at Compton Blvd. in northeastern Redondo Beach, service would be provided to a number of TRW office buildings and manufacturing plants, and to Castle Park (a small amusement park bordering the east side of the line). At Manhattan Beach Blvd., there would be access to a small commercial plaza and a light industrial area in Lawndale.

At Artesia Boulevard, the line crosses a commercial section in Lawndale/Redondo Beach; just north of Artesia (both along the ATSF and just to the west along Inglewood Ave.), there are major clusters of townhouses and apartment complexes. South of Artesia in Redondo Beach, to the east side of the rail line lies the Galleria at South Bay, a major shopping mall/shopping center complex along Hawthorne Blvd. The Galleria already has its own bus terminal and transfer facility.

Entering Torrance at 190th Street, access would be provided to the Hawthorne Blvd. commercial section to the north, to the Old Town Mall and a medical building to the south; and to Columbia Park, a heavily used recreational area to the northeast. This would be the junction with the Coastal Corridor line whose southern extension will follow the busy Hawthorne Blvd. commercial strip southward, past the major Del Amo Fashion Plaza.

Continuing to the southeast, the Torrance Business Park (a major development of office and light industrial parks), would be accessible to the Harbor Subdivision at Prairie Ave.; there are additional modern industrial parks farther southeast, along Alaska Avenue. There may be additional land here for new development in what is presently a lower-density industrial zone.

At Torrance Boulevard, the Harbor Subdivision crosses a mixed commercial/residential section; just to the south at Carson Street, service would be provided to new office and industrial parks, apartments, and townhouses west along Crenshaw and southeast along Plaza del Amo, and also to the big Torrance High School and the Charles H. Wilson Park recreation area.

Continuing south and east to the border between Torrance and Harbor Gateway,

access would be provided to a major commercial area including the Victory Center (a large new shopping plaza on Sepulveda near Western) and to major apartment complexes at Arlington; and at Western, to major apartment complexes on the north and a large section of densified semi-detached housing to the south of the line.

Through the remainder of Harbor Gateway, the adjacent county area, and western Carson, the line passes through additional residential areas and some vacant/underutilized industrial land; there may be additional room for development here. At Avalon Blvd., there are a number of new apartment complexes.

Assuming the Long Beach connection via other rights-of-way as described above, the transit line would provide peripheral access to major commercial sections at Avalon and PCH, and Avalon and Anaheim in Wilmington. Much of the land use along Anaheim Street from this point east to the LA River is industrial mixed with commercial. Bus shuttles could provide a link with the growing Port of Long Beach, the Long Beach Naval Shipyard, and the major Port of Los Angeles/Port of Long Beach development on the Terminal Island landfill area which has been proposed under the 2020 plan.

An extension to the Long Beach CBD area would serve the Long Beach Plaza shopping mall and the surrounding commercial area, City Hall, Library, County Building, Long Beach Convention and Entertainment Center, Terrace Theatre and Long Beach Arena. It would also access a number of CBD area hotels and new high-rise housing, and would tie in with the Long Beach Transit Mall. The latter would provide a connection with the St. Mary Medical Center, Long Beach Hospital, Pacific Hospital, and Long Beach Memorial Medical Center (via the LA-Long Beach LRT line), while transfer to local and shuttle buses would provide access to Shoreline Village, a major commercial and tourist area. A monorail has recently been proposed to link the LA-Long Beach line with the Queen Mary/Spruce Goose complex, another major tourist attraction, and would serve as a feeder/distributor for this east-west line as well.

Further, considerable new development is planned in the Long Beach CBD. This includes the Greater Los Angeles World Trade Center (which should open about the time this is published): a 2.2 million square foot, \$ 550 million facility including four office towers, a hotel, exhibit and commercial space, and entertainment/cultural facilities. Another example is a proposed 3 million square foot, \$ 1 billion development on the former Pike amusement park site, involving a master plan with 11 buildings on 13.8 acres of prime land south of Ocean Boulevard. This will include a 30-story office tower, five other office buildings, a 500 room hotel, 1000 apartment or condominium units, and attractive pedestrian promenades (4).

Finally, it should be noted that Long Beach is a major retirement area; the combination of a high growth rate with higher transit dependency (senior citizens) than elsewhere is a unique situation, and one which certainly justifies extension of high-quality transit service to this city.

It is apparent that with major trip generators such as downtown Inglewood, the LAX area, South Bay shopping centers, and the Long Beach CBD, a transit route or routes using the Harbor Subdivision would have considerable potential for

generating off-peak traffic, which would greatly improve the economic viability of the transit operation.

Development Potential On Rail Yards Or Excess Right-of-Way. Access to the LA CBD via the LA-Long Beach line north of Stauson would permit the same routing options, and joint venture opportunities, as were discussed in Chapter 10.

If a transit route were to follow the Harbor Division all the way north to the LA River via Redondo Junction, it would access only a single additional rail yard: Malabar Yard in Vernon. This is 130' wide, which might suggest potential for developing a transit station. However, it is probable that the ATSF will make heavy use of this facility in the future in conjunction with the Alameda Corridor development, as well as to facilitate local switching movements.

Otherwise, the right-of-way along the northern end of the ATSF Harbor Sub-division is generally quite narrow, only 30' wide from Vernon to Inglewood. Farther down, from Inglewood to Douglas in El Segundo, the R/W is 50-60' wide. There are several short segments 100' or 200' wide which might have station development potential; however, the one at Eucalyptus in Inglewood is probably too far west for a Civic Center station, and the one at El Segundo Ave. may be only marginally useful, because the Coastal Corridor line under development by the LACTC will run a little farther to the west, to better serve aerospace employers.

From El Segundo south and east to Wilmington, the right-of-way is typically 100' wide. This is not wide enough to permit much in the way of joint development on the R/W alone, but would be useful if incorporated into projects on adjacent land, perhaps using the air rights over the rail line.

In addition there are 170-250' wide sections in a few locations which might have some potential for station development. These include an area of about 16 acres at Inglewood Blvd. in Manhattan Beach, 5.5 acres at Artesia Blvd (just north of the Galleria), roughly 9 acres at 182nd (just south of the Galleria), a small section at 190th (near Old Town), about 4 acres at Carson St. and 7 acres at Vermont Avenue.

At the south end, ATSF's Watson Yard is roughly 44 acres in extent; however, it is actively used for railroad purposes, and at most only a narrow strip of R/W will likely be available to route a transit line down the west side of the yard to reach Anaheim Street.

Overall, then, there is relatively little excess railroad-owned property that would permit major public/private joint development projects solely on this right-of-way, south of the big rail yards along the LA River near downtown Los Angeles. There may however be numerous opportunities for new, large-scale developments on vacant or marginally-used industrial property bordering the railroad (evaluation of which is beyond the scope of the current project).

Freeway Conditions. A Harbor Subdivision transit line would parallel the Santa Monica and San Diego Freeways. Peak hour volumes on the section of the Santa Monica Freeway which most closely parallels the line (between the Harbor and the San Diego Freeways) range from 15,000 to 18,000. In addition, a high volume of

traffic from the LA CBD and the Wilshire District to LAX moves over surface arterials, including Crenshaw, La Brea, Venice, and La Cienega. Peak hour volumes for the parallel San Diego Freeway range from 17,000 to 18,000.

Congestion on the Santa Monica Freeway is severe (see the discussion in the preceding chapter on the Santa Monica Branch); the San Diego Freeway is also heavily congested, with a volume/capacity ratio over 1.0 (Level of Service F) for more than two hours in a northbound direction in the morning and in both directions in the evening.

Accident rates for the Santa Monica Freeway (and the section of the Harbor Freeway providing access to the LA CBD) are very high; while accident rates for the San Diego Freeway are also very high, ranging from 64 per mile per year between the Santa Monica Freeway and LAX to 34-44 per mile per year between LAX and Long Beach.

Considering the high volumes of traffic on parallel freeways and arterials, the heavy recurrent freeway congestion and high freeway accident rates, there should be excellent potential for diversion of freeway traffic to a Harbor Subdivision transit line, with park-and-ride as an important mode of access.

Transit Service. Current transit access to the area in the vicinity of this line includes Torrance Transit express bus routes serving Hawthorne/Anza and Torrance Boulevard; and also about half a dozen SCRTD routes serving Hermosa Beach, Hawthorne Boulevard, PCH, San Pedro/Avalon Boulevard, and Rolling Hills. In Long Beach, there is an excellent municipal bus system providing rather full coverage of the local area.

Status. Under the proposed merger of the Santa Fe and the Southern Pacific, a scheme was developed to allow abandonment of the northern end of the Harbor Subdivision, while retaining the southern segment to provide freight service out of Watson Yard--gaining access to Watson via the SP Wilmington and San Pedro Branches. (The latter provide a more direct route from downtown rail yards to the port area, which generates most of the traffic.)

Although the SFSP merger did not come to pass, the Alameda Corridor plan, which has been endorsed by SCAG's Executive Committee, the Cities of Los Angeles and Long Beach, and other corridor cities, could provide some of the same benefits from the viewpoint of track consolidation between the LA CBD and the San Pedro Bay ports. The Alameda Corridor would provide a first class, double track line with centralized traffic control, for use by all three railroads serving the port area.

The Ports of Los Angeles and Long Beach have recently taken the lead role in Alameda Corridor planning; and a Strategic Plan for Alameda Corridor implementation has already been developed by consultants to the Ports. This study suggests that critical path engineering and technical work on the Alameda Corridor will require a total of about 54 months, i.e. 1993 is the earliest date for placing the Alameda Corridor in operation (5). It is more likely that the start-up date would be around 1995.

The section of the ATSF Harbor Subdivision to be used by the LACTC in developing

its Coast Line is wide enough to permit construction of a transit line, while leaving room for the current freight operation. This is not true of the railroad line north of Inglewood where the right-of-way is narrower, unless an all-aerial transit line were constructed along this stretch. At present this is only route providing the ATSF with access to the ports.

However, after inauguration of the consolidated rail corridor, it is expected that most or all of the Santa Fe's through trains would travel to the ports over what is now the SP San Pedro Branch. An option for the railroad at that time might be to abandon the northern segment of the Harbor Subdivision, and retain only the sections south of LAX to provide service to industrial customers; under this scenario, local freights would gain access to this southern trackage from the Alameda Corridor via existing track connections along Alameda Street, near the border between Carson and Wilmington.

At that time, the ATSF Harbor Subdivision R/W north of LAX might become available for transit. If this northern segment were developed as a light rail or other rail transit line, there would remain the option of providing night freight service by a short line carrier to serve whatever customers (if any) might remain on this section. For the stretch south of LAX, the railroad would probably want to retain a single track under its own ownership, plus the necessary industrial spurs needed to access local freight customers between the port area and El Segundo. The remainder of the right-of-way here is wide enough to provide room for a double track surface/aerial transit line.

In the event the ATSF would feel it necessary to retain the single track line along the full length of the Harbor Subdivision as an auxiliary through route to the ports, this would of course mean that the northern segment between Vernon and Inglewood would not be available for surface transit operation. Under this scenario, an elevated line would be needed to develop transit on this portion of the R/W, with only the footings for the columns holding up the aerial structure being located on the right-of-way itself so as to not interfere with freight operations (except for such temporary "shoofly" track arrangements as would be needed to detour freight trains around construction areas).

There is less urgency to making a decision on the use of the Harbor Subdivision for public transportation than is the case with many other railroad rights-of-way in this area, since it will experience heavy freight use for long-haul commodity shipments to and from the ports until the Alameda Corridor becomes a reality. Even then, the ATSF will want to maintain local freight access on this right-of-way between El Segundo and Wilmington. From this standpoint, the Harbor Subdivision R/W is fairly well protected.

However, other crucial right-of-way links between LAX/South Bay and the City of Long Beach may be in much greater jeopardy. It is primarily from this viewpoint that there is some urgency in protecting for transit use the port area rights-of-way which could eventually be needed to connect the southern end of the the ATSF line to the Long Beach CBD.

Other Regional Connections. Viewed in a regional context, a transit corridor along the Harbor Subdivision and routed into the downtown Long Beach might eventually be extended into Orange County. There are several ways this might be

accomplished:

1) Combination with the SP Los Alamitos Branch (see Appendix C), linking the Long Beach CBD to the congested Belmont Shore, Naples, and Marina Pacifica Mall residential and commercial sections of Long Beach, and with the west end of the Los Alamitos Branch near Cerritos Ave. and Los Alamitos Blvd.

Surface right-of-way is scarce in the Long Beach CBD area; a possible eastern extension from the Convention Center area might utilize parts of Shoreline Drive or Seaside in combination with nearby parking areas and cleared land, while tunnel might be required farther east. A landscaped transit alignment above the foot of the upper beach is theoretically possible along the Bluff Park segment (leaving the park above and beach below intact for recreational use). However, no routing recommendations will be given here, as that would require further, detailed study.

Such an underground transit link would probably surface along Westminster near the Pacific Coast Highway and run north along the San Gabriel River, being routed over the R/W of a north-south rail spur that runs along the Long Beach/Seal Beach border (which could provide a link to Leisure World). The line would continue north across the 22 Freeway, and run along parkland/power line R/W up to the 405 Freeway. It would continue along the east side of the river and thence to Coyote Creek, where power line R/W and spreading ponds have left some room on the east bank (a transit structure on pylons might be needed over the ponds).

North of Willow Street, there is a very wide graded access way between the east side of the Coyote Creek (LA County channel) and the much smaller Orange County drainage ditch, which might be used for right-of-way; the link to the Los Alamitos Branch would probably require an aerial structure skirting a power substation at Los Alamitos/Spring, crossing Los Alamitos and taking some lower-cost industrial real estate to gain entry to the Los Alamitos Branch. This would allow the line to avoid cutting through nearby residential neighborhoods.

With a link to the Los Alamitos Branch, it would be possible to serve new office and industrial parks in Los Alamitos and Cypress, and the Los Alamitos Race Course. Continuing east, a connection could be made in Stanton with the West Santa Ana Branch, for linkage to the Santa Ana CBD. A connection could also be made with the Stanton Branch for service to Disneyland in Anaheim (see Appendix C).

(This route would be complementary to a second possible transit route originating on the LA-Long Beach line and running down the East Long Beach Branch/PE Newport line and east along 7th past the Veterans Administration Medical Center and the California State University at Long Beach; thence down the San Gabriel River to the U.S. Naval Railroad, east to Westminster, and south along the SP Stanton Branch to Huntington Beach. These rights-of-way are described in more detail in Appendix C.)

11) Another possibility would be extension of a Harbor Subdivision transit line east to Belmont Shore and northeast from this point to the VA Medical

Center and Cal State, and thence north along the San Gabriel River, to connect with the Los Alamitos Branch as before. This might involve more expensive construction than but would serve more trip generators.

(This latter alternative would be complementary to one extending from the LA-Long Beach line southeast via the East Long Beach Branch/PE Newport Beach line and a tunnel segment to Belmont Shore, and thence east along Westminster and the US Naval Railroad. Such a route combination would have an interchange station between the two lines underground, in the Belmont Shore area. See Appendix E for a discussion of the East Long Beach Branch/PE Newport Beach R/W.)

iii) Yet another possibility would continue a line east from Belmont Shore to Westminster Avenue and follow the highway and parts of the U.S. Navy Railroad eastward to the SP right-of-way in Westminster, connecting with the McDonnell Douglas plant and Westminster Mall; and following the Stanton Branch north and then east to Anaheim. This route would be a little more circuitous than the Los Alamitos Branch option.

While the eventual link from Orange County to Long Beach via one or the other of these routes could entail some costly tunneling, considering the projected growth in the City of Long Beach, and steadily worsening traffic conditions along the 405 Freeway and in the southeastern corner of Long Beach, a transit connection of this kind may eventually be necessary for to maintain mobility in this part of the region.

iv) Other regional connections involving a Harbor Subdivision transit line might be provided farther north. At one time, Red Cars provided service from San Bernardino to Redondo Beach. It may be possible to again provide such service, based on the following considerations. In the event that a transit operation were some day provided on the abandoned ATSF Redondo District line (whose right-of-way has effectively been preserved), access to the LA CBD could be provided most directly via the northern part of the Harbor Subdivision. In the LA CBD, a connection could be made to a Pasadena light rail line/Second Subdivision interurban line, to permit trains to run all the way to San Bernardino.

v) Finally, consideration should be given to the use of the SP All-Ingleswood Branches (see Appendix E) to provide a connection in a northerly direction to the Fox Hills Mall area, the Hughes Airport/Playa Del Rey development area, Marina Del Rey, Venice, and probably (via underdetermined route, possibly tunnel), Santa Monica.

Other Routing Issues. One more routing issue should be noted. The preceding discussion assumes that the ATSF Harbor Subdivision could provide the east-west Proposition A link from the South Bay area to Long Beach. There are other candidate corridors for this Proposition A line, including the Pacific Coast Highway and the 405 Freeway. Owing to the scarcity of available right-of-way along PCH, the 405 route would appear to be more likely than the other alternative.

The use of the 405 Freeway route would access growing employment areas such as Harbor City, the Carson Mall, and some residential areas in North Torrance,

Carson, and Long Beach. In terms of a regional connection, it would provide a link to a major employment area around the Long Beach Municipal Airport--and a surface link between LAX and the Long Beach Airport. (Such a line might be continued east along Willow Street/the Coyote Creek to the SP Los Alamitos Branch, permitting much the same connections in Orange County as were described above).

It may theoretically be possible to develop fixed guideway transit routes along both the railroad and the freeway sub-corridors. However, this would be a very long term eventuality, as present funding constraints may make it difficult to construct even the single east-west Proposition A corridor this area. Nor have patronage forecasts been performed which would indicate whether there would be enough demand for both routes.

However, there may be a way to provide fairly rapid public transport service on both sub-corridors, as follows. There are plans to construct HOV lanes on the 405 Freeway from South Bay to Long Beach (the segment in western Orange County, just east of Long Beach is already under construction). An option would be to utilize the 405 HOV lanes for freeway bus service, with the provision of on-line bus rapid transit stations at major development points (or even ramps to carry the buses into centers too distant for pedestrian to access).

Under this scenario, the only additional capital costs on the 405 sub-corridor would be the bus stations, which would function in the same way as the Cal State and USC Medical Center stops on the El Monte Busway. A fairly high quality transit service could then be provided, without preempting major funding needed to implement a fixed guideway transit line farther south along the Harbor Subdivision. The basic concept would be very much like an earlier Orange County proposal for installation of an HOV lane/transitway combination on the 5 Freeway corridor as well as a rail transit line on the parallel West Santa Ana Branch right-of-way (see Chapter 12).

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12. SOUTHERN PACIFIC WEST SANTA ANA BRANCH

Railroad Route. The West Santa Ana Branch is the former Pacific Electric (Red Car) Santa Ana Line, and is popularly called the PE right-of-way in Orange County (Figure 12.1). This branch line, only part of which is still in use, extends from Watts southeast to the City of Santa Ana. The western end of the right-of-way begins in Watts at Willowbrook Avenue and 105th Street, and runs parallel to Fernwood Avenue in Lynwood. This section has been abandoned for many years.

East of Lynwood, the segment in active freight service begins in Paramount, and extends south and east through Bellflower to Cerritos, where it passes under the 605 Freeway. It continues through Artesia, La Palma, Cypress, and Anaheim to Stanton, where there is a junction with the SP Stanton Branch.

South and east of Stanton, the line has been abandoned, but the right-of-way is still more or less intact. It continues through Garden Grove to Santa Ana, crosses the Santa Ana River and turns east just below 5th Street. The R/W ends at Townsend Street, about a mile west of the Santa Ana Civic Center.

Possible Transit Uses. There are at least three ways in which a West Santa Ana Branch/PE right-of-way transit line could be tied in with the Los Angeles County transit system (Figure 12.1): (a) via the LA-Long Beach line to the LA CBD; (b) via the Century Freeway line for a connection with LAX; and (c) by means of a transfer to the southeastern extension of Metro Rail to East LA and the LA CBD. These routing options were discussed in a 1985 document by the OCTD (1).

The right-of-way begins at Watts Junction, just south of the future 103rd Street stop on the LA-Long Beach LRT line. As the PE right-of-way provides a long, straight route between Los Angeles and Orange Counties, one proposal has been to operate a through service from the Santa Ana Civic Center area to the LA CBD, using the LA-Long Beach line for the segment from downtown Los Angeles to Watts.

Now, the Century Freeway will extend in an east-west direction from Norwalk to the vicinity of LAX, using the section of abandoned PE right-of-way from the Imperial Highway (in Watts) to the Long Beach Freeway. This suggests a second route from Santa Ana to LAX via the West Santa Ana Branch/PE R/W and the I-105 rail transit line.

The Century Freeway line will have its eastern terminus at the 605 Freeway in Norwalk. For this reason it been proposed that the eastern extension of Metro Rail, which will run down the Santa Ana Freeway, turn south along the 605 Freeway, and share a common terminus with the Century line. Under this scenario, a West Santa Ana Branch transit line might extend northwest from Santa Ana to Cerritos, and turn north along the 605 Freeway to join the Century line in Norwalk. This would provide a ready connection with the Metro Rail service.

Another routing option for a West Santa Ana Branch transit line would be to follow a more direct route from Cerritos to Paramount, continuing northwest

along the old PE R/W to make its connection with the Century line. Both routes might eventually be needed in the more distant future.

Recent documents developed for the OCTC, however, leave some uncertainty whether the West Santa Ana Branch route would be operated as a medium-capacity rapid transit line connecting with the Century Freeway service, or as an electrified commuter rail line continuing east from the Santa Ana CBD and routed over the Santa Fe Fourth Subdivision into southern Orange County. The latter option would require equipment meeting FRA requirements for operation in mixed traffic with freight and intercity passenger trains; such cars would be unable to operate over the LA County light rail/rapid transit network. Under a commuter rail scenario for the West Santa Ana Branch, a transfer would be required at Cerritos, Norwalk, or Lynwood depending upon where the link would be made with the Los Angeles County lines.

Conversely, options which are compatible with the LA County system would require a transfer to LOSSAN corridor San Diegan and commuter trains at the Santa Ana Regional Transportation Center, east of the Santa Ana CBD.

The discussion below will consider factors indicating potential demand for a West Santa Ana Branch/PE right-of-way transit service and will cover the section on the West Santa Ana corridor itself (between Watts and Santa Ana) in the greatest detail. However, mention will also be made of major trip generators which would be accessible via transit links to the LA CBD and the LAX area. Finally, comments on parallel transit service will focus on the inadequacy of present service between Los Angeles and Orange Counties.

Population. 1984 population maps indicate that most of the West Santa Ana Branch/PE R/W is surrounded by moderate density residential areas, with a more continuous residential exposure than either the 5 Freeway/SP Santa Ana Branch corridor paralleling the line to the north or the 405 Freeway corridor to the south. In addition, the right-of-way borders large medium density sections of Lynwood and Bellflower. Where the transit line enters the Santa Ana CBD there is another medium density residential area, lying just to the north of a high density strip.

The 2010 maps display the same general pattern, but with the addition of a large medium density section in western Anaheim/Stanton to the north of the line, and in Garden Grove on the south side of the R/W. In Santa Ana, the medium density residential area is shown to have grown considerably, and the high density strip to the south of the line will attain a very high residential density.

Employment. The 1984 employment maps indicate that the West Santa Ana Branch/PE R/W borders a large moderate density employment area in Lynwood, another large moderate density area to the south of the line in Stanton/Garden Grove, and a further moderate density employment center farther to the southeast in Garden Grove. The 2010 maps suggest a considerable expansion in the latter.

At the southern/eastern end of the line in Santa Ana, the 1984 maps indicate a large medium density employment center in the CBD area. The 2010 maps show employment increasing here to very high density, with considerable expansion of

moderate density employment areas nearby.

However, an extension of the line to the southeast via other rights-of-way, or transfer to other transit services, would provide access to what are presently very large moderate density employment areas in Tustin and Irvine. The 2010 maps indicate these areas increasing to medium density employment.

Further, a connection to the Century Freeway line would provide access to a large medium density area in Hawthorne (Northrop), as well as very large medium density employment areas around LAX, including Westchester, Inglewood, El Segundo, and Hawthorne. Additionally, a connection with the LA-Long Beach line would provide access to a large employment area of medium, high, and very high density in the LA CBD. The 2010 maps project a considerable increase in employment in both the LAX and LA CBD areas.

Hence, a West Santa Ana Branch/PE R/W transit line would provide Orange County and Eastern Los Angeles County residents who have walk-on, bus, or park-and-ride access to the line, expanded opportunities to reach major employment centers both to the southeast, in Orange County, and to the west and northwest in LA County. As many people currently make work trips by auto to downtown Los Angeles over the crowded Santa Ana freeway (as well as to other areas of LA County via other, increasingly congested highway routes), there would seem to be great potential to use this corridor for intercounty commute trips.

Commercial Areas And Other Activity Centers. A direct route to Orange County beginning in the LA CBD and using the LA-Long Beach line would follow Flower Street south of the downtown area, and would therefore access the LA Convention Center. If the route followed at Watts Junction were the abandoned Santa Ana Blvd. interurban right-of-way, the West Santa Ana Branch trains would pass within viewing distance of Watts Towers. South and east of Watts the route would follow Century line.

East of Lynwood (assuming the direct, diagonal route), it would continue down the old Red Car line southeast through Paramount and Bellflower. Paramount Blvd. is a major commercial street, and a Paramount Blvd./Rosecrans Avenue station would serve a big commercial center planned at this intersection as well as a commercial plaza under construction at Garfield and Rosecrans. A Lakewood Boulevard stop would connect with this important arterial/low density commercial strip, and also with some big, new apartment complexes just south of the line along Downey Ave. (via Compton Ave.).

A stop at Bellflower Boulevard would provide access to a major commercial area with a mall-like atmosphere in downtown Bellflower; it would also serve major apartment complexes, the Bellflower City Hall, Library, and Court House to the east, and another commercial section to the north at Bellflower/Alondra (including the Round Table Plaza). Also, via Pacific Avenue (a diagonal road paralleling the line), pedestrian access would be provided to apartments at Alondra/Clark Ave. to the northwest. There is a fair amount of space here for park-and-ride lot development next to the rail line. Both the former passenger station and an old freight depot still exist here; the former could be re-opened for transit purposes and the latter used as the nucleus of a small joint development project on the station site.

The alternative route south from the Century line/Metro Rail terminus along the 605 Freeway would provide access to the Cerritos College and to an additional commercial area at Alondra Boulevard.

East of the 605 Freeway, a West Santa Ana Branch/PE R/W transit line would serve Los Cerritos Center, a huge shopping mall at 183rd and Gridley (it could also provide access via bus link to the Artesia Community Hospital and Pioneer Hospital). At Pioneer/South, the line would pass close to the Artesia City Hall, and a small commercial center. Continuing to the southeast, it would also access the Cerritos Regional Park, a major recreational area.

East of the LA/Orange County Line, the next major point served would be the Cypress College campus at Valley View; just to the north of this along Lincoln in Buena Park there are several huge commercial shopping plazas. The line would intersect Ball Road and Knott Street, accessing at least four large apartment complexes, the Anaheim Medical Center (and several smaller medical centers), a retirement home, some small commercial shopping plazas, and recreational facilities.

In Stanton, it would cross Beach Boulevard, a major commercial street; nearby there are a number of apartment complexes. This is the beginning of the section of the West Santa Ana Branch which has been abandoned. After entering Garden Grove, the PE R/W transit line would serve a huge commercial area at Brookhurst and Chapman. There are large apartment complexes and some offices just to the south on Brookhurst.

Additionally, the Brookhurst/Chapman Specific Plan calls for major redevelopment of the section just to the northeast of the right-of-way. This is to include retail centers, office buildings, and a theatre/restaurant area (2).

After this, the line would cross Garden Grove Boulevard and Euclid Street, accessing the Garden Grove City Hall and Library, some office buildings, commercial plazas, a very large complex of apartment buildings, and the Main Street Mall (a quaint one-block section lined with shops). The Garden Grove Community Center is well landscaped, and one of the more scenic points along the right-of-way. Further, the City of Garden Grove has a plan for major shopping center expansion in the Community Center area, with an industrial park just to the west at Nelson.

South of the 22 Freeway, the line would pass close to the intersection of Harbor (a major commercial street), and Westminster, which has office parks and light industry; a major apartment complex is located just to the southwest.

Significantly, a 1980 study of land use along the PE right-of-way in the City of Garden Grove determined that implementation of a transit line would have major, positive economic impacts for the city. Specifically, it was found that a rail transit line would permit 1.3 million square feet of mid- to high-rise office space at Brookhurst/Chapman and at the Community Center (as compared with 670,000 without transit) and 500,000 square feet of future industrial space at Harbor/Westminster (compared to 350,000 without transit).

The same study found that considering all station areas together, one million square feet of retail space and 5900 new dwelling units could be supported with the transit line (compared to 515,000 retail square feet and 3600 units without transit). Parking requirements would also be reduced, while high visibility from the freeway of office buildings which would be supportable under the transit scenario would be essential in capturing a region-wide share of future office space growth (3).

Crossing the Santa Ana River, access would be provided to important outdoor recreational areas. An extension to the east along Santa Ana Boulevard would serve the Santa Ana Civic Center, including City Hall, the Library, County buildings such as the County Courthouse, the Santa Ana Transit Terminal, and office buildings and commercial development along Main Street. Bus transfers would also provide linkage to the Doctors Hospital of Santa Ana, Rancho Santiago College, and Charles W. Bowers Memorial Museum. Finally, a connection could be made with the Santa Ana Regional Transportation Center, a major new intermodal facility located at the Santa Ana Amtrak station, just to the east of the CBD.

It is evident that a West Santa Ana Branch/PE right-of-way transit line would serve a number of commercial, educational, institutional, and recreational trip generators in eastern Los Angeles County and in western and central Orange County with connections to numerous activity centers along the route. Considerable off-peak ridership would be generated, greatly enhancing the viability of the line.

Additionally, with a link to the LA CBD via the LA-Long Beach Line, commuters would gain access to an additional large commercial area in downtown Los Angeles which would provide noon-time shopping for office workers; and with a direct rapid transit connection to LAX, orange county residents would have greatly improved access to the busiest air travel gateway in southern California.

Development Potential On Rail Yards Or Excess Right-of-Way. Most of this right-of-way is 100' wide. There are no yards or excessively-wide sections on the segment currently owned by the railroad. However, there is a section from Nelson to Garden Grove Blvd. in downtown Garden Grove which ranges from 140' to 293' wide for a distance of 1250'. This may amount to as much as 6 acres (including the land needed to provide future the transit R/W itself). This area is already in public hands, as it is part of the segment purchased some years ago by the OCTD; it is of special interest because of current development plans in the City of Garden Grove.

It will be noted that the Garden Grove development potential cited in the preceding section would involve primarily non-railroad owned property.

Other than this, the line crosses a number of commercial sections where air rights development over the 100' right-of-way might be a possibility at presumed future transit stations. These locations would include Los Cerritos Center, Lincoln/Cypress College, Ball/Knott, Beach Blvd. in Stanton, and Brookhurst/Chapman.

Freeway Conditions. Very heavy volumes of freeway traffic are encountered on routes parallel to the West Santa Ana Branch. Peak hour volumes are on the

order of 16,000 to 19,000 near the LA county line for the 5 Freeway, which lies to the north, and the 405 Freeway, which lies to the south of the West Santa Ana corridor; and 10,000 to 18,000 for the 91 Freeway, which crosses the West Santa Ana Branch in an east-west direction in Cerritos (in LA County).

Very heavy congestion is encountered during rush hour on these freeways, with a volume/capacity ratio over 1.0 (level of service F) on parallel sections of the 5, 405, and 91 Freeways--for over two hours on portions of the 5 Freeway, and over one hour for the 405 and 91 Freeways in a westbound direction during the AM peak.

These freeways also experience high accident rates, which further compound the congestion problem. Accident rates are particularly high on the 5 Freeway (from about 50 to over 70 accidents per mile per year), but they are also high on the 405 and 91 Freeways (over 50 accidents per mile per year in places).

The combination of high traffic volumes, heavy recurrent congestion, and high accident rates on parallel freeways would suggest that there may be excellent potential to divert commuters and other drivers traveling in both directions, to a transit line operating on the West Santa Ana Branch.

Transit Service. At present, there is OCTD express commuter bus service from parts of western Orange County to the LA CBD, on the parallel I-5 corridor. No bus or HOV lanes are yet available, so intercounty buses on this route must operate in mixed traffic, subject to heavy congestion. There is also an SCRTD express bus route on the I-5 corridor, connecting at Disneyland with an OCTD local bus line to Santa Ana. However, the RTD route is very circuitous, going on and off the freeway at a number of points, and the trip is very time-consuming.

Additionally, San Diegan Amtrak intercity trains link Santa Ana with the LA CBD, but this service is not particularly oriented to peak hours, and fares are higher than those normally charged for commuter transit. There is also intercity bus service between Santa Ana and Los Angeles.

Transit connections between Orange County and points on the west side of Los Angeles County (such as LAX) are poor, involving a long ride on local buses with several transfers.

Need For Additional Diagonal Travel Corridors. Orange County is well-supplied with arterial highways, but these are nearly all arranged in a north-south/east-west grid. There are very strong northwest-southeast travel desire lines, but only the 5 and 405 Freeways have this primary orientation. These diagonal freeways may remain heavily congested with traffic long after the morning rush hour has ended (when the arterial network has become relatively free of vehicles).

The West Santa Ana Branch/PE R/W would provide an additional, badly-needed diagonal travel corridor across Orange County. Between Norwalk and Anaheim, the 5 Freeway is fully three miles to the northeast of the West Santa Ana Branch (2.5 miles in western Santa Ana); at Cerritos and at western Santa Ana, the 405 Freeway is four miles to the southwest (3.5 miles at Stanton).

Local Orange County transit trips in the vicinity of the West Santa Ana Branch rail line require the use of routes following the grid of north-south/east-west streets. This will mean at least one transfer, so that bus trips parallel to the former Red Car line are at present time-consuming and inconvenient.

Whereas HOV lanes are planned for the 5 and 405 Freeways, these will (initially, at least) provide no on-line stations for transit buses. A transit facility on the West Santa Ana Branch would complement these important highway facilities, and greatly enhance mobility in this part of the region.

Status. The segment west of the LA River has been abandoned for some years. The R/W in Watts and Lynwood west of Imperial Highway is intact and is bordered by Santa Ana Blvd./Fernwood Ave. The R/W east of Imperial Highway in Lynwood will be used by the Century Freeway (which will incorporate the Century transit line).

The section east of the LA River in Paramount, passing through Cerritos and extending to Beach Blvd. in Stanton is still in use by rail freight, with several trains per week; but it is believed that the railroad is seeking other locations for the few remaining customers along this segment, in preparation for termination of local freight service.

In anticipation of rail transit development, the segment east of Beach Blvd. in Stanton, and extending through Garden Grove to Santa Ana, was purchased by the OCTD in 1983 with state Article 19 funding, when the railroad abandoned that piece of right-of-way.

A 1981 analysis of patronage for a West Santa Ana Branch rail transit line extending from Los Cerritos Center southeast to Santa Ana, and continuing southeast to Mission Viejo (this latter part along the I-5 corridor), projected a total of 59,800 daily riders on the rail line, mainly on the PE right-of-way segment. This figure applies to study Alternative 18, which also included parallel transitway bus service on the 5 Freeway west of Santa Ana (plus freeway bus service north on the 57 Freeway, west on the 22 Freeway, and south and west on the 55/405 Freeway combination).

Express bus ridership was 29,700, and in addition some 26,200 carpool users would be generated under this alternative. With a total of 115,700 daily riders, a strong case was made for developing both the I-5 corridor HOV lane/transitway combination, and the rail line on the PE right-of-way (4).

With the defeat of the 1984 sales tax (which would have provided transportation funding), prospects for construction of a rail line on the West Santa Ana Branch corridor appeared dim. A requirement for the use of state funds in purchasing the PE right-of-way was that something must be built on it within five years, or the money must be given back to the state. In April, 1988, the OCTD had decided to sell off the portion from Stanton to Garden Grove to the City of Garden Grove (presumably also to the City of Stanton) for commercial/industrial/residential development.

At that time the plan was to develop a transitway/arterial street combination on the remaining section of PE R/W from Garden Grove to Santa Ana, which would

provide a bus link from the 22 Freeway to the Santa Ana Civic Center. The Orange County Transportation Commission supported the OCTD in its plan to sell off this R/W, despite opposition from the OCTC Citizens' Advisory Committee.

However, it was recently announced by the Orange County Transportation Commission that the county not only intends to retain ownership of the four-mile section of former Pacific Electric right-of-way between Garden Grove and Stanton, but is also interested in purchasing of the remainder of the West Santa Ana Branch between Stanton and Lynwood (5,6). A Santa Ana to Los Angeles County transit line will therefore be included in a new Orange County rail study (see Chapter 8).

The decision to reconsider the disposal of the former Red Car right-of-way was prompted by two events. First, a public opinion survey released by the OCTC in the fall of 1988 revealed that a majority of residents would now be willing to support a half-cent increase in local sales taxes if it was certain that part of the money raised would be used to finance a new rail transit system. Second, the Southern Pacific Transportation Company has indicated that it is interested in selling off the remaining right-of-way from Stanton into Los Angeles County.

Orange County transportation planners see potential for connecting the line with two Los Angeles County routes in the relatively near term. Airport capacity constraints make a connection to LAX via the Century Freeway line particularly attractive. There is also considerable interest in tying into the LA-Long Beach line at Watts, to provide a commuter connection to the LA CBD. At least one additional Los Angeles County rail connection is contemplated.

Through-routing over the LA County Long Beach and Century lines would suggest that Orange County investigate a "universal vehicle" concept, with the transit cars having the same floor height and width dimensions as the Long Beach and Century cars, and equipped with both pantographs and third rail shoes to operate over both LA County lines (see also Chapter 8). Provision of pantographs for overhead power pickup would also provide much more flexibility in routing such vehicles over possible future branch lines within Orange County. However, it is expected that the West Santa Ana transit line itself would be largely if not fully grade separated, owing to the large number of grade crossings near or even coincident with the intersections of major north-south and east-west arterial highways.

The airport link between Los Angeles and Orange Counties is of particular interest, as the City of Los Angeles Department of Airports has recently studied ground access to LAX. With passenger traffic levels forecast at up to 65 million passengers in the year 2000, it is believed that the ground transport system will be unable to handle the volumes of traffic developed; therefore it is desired to provide a rail transit system with stations at each air terminal within the Central Terminal Area, linkage to present and future remote parking lots, and a direct connection with the regional transit system (7).

This would include consideration of special airport-bound rail cars from various areas within the region. A technology compatible with the LACTC Century Freeway and Coastal Corridor rail transit projects is considered preferable.

It should be noted that several decades ago the Cleveland Transit System extended its rapid transit system to the Hopkins Airport, and purchased a series of modern rapid transit cars called the "Airporters," furnished with comfortable seats as well as luggage racks for the convenience of air travelers. Transit vehicles thus-equipped would fit in very well with the concept being developed by the Airport Department, and by the OCTC.

Possible Connections Within Orange County. If the SP Los Alamitos and Stanton Branches were also acquired for transit purposes, it would be possible to have a major transit hub in Stanton near Beach Boulevard, allowing rush hour through-routing of trains and a number of transfer opportunities during peak as well as off-peak periods. The Los Alamitos and Stanton Branches are discussed in more detail in Appendix C.

Through-routing of trains in the direction of Los Angeles County could include the following routes:

- a) Service from Huntington Beach north along the Stanton Branch to the junction with the West Santa Ana Branch, and thence northwest and north to the Los Angeles CBD.
- b) Service from Anaheim Stadium/Disneyland west along the Stanton Branch (combined with a power line R/W) to the West Santa Ana Branch, and northwest and west to LAX.

This might be operated in conjunction with (c) a through service from the Anaheim CBD west to Stanton on the Stanton Branch, and then south to Huntington Beach. (Service could also be extended north from Anaheim to Fullerton, La Habra, and Brea via parts of the UP Anaheim Branch--see Appendix C.)

Through-routing of trains in the direction of Santa Ana could include the following:

- d) Trains routed from the Los Alamitos Branch east to the junction with the West Santa Ana Branch, and thence southeast to Santa Ana.
- e) The original OCTD concept was to develop a rail transit line combining the use of the West Ana Branch from the Santa Ana CBD to Beach Boulevard, with a northerly extension along Beach to the 5 Freeway (by way of Knotts Berry Farm), and a southeastern extension to Irvine down the 5 Freeway (8).

It is easy to see why there was interest in the extension north along Beach Boulevard. This would provide service to a number of motels north of Ball, the West Anaheim Community Hospital at Orange and new high-density retirement apartments nearby; and big commercial plazas including the Giant store at Lincoln. Farther north near La Palma, it would access the Knott's Berry Farm amusement park and Marketplace, Buena Park Mall, Movieland Wax Museum, Medieval Times, and motels near La Palma; and the Buena Park Civic Center and the big Buena Park Commerce Plaza (major office buildings) near the 5 Freeway.

A station here could also connect with freeway bus services using the I-5 HOV lanes. An extension north to the ATSF Third Subdivision (in La Mirada) would

access the Buena Park Doctor's Hospital, several huge commercial plazas (McComber's Center and Builder's Square), and a number of nearby apartment complexes. It could also provide an intercept point on the Amtrak line from Los Angeles to San Diego.

It may be assumed that aerial/subway construction would be provided on this leg; or perhaps even a monorail with a smaller-diameter aerial guideway. However, initially a Beach Boulevard connecting service might be provided by limited stop articulated buses with signal preemption and other means of speeding up mixed-flow transit bus service, with a transfer to the West Santa Ana Branch service at Stanton. (A rail line or other fixed guideway transit link could be constructed later, as allowed by funding.)

f). Other connections may be feasible in Santa Ana. One option would be a southeastern extension to Irvine following the 5 Freeway (as in the earlier OCTD plan), or via a more southerly route. Another possibility would be to operate along some portion of the ATSF Fourth Subdivision. The railroad has proposed to sell the latter to the public for use in Southwest Corridor intercity rail and Orange County commuter train development. It is possible that there would also be room to locate a transit line on this R/W (beginning some distance to the east of the 55 Freeway). However, owing to constricted R/W width near the Santa Ana train station, it may be preferable to utilize parallel freeways or aerial construction over arterial highways for fixed guideway conventional transit (non-commuter rail) extensions in this direction.

g). There may be a number of other alternatives for extensions in a southerly direction, including a tie-in with communities and activity centers such as Newport Beach, Balboa Peninsula, Newport Fashion Island, the South Coast Plaza, Orange Coast College, Southern California College, Fairview State Hospital, the Orange County Fairgrounds, and of course John Wayne Airport.

A variety of rights-of-way might be used for such extensions: the 55 Freeway, arterial highways such as Red Hill Ave., possibly the SP Santa Ana Branch, or even the industrial spur track from Tustin to Irvine. Fortunately buildings in the newly-developed sections of Orange County tend to be set far back from nearby arterial highways, providing ample room for fairly aesthetic placement of aerial structures. The arterial segment of Route 55 south of the 73 Freeway has a wide, grassy median which might be useful in developing an at-grade rail transit line.

No specific recommendations will be made on possible fixed guideway transit extensions from the southeastern end of the West Santa Ana Branch/PE right-of-way, as this would go far beyond the scope of this study. Orange County transit planners will find this a challenging exercise in future transit routing studies.

Orange County has planned an ambitious HOV lane/Transitway program. It is most probable that for many years, connections with Irvine and points to the south of Santa Ana will need to be made by express buses. This may be a prudent course of action, as it offers the opportunity to test ridership potential on prospective fixed guideway transit routes with "pre-metro" transit coach service before making hard-and-fast decisions on guideway alignments.

However, an interesting recent development in Orange County may have some bearing on routing and technologies. McDonnell Douglas Realty, the real estate arm of the aerospace company, has already broken ground for a half-mile long, \$ 3.5 million monorail loop to connect that city with John Wayne Airport (9). The intention is to provide a feeder line to an eventual higher speed, line-haul transportation system through Orange County.

Commuter rail service has also been proposed between southern Orange County and downtown Los Angeles, and from Riverside to Irvine (direct and via Fullerton). This may provide an opportunity for bi-directional commuter rail operation on the segment of the Santa Fe Fourth Subdivision south and east of Santa Ana. If the West Santa Ana/PE R/W transit line were routed over to the Santa Ana Regional Transportation Center, a transfer could be made to commuter trains serving Tustin, Irvine, and points to the southeast under this scenario.

It should be noted that it would be difficult if not impossible to provide room for a transit line in addition to the existing track used by LOSSAN corridor trains on the Santa Fe right-of-way immediately to the east of the Santa Ana Amtrak station, because of constricted R/W in this location. A recent proposal by consultants for the OCTC to eventually operate electric commuter trains on the Fourth Subdivision may be the best way to serve southeastern Orange County using the Fourth Subdivision right-of-way, as it would avoid a duplication of facilities.

Other Possible Regional Connections. The OCTC has already suggested connecting a West Santa Ana Branch/PE right-of-way transit line with the LA CBD via the LA-Long Beach Line, and with LAX via the Century line (10). Other possible intercounty connections could be the following:

i). A link from the West Santa Ana Branch, via the LA-Long Beach line, to the City of Santa Monica using the SP Santa Monica Branch and Exposition Boulevard (see Chapter 10).

ii). A second link to LAX via the SP El Segundo Branch, which would serve the Northrop facilities at Hawthorne Municipal Airport before going to the business/industrial park section of El Segundo just south of LAX (with the trains then routed north to the airport via the Coastal Corridor). In addition to serving an additional aerospace trip generator, this largely single track branch line from Watts to El Segundo could be useful if an Orange County-LAX service adds enough trains to cause a capacity constraint on the Century Line.

(However, the addition of the El Segundo Branch to the LA County system would certainly be a low priority in LA County; and it would more likely provide a local service than be part of a long-distance route).

iii). A link to southern Los Angeles County should some day be possible using the Los Alamitos Branch. This could allow service to the Long Beach CBD via Belmont Shore, the congested "Iron Triangle" area, the VA Medical Center, and Cal State University at Long Beach; probably via the Coyote Creek/San Gabriel River/605 Freeway corridor and 7th Street (Chapter 11). In the Long Beach CBD, further regional connections could be made to an east-west Long Beach-South

Bay-LAX route, as well as to the LA-Long Beach line. (Other options for routing to Long Beach may also be possible--see Appendices C and E.)

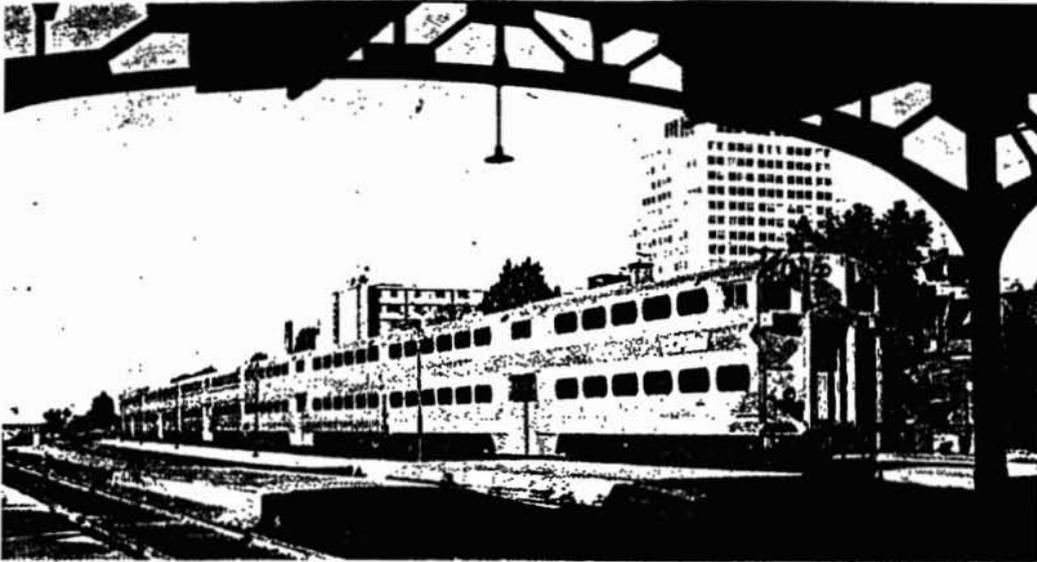
Another potential Long Beach area destination could be the Long Beach Municipal Airport, which would be a major employment center. This connection is also discussed in some detail in Chapter 11.

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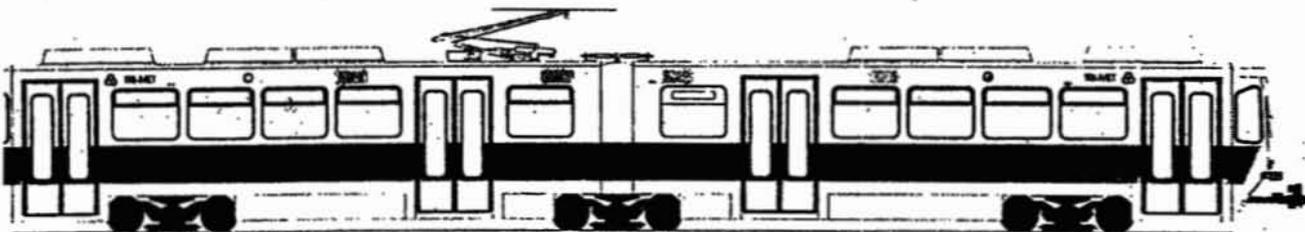
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BOTH COMMUTER RAIL AND LIGHT RAIL OPTIONS HAVE BEEN PROPOSED FOR SERVICE ON THE SANTA FE SECOND SUBDIVISION

**Right:
GO Transit
commuter
train
near
Toronto**



**Left:
Canadian
National
bi-level
commuter
train,
Montreal**



Above: Portland LRT is typical of modern designs.

13. SANTA FE SECOND SUBDIVISION

Railroad Route: The Santa Fe Second (Pasadena) Subdivision begins near the LA Union Passenger Terminal (LAUPT), following the west bank of the Los Angeles River north to a point above Pasadena Avenue (Figures 13.1,13.2). Here it crosses the river and turns northeast, roughly paralleling the Pasadena Freeway and Figueroa St., passing Lincoln Heights and Mount Washington, to enter Highland Park. At Highland Park it turns east, crossing the Arroyo Seco, and enters South Pasadena, running just north of Monterey Road. It turns to the northeast and north to pass through the Pasadena CBD on an alignment just west of the Arroyo Parkway.

Near Walnut Street it enters a short tunnel which brings it out in the median of the 210 Freeway. It continues east in the freeway alignment until it reaches Arcadia. About a half mile east of Baldwin Avenue, it turns to the southeast, entering Monrovia, and again follows an easterly alignment parallel to the 210 Freeway through Duarte and the Santa Fe Flood Control Basin (crossing the San Gabriel River). East of Irwindale Avenue it turns to the northeast, entering Azusa, curves back to the east to enter Glendora, and then follows a south-easterly alignment to Alosta Avenue, which it parallels on the north side. It curves to the southeast near the intersection of the 210 Freeway and Route 30, and enters San Dimas.

In San Dimas, it rather closely follows the Arrow Highway, entering La Verne, and then, continuing in an easterly direction, passes through Claremont (now crossing into San Bernardino County), Montclair, Upland (here about a half mile north of the 10 Freeway), Rancho Cucamonga, Fontana, and Rialto. Finally it enters San Bernardino, curves slightly to the northeast, crosses the Lytle Creek Channel, and runs east to end near the old San Bernardino train station. At this point the Second Subdivision is joined by the Third (coming up from the south), and merges with the First Subdivision which continues north along the 215 Freeway, and off into the desert.

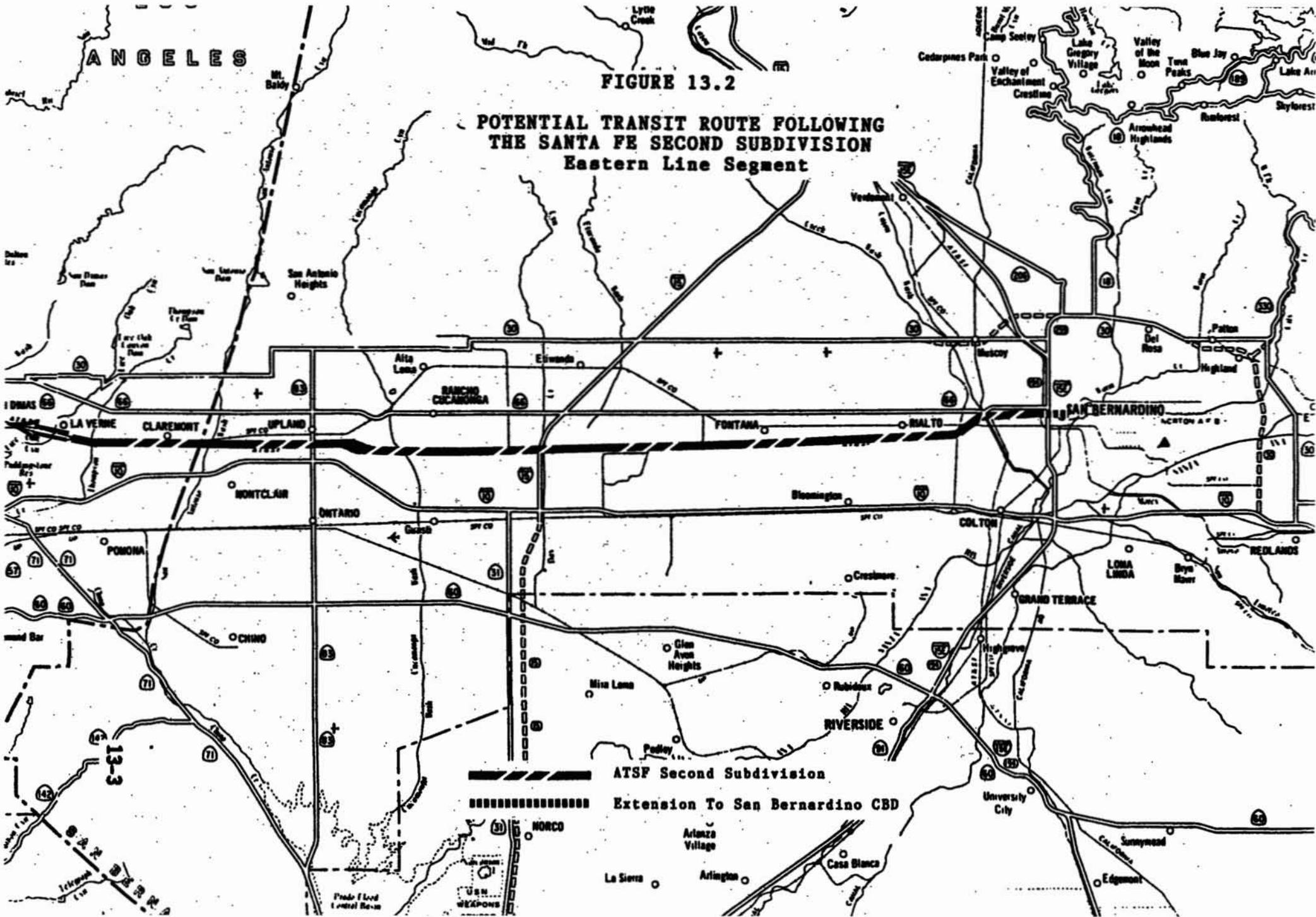
Transit Technology And Routing Options. There are four basic technology and routing options for providing public transit service on the Second Subdivision, detailed below:

(1). This railroad main line has considerable potential for light rail service between Los Angeles and Pasadena. Assuming that the transit route were to originate in tunnel at the north end the LA CBD (either at LAUPT or farther to the west), it would emerge to the north and east of Chinatown (in the Southern Pacific Cornfield-Bullring Yard area) to join the Santa Fe line just before it crosses the LA River.

In Pasadena, several possible east-west alignments could be used to access the CBD area. One alternative is to utilize the Second Subdivision trackage in the median of the 210 Freeway; this alignment is about 4/10 mile north of Colorado Boulevard, or about an eight minute walk (assuming that the commuter walks at 3 MPH). A second possibility would be the use of a tunnel alignment under Colorado Boulevard, emerging near Allen Avenue to follow the Santa Fe spur track along Walnut Street (which is little-used by freight, and connects with the

FIGURE 13.2

POTENTIAL TRANSIT ROUTE FOLLOWING
THE SANTA FE SECOND SUBDIVISION
Eastern Line Segment



freeway rail alignment near Sierra Madre Villa).

A Colorado Boulevard subway would be quite expensive, and for this reason another option considered was a Green Street transit mall, which would be slower than the freeway alignment, but more convenient to Colorado Avenue. This alternative would also utilize the Walnut Street spur track. But the Green Street alignment was recently dropped from consideration, owing to probable traffic problems and opposition by commercial interests. High platform stations would not fit in well with the storefronts along much of Green Street.

Hence, at this point in time the 210 Freeway alignment appears to be the most feasible CBD access route, in light of funding constraints.

A Pasadena light rail line might initially terminate in East Pasadena; however it could be extended east to Arcadia or to the junction of the 605 and 210 Freeways near the Santa Fe Dam Recreation Area, which is just west of Irwindale.

(11). If another route were chosen for the LA-Pasadena light rail line, it would of course be possible to utilize the Second Subdivision in its entirety for diesel commuter rail operation, using push-pull locomotive-propelled trains if a peak hour-only service is anticipated, or railbus equipment should it be desired to provide frequent off-peak service as well. A problem with this is that with the rejection of the Green Street option, only the 210 Freeway alignment is left for an east-west light rail alignment through Pasadena.

(111). If the Second Subdivision were chosen for the Pasadena light rail line, it would still be possible to operate a commuter rail line from the end point of the LRT line east to San Bernardino. As commuters would prefer not to transfer somewhere near the mid-point of their trip, there would be a (perhaps substantial) transfer penalty resulting in lower ridership than for a through service.

There is, however, precedent for this kind of operation: transfers from diesel trains to multiple unit electric trains or to rapid transit were necessary in certain operations on the Long Island Railroad (e.g. at Jamaica and elsewhere), on New Jersey Transit (at Newark), and between the former Pennsylvania-Reading Seashore Lines Atlantic City service and the Lindenwold High Speed Line. Assuming that in our case the LRT line used the freeway alignment, the commuter line would have its point of origin at the light rail terminus, which might be located anywhere from Sierra Madre to Irwindale.

(iv). Even if the Second Subdivision were chosen for light rail, it would be possible to provide through service from San Bernardino to the LA CBD over the same tracks, if an interurban electric railway technology were employed. Operation from Pasadena or Irwindale east to San Bernardino under this scenario might initially require a diesel generator unit to propel the interurban cars; or the entire line might be electrified from the start. In this case there would be no loss of ridership because of a transfer. However, the large number of local stops on the LRT line could have a deleterious effect on running time for the through runs between LA and San Bernardino.

Under this scenario, skip-stop service may be desirable, and even (where space

permits south of Pasadena) a third track for passing on one or the other side of the right-of-way to allow longer-distance express trains (to/from San Bernardino) to overtake and pass locals. These scheduling and travel time aspects would need to be worked out in future engineering and operational analyses of this corridor.

Freight service from Irwindale to the east might be conducted at night, as is done on the San Diego Trolley; or on a parallel single track dedicated to the freight operation.

A detailed discussion of some of the technology requirements for implementation of transit service on the Second Subdivision, with particular attention to the through-routing option, is given in Appendix J.

There are still other options for separating long-distance (LA-San Bernardino) and local (LA-Pasadena) passenger transportation services on this corridor, requiring combination with other railroad and former Red Car rights-of-way. These will be mentioned at the end of this chapter.

Demand Criteria. The data provided in the next four sections were initially developed in the course of the Phase I evaluation. In 1987, it was thought that only the segment between Los Angeles and Irwindale would be sold by the ATSF. Subsequent railroad analysis determined that disposal of the entire right-of-way from LA to San Bernardino would better suit corporate needs (also providing a major opportunity for public agencies to purchase a much longer line, with potential for commuter rail or interurban railway development).

The comments given below pertaining to freeway conditions and transit service apply only to the segment between the LA CBD and Irwindale. For population, employment, commercial areas and other activity centers, additional information has been added covering the remainder of the route to San Bernardino. Nevertheless, the LA-Irwindale data are useful for comparison with the other four high-potential railroad corridors discussed in detail in Chapters 10-12 and 14, as a Los Angeles-Irwindale transit line would be roughly the same length as these other routes.

Population. The 1984 population maps indicate that between the LA CBD and Pasadena, the Second Subdivision penetrates largely moderate density residential neighborhoods; with the exception of a medium density area along Figueroa Street near Mount Washington, and large medium density areas in Highland Park. In South Pasadena, the line borders a low density section. For 2010, an additional large medium density residential area is shown to the west side of the Pasadena CBD, centering on the railroad line.

For the east-west alignment between Pasadena and San Dimas, the 1984 maps indicate that substantial moderate density areas occur just to the north of downtown Pasadena, continuing into East Pasadena. Farther east, moderate density neighborhoods are also shown in Monrovia, Duarte, and parts of Glendora, while residential densities are low in Arcadia, Azusa and San Dimas. For this segment, the 2010 maps display basically the same pattern.

Still farther east, the 1984 maps show only low residential densities from La

Verne to Rancho Cucamonga, with the exception of a moderate density section in Pomona/Claremont. However, the 2010 maps indicate a marked expansion of moderate density housing areas in La Verne, Pomona, Claremont, Upland, and Rancho Cucamonga. This growth process can be observed today; while considerable vacant land still exists in many of these communities, development is taking place rapidly as many people who work in the LA CBD or in other parts of central/western LA County seek affordable housing in eastern Los Angeles and western San Bernardino Counties.

Still farther east, the 1984 maps indicate that over most of the area, low population densities occur, with moderate density areas of modest size in Fontana, Rialto, and San Bernardino. However, the 2010 maps indicate a great expanse of moderate density residential area in all three cities, and in addition a substantial high density residential section in the San Bernardino CBD area.

Employment. The 1984 employment maps indicate that the section of the LA CBD served by the line (either by the light rail tunnel or via Metro Rail) to be a mixture of medium, high, and very high density employment. By 2010, most of this area will be very high density. Just to the north in Chinatown, the 1984 maps indicate a large medium density employment area; by 2010, part of this will grow to high density. Continuing past Mount Washington/Lincoln Heights, a large area of moderate density employment is shown on both 1984 and 2010 maps.

In Pasadena, the 1984 maps indicate a substantial area of medium density employment extending from the CBD, bordering the line to the south and east, as well as to the northwest; with a moderate employment density north of the CBD, on the other side of the rail line. By 2010, an additional expansion of moderate density employment will occur west of the CBD and the Arroyo Parkway/railroad alignment.

Additionally, the 1984 maps indicate a moderate density employment area in East Pasadena, north of the Second Subdivision; and another moderate density employment area in Arcadia/Monrovia, mainly to the north of the rail line. The 2010 maps display an additional expansion of moderate density employment in Arcadia, south and west of the line.

The 1984 maps show no significant employment concentrations between Monrovia and San Bernardino; but the 2010 maps indicate the rail line passing through a large area of moderate employment density in Azusa/Glendora. The 2010 maps also indicate a large moderate density employment area north of the line in Claremont; and an even larger area on both sides of the line in Upland.

For San Bernardino, the 1984 maps display medium and moderate densities of employment in the San Bernardino central business district, just to the east of the train station. However, the 2010 maps indicate an increase to high employment density in downtown San Bernardino, and an additional, very large moderate density employment area to the south of the CBD, down to Colton.

Commercial Areas And Other Activity Centers. Depending upon the technology used, a transit service operating on the Santa Fe Second Subdivision would originate at Los Angeles Union Passenger Terminal (LAUPT) or in the light rail

tunnel on the west side of the LA CBD. In the latter case, depending upon routing decisions which are now pending, it might either proceed directly to Chinatown (with a Metro Rail link to LAUPT), or serve LAUPT directly on its way to Pasadena.

The fact that use of the Second Subdivision for transit will mean relocation of Amtrak trains that now stop at Pomona and Pasadena, to the Third Subdivision (via Fullerton) would seem to favor a direct link. Otherwise, the requirement that LAUPT-bound train riders (often carrying baggage) make a second transfer in the LA CBD could discourage future long-distance Amtrak trips originating along the Second Subdivision travel corridor.

In either case, a Second Subdivision transit line would provide access to the Los Angeles Civic Center area, including City Hall, County and Federal Buildings, the Music Center, and Chinatown (a major commercial/tourism area on the north side of the downtown LA), as well as to the growing financial district on the west side and major commercial sections on the east side of the CBD farther south.

There are ambitious plans for redevelopment on 7.8 acres of land in Little Tokyo, south of LAUPT, involving 1.25 million square feet of office space, a 500 room hotel, hundreds of apartments, stores, a plaza, and museum, as an extension of the LA Civic Center (1); there is also a project to revitalize the major Broadway commercial area with new lighting and sidewalks, additional security and street maintenance, and perhaps even a tourist trolley (2). Farther north, across from LAUPT, a \$ 25 million plan has been developed to revitalize Olvera Street, a major tourist attraction; including renovation of historic buildings, improvement of commercial and entertainment facilities, and 50,000 square feet of new commercial space (3).

An elaborate plan has been drawn up by the Los Angeles Community Redevelopment Agency for the Union Station area, as well. This will entail 3.2 million square feet of retail, office, and hotel space, and perhaps a railroad museum and other museum facilities. The development will be built in two phases over the next 10 or 15 years. A major objective of this plan will be creation of an active pedestrian-oriented linkage within the area, which will be a transportation hub including Metro Rail, the existing Amtrak station, and the new terminus of the El Monte Busway (4,5).

There is also currently a fair amount of industrial activity in the vicinity of LAUPT, with commercial art studios in newly rehabilitated warehouses along Spring Street.

It is evident from the above that the section of the LA CBD convenient to a commuter service focused on Union Station and accessible to the proposed Pasadena light rail alignments is at present a high activity area, and will experience considerable growth in the near future. It includes the major CBD policy growth area and a smaller such area in Chinatown. A shuttle bus connection with Dodger Stadium would seem appropriate from a transit station located in the area north of Chinatown.

North of the CBD, a Second Subdivision transit line would touch on a third

policy growth area between the LA River and the 5 Freeway, and a major commercial section along Figueroa in Highland Park from Avenue 52 to York Boulevard. It would also pass right in front of the Southwest Museum, an important cultural facility featuring Native American cultures and Hispanic heritage, and would be close to the Ernest E. Debs County Regional Park, a major recreational area. It should be noted that the section served by the line between Lincoln Heights and Mount Washington, and north into Highland Park has a high percentage of transit dependent people.

Continuing north and east, it would serve the South Pasadena City Hall, and the major commercial section at Mission and Fair Oaks. There are also two- and three-story garden apartment buildings, and some small office buildings along the line in South Pasadena.

In the Pasadena CBD, the Arroyo Parkway alignment is bordered by light industrial activity and at the north end it is not too distant from Ambassador College. The 210 Freeway alignment would be convenient to City Hall, the Library, Fuller Theological Seminary, Pasadena Plaza (a major shopping mall), and the Colorado Boulevard retail-commercial/office center.

The Rose Parade and Rose Bowl Game are major Pasadena events of national repute. Every year the SCRTD provides dedicated bus service from a number of points in Los Angeles County to serve the Rose Parade and the Rose Bowl Game, with an elaborate special schedule distributed on buses all over the area (6). It follows that direct service to the Rose Parade on January 2, and service to all Rose Bowl events (by shuttle bus from the nearest station) would be an additional function of a transit line operating through Pasadena on the Second Subdivision.

Continuing farther east (assuming a 210 Freeway alignment), access to the Pasadena City College and the California Institute of Technology could be provided by bus shuttle. In East Pasadena, direct service would be provided to a commercial area along Colorado Blvd. at Sierra Madre and Foothill.

At Kinneloa, the freeway/rail alignment comes very close to Colorado Boulevard. The major Fedco membership store is located here, and Colorado continues to be commercial in nature east to Rosemead and Michellinda. To the north in this section lie the large Avon plant, the Xerox building, and medium sized commercial shopping centers (including the Sears Plaza) along Foothill Blvd.

In Arcadia, the LA County Arboretum would be within walking distance of the transit line, and the Santa Anita Race Track and Santa Anita Fashion Park are located to the south along Baldwin Avenue. These trip generators could be made accessible by shuttle bus (or perhaps even via a spur track along the east side of the botanical gardens and continuing across the race track parking lots), as would the Methodist Hospital and Civic Center.

Farther east in Arcadia, where the rail line runs to the south of the freeway, it would provide access to a major commercial section around Santa Anita Avenue and Huntington Drive; there is also an important commercial area along Huntington Drive to the north of the line (on the other side of the freeway), accessible via Mayflower Avenue. In Duarte, large shopping areas are also

located north of the freeway, at Buena Vista. However, right on the rail line is the important City of Hope National Medical Center, a hospital/research complex of considerable size. There are also three-story apartment buildings near the R/W at Duarte Road and Myrtle, and some new light industrial buildings along Duarte Road.

East of Duarte, the rail line enters Irwindale, crossing the Santa Fe Dam Recreation Area (which includes major spreading basins along the San Gabriel River). This lies just to the east of the 605 Freeway overpass, and presumably space could be found here for major park-and-ride lots. It has also been proposed to locate the Raiders Stadium in this general area of Irwindale; a 170 acre site with provision for 62,000-70,000 seats was first proposed, but the actual site is uncertain at this time (7,8). If the stadium were located near the 210 Freeway, it might be possible for stadium parking lots to double as park-and-ride areas during weekdays; however, present indications are that it might be located south of Live Oak Avenue and west of the 605 freeway, which is at some distance from the transit alignment (9). Under the latter scenario, a spur track or shuttle bus from the rail line might provide access to major events. (However, it is not at all certain that the stadium will actually be located in Irwindale).

In Azusa, service would be provided to City Hall, new apartment buildings, and the commercial section of the city; there is also a large industrial area to the west and a large new industrial park on the east side of town. Just to the east of Azusa the line would serve Citrus College; in Glendora it would access City Hall and the nearby commercial area, as well as commercial development along Alostia Avenue to the south and the Foothill Presbyterian and Glendora General Hospitals.

In San Dimas, the rail line passes near the 210 Freeway/Route 30 interchange (another prospective major park-and-ride location), the site of the future Glendora Mall, and the Civic Center and existing commercial area. There are also new apartment buildings near the line at Bonita Avenue and on Arrow Highway; and a new industrial/business park to the east. Farther east in La Verne, access would be provided to the Civic Center/main commercial area, as well as the University of La Verne.

In Pomona, the rail line passes the Pomona Raceway, and is about a mile from the LA County Fairgrounds. Here it may be possible to use the raceway and/or fair parking lots for park-and-ride during weekdays. There was at one time a rail spur going part of the way into the Fairgrounds; it might be possible to run a spur track down White Avenue for better fair access, or provide an extension of the county fair monorail as a feeder service (perhaps an updated version of classic suspended monorail design presently operating through the fair, with larger and faster cars).

A \$ 100 million business park, the Koll Business Center La Verne, has also been sited on a parcel right on the rail line; this is to include 1.4 million square feet, with retail facilities, a hotel and convention center. This facility is expected to provide 4,000-5,000 new jobs (10). This would provide another major trip generator along the rail line.

Access would also be provided to several commercial areas in Pomona, along the Arrow Highway/Garey Avenue (also the bus transfer point for the Pomona CBD), while farther east, service would be provided to the Claremont City hall and commercial center, the important Claremont College educational facility, and the Rancho Santa Ana Botanical Garden.

In Montclair, the Second Subdivision passes just north of the Montclair Plaza, (a major shopping mall in this area), as well as smaller shopping plazas along Central near the railroad. The Montclair Transcenter is located right next to the rail line, and convenient to the mall; it has ten bus bays and a park-and-ride lot, and has been proposed to be the major bus transfer facility for this section of the Pomona Valley (11). Provision of transit service on the Second Subdivision would allow this to become a reality.

In Upland, another major shopping area, the Mountain Green Center, is located just to the south of the railroad. Access would also be provided to the Upland Civic Center and the commercial section at Euclid, which includes the quaint Second Avenue street mall and an office complex made up of refurbished railroad cars grouped around a replica railroad station (Appendix I). In addition, there are new apartment buildings along the rail line in the eastern part of Upland. Access could also be provided by shuttle to the San Antonio Community Hospital in Upland; and of course Euclid Avenue would be the major transfer point to the Ontario Civic Center/commercial area.

(A possible link to the heavily-used Ontario Airport facility was investigated in the course of field work; a transit connection along the Cucamonga Creek, or perhaps a light rail extension down Euclid Avenue and east along the SP main line right-of-way would be required. Of course, initially it is assumed that a bus shuttle would be provided to the air terminals.)

In Rancho Cucamonga, access would be provided to older industrial development as well as to new, major housing and commercial developments. A park-and-ride intercept lot would need to be provided somewhere near the 15 Freeway overpass. East of this point lies the old Kaiser Steel plant which is being redeveloped into a major industrial park, and continuing eastward, service would be provided to the Fontana City Hall and the Rialto Civic Center, and nearby commercial areas.

Finally, at the eastern terminus of the Second Subdivision is the City of San Bernardino; the present Amtrak station is located a few blocks from the Central City Mall, City Hall, Courthouse, financial center, and some high-rise housing. It is assumed that a bus link (or perhaps a fixed guideway transit connection via the SP San Bernardino Branch--see Appendix C) could be provided south to the San Bernardino Valley College, Inland Shopping Center, and National Orange Showground.

Additional detailed land-use information on the Second Subdivision is reported in Appendix I of this report.

Development Potential On Rail Yards Or On Excess Right-of-Way. The Second Subdivision begins just north of LAUPT; however, a light rail alignment using the Santa Fe line would probably emerge from a tunnel on the east side of

Chinatown, in an area known as the Cornfield/Bullring Yard. This property (excluding the Link Yard) amounts to at least 43 acres, is (or was until recently) owned by the Southern Pacific, and will soon be redeveloped.

The Second Subdivision varies greatly in width between the LA CBD and Pasadena. Much of it is about 50 feet wide; there are narrower sections such as the 35' wide right-of-way in Highland Park (it appears to be even narrower owing to access roads encroaching on both sides of the single track R/W here), and it is wider (90' or 100') in a few places. Several of these like Avenue 26 and the Southwest Museum area might be of interest for station development.

The north-south right-of-way in Pasadena is generally 30' wide. Right-of-way valuation maps suggest that the Pasadena station site is at least 6.5 acres in extent. A joint development project involving ATSF land (part of which may be sold with the R/W for transit development) and a number of nearby properties may be feasible, provided the total amount of land involved is large enough to first satisfy station parking requirements.

The alignment in the 210 Freeway is generally 40' wide at the west end, and hence its use would be limited to providing a double track transit facility with narrow station platforms (the freeway railroad alignment on embankment widens to 50-60' towards the east, but again this is only wide enough for transit station development).

In Monrovia/Duarte, the surface R/W is 50-60' wide; a 100' wide area in Arcadia at the old station site (about four acres) might be of use in developing a Huntington Drive Station with parking. In Monrovia, the property at Myrtle amounts to a little less than three acres at the old railroad station, which could be rehabilitated (remaining land would probably go to station parking).

While the R/W at the San Gabriel River is only 50' wide, there is considerable vacant, non-railroad owned land nearby. Other than the possible stadium, it is usually assumed that additional land would be used for parking.

Most of the right-of-way east of this point is 100' wide. This is wide enough to have some development potential if combined with adjacent, non-railroad owned property. It should in theory also be sufficiently wide to allow construction of two passenger tracks and one freight track. In addition, there are some wider areas owned by the ATSF as follows:

In Azusa, there is a wider section totaling about 14 acres. A small railroad station located here could be reopened; it is possible that some of the excess railroad R/W has already been purchased by the city, as a Public Works Department redevelopment project is underway there.

In Glendora, there is a wider section also totaling about 14 acres. This includes the site of the former rail station, and it may be possible to accommodate the necessary station parking and promote a minor joint development project in this location as well.

In Pomona, there is a wider section totaling about nine acres; this includes the present Amtrak station site. This would probably be used mainly for station

parking; however, there may be vacant land nearby which could be incorporated into a joint development project.

From San Dimas to Pomona, the SP Baldwin Park Branch (which may soon be abandoned) closely parallels the ATSF line and there is a considerable amount of land between the two rights-of-way, in a linear configuration. Some of this area however is already occupied by industry, and it is not certain how railroad and non-railroad real estate in this location might be used together. Nevertheless a combination of ATSF and SP parcels with some existing vacant/marginally-used industrial property nearby might have fair development potential.

In Claremont, the old ATSF station still exists as a landmark building; while valuation maps show a wider R/W with an area of about seven acres, field examination of the site suggests that most of this property has already been built upon. Instead, the gore between the SP Baldwin Park Branch and the ATSF Second Subdivision, east of town, appears to be more promising for a park-and-ride station, as there would be much more room for parking lot development in this location.

In Upland, there is an area of about nine acres including the old train station which is currently rented out; this is situated in a small commercial zone. At Rancho Cucamonga, the old station building at Archibald Avenue could be rehabilitated; although the R/W is only 100' wide here, the field survey indicates that the station together with a nearby, abandoned winery could have potential for a small joint venture project centered on the rail line. Farther east at Haven Avenue, an area of about seven acres might have park-and-ride station potential.

In Fontana, from Beech to Cherry (to the west of the present town center), there is a 200' wide strip of R/W which would total 24 acres. This area may therefore have park-and-ride as well as joint development potential. In downtown Fontana a four acre, wider section of R/W is shown on the valuation maps as municipal parkland. Hence, this parcel would not be available for redevelopment. In Rialto, an area of perhaps six acres or so, including the former station site, might be of use for station parking development.

Finally, in San Bernardino, there is a very large yard area totaling about 268 acres. At the east end, this adjoins the existing Santa Fe station which is used by Amtrak; at the west end, it extends some distance out of town, surrounded by other vacant land. Nevertheless, it is likely that some of this property, located as it is near the San Bernardino CBD, could be used in a joint development project of considerable size. Since this rail yard will continue to be a point on the main ATSF transcontinental line, the railroad will want to retain ownership of some of this land for storage and maintenance facilities.

However, if only about one third of this property were used in transit-related development, it would amount to close to 90 acres. With a landmark station, and continuing train activity nearby, a shopping center with railroad theme might be a possibility.

Appendix I discusses joint development opportunities along this line in some detail, with particular attention paid to existing and former train stations,

many of which are of an historic nature. This appendix also elaborates on places where additional open land not owned by the railroad borders on the R/W and might be of value for station development, parking areas, and possible joint development project locations.

For the most part, potential for large-scale joint ventures would seem to be limited to the non-ATSF rail yards near Chinatown and the large Santa Fe yard in San Bernardino; and perhaps in Fontana. Some of the smaller parcels may be of special interest because of location (e.g. Pasadena); in fact many of the old station areas could have potential for local projects of modest size. If it were desired to increase the scale of these developments, additional nearby land (which seems to be available in a number of places) would need to be acquired.

Freeway Conditions. Traffic conditions on freeways closely paralleling the western segment of the Second Subdivision are as follows. Peak hour volumes are about 8,000-9,000 for the Pasadena Freeway north of the 5 Freeway interchange, and considerably heavier on the 210 Foothill Freeway, ranging from 14,000 to 18,000.

Both freeways are subject to heavy congestion. A volume/capacity ratio over 1.0 (level of service F) is encountered in a southbound direction on the Pasadena Freeway for over one hour during the AM peak period south of Highland Park, and in a northbound direction for over two hours in the PM peak between the LA CBD and the 5 Freeway interchange. For the 210 freeway, level of service F conditions occur in a westbound direction between the 605 Freeway and Route 19 during the morning rush hour, and eastbound in the afternoon for over an hour between the 134 and 605 Freeways.

Accident rates are especially high on the Pasadena Freeway from the LA CBD to the 5 Freeway junction: 69-110 per mile per year. North of this point, the rate is 54 per mile per year, which is rather high considering that traffic volumes are lighter than for many of our other freeways; however the Pasadena Freeway is substandard by modern design standards, with tight curves and very short on/off ramps. By comparison, for the 210 Freeway (a newer facility), accident rates range from 27 to 30 per mile per year between the 134 and 605 Freeway interchanges.

A combination of heavy traffic volumes on the 210 Freeway, heavy congestion on both freeways, and heavy accident rates and substandard design of the Pasadena freeway would suggest excellent potential to generate transit patronage along this part of the corridor.

Transit Service. A number of express and limited stop bus routes parallel the section of ATSF R/W from the LA CBD to Irwindale. These include two SCRTD routes operating via the Pasadena Freeway and serving Altadena via the Pasadena CBD; a limited stop route along Huntington Drive; and about half a dozen express bus lines routed via the El Monte Busway. The latter serve Fair Oaks, Lake Avenue, Sierra Madre via San Gabriel Blvd. and Santa Anita Avenue, Duarte via Huntington Drive, and Monrovia. The fact that this area can already support such a large number of transit routes suggests that a high-quality, east-west transit facility on the Santa Fe right-of-way, connecting many of the San Gabriel Valley cities in a linear fashion, would have an excellent chance for

success.

Status. The Santa Fe Railway until recently operated its freight traffic in a one-way loop arrangement, westbound on the ATSF Second Subdivision (San Bernardino to Pasadena to LA) and eastbound on the ATSF Third Subdivision (LA to Fullerton to San Bernardino). This applied mainly to lighter intermodal trains; bulk trains operated both in both directions on the Third Subdivision. The ATSF has been interested in consolidating all of its through freight traffic on the Third Subdivision, and would like to double-track the latter to allow them to vacate the Second Subdivision.

In 1987, railroad representatives suggested selling off the segment from LA to Irwindale, and retaining ownership from there to San Bernardino for freight service. More recently, they have suggested selling off the entire Second Subdivision from LA to San Bernardino, while retaining trackage rights between San Bernardino and Irwindale for local freight use.

In 1988, a consultant study was done by Alderon, Inc. for LA County Supervisor Schabarum, evaluating a commuter rail line between Los Angeles and San Bernardino using the ATSF Second Subdivision; and drawing heavily from an earlier Caltrans study. Nine- and 13-station alternatives were considered, with four round trips per day. Senator Ayala from San Bernardino County, a long-time advocate of commuter rail service to San Bernardino, has also become interested in a possible Second Subdivision commuter service, and formed an advisory committee to promote this concept. SCAG has completed some preliminary ridership estimates for such a service, using the stations and system performance specifications originally developed by Caltrans and later updated by Alderon.

The segment between downtown LA and Pasadena is one of two surviving alternatives being considered by the LACTC for its Pasadena light rail corridor. It is identified as their "Marmion Way" or Highland Park alternative. The plan is to through-route Long Beach trains via a new subway alignment continuing north from the Flower Street subway terminus (now under construction) along the west side of the LA CBD, and either directly north and east through Chinatown, or via Union Station.

There has been considerable recent interest in the Second Subdivision LRT alternative in Highland Park and South Pasadena, where it is understood the local communities would prefer quiet electric trains to the long diesel-hauled freight consists that now run through their neighborhoods. The Pasadena Light Rail Task Force favors the use of the Santa Fe right-of-way over other north-south alignments to access the Pasadena CBD area, and has recently recommended that the city support the Highland Park alternative. Los Angeles City Councilman Richard Alatorre and Assemblyman Richard Polanco have also endorsed the Highland Park route (12).

The other LA-Pasadena routing option which has gone forward into the EIR process is the North Main Street alternative, which would follow Huntington Drive (an old Red Car route) and utilize the proposed 710 Freeway extension to Pasadena. However, opposition to the freeway extension may impact the viability of this route.

It is believed that the LA County Public Works Department at the urging of Supervisor Schabarum will soon award a contract for a valuation study in preparation for possible purchase of the right-of-way. Also, the LACTC has authorized up to \$ 2 million to fund planning and preliminary engineering studies towards implementation of what has been termed the Pomona Valley-Los Angeles commuter rail project (13). It is understood that this will include service integration of a Los Angeles-San Bernardino commuter line with the Pasadena light rail line.

Patronage Forecasts. Recent patronage forecasting work has indicated that a LA-San Bernardino commuter rail line with peak direction only service on a 20 minute headway and 13 stations would generate 16,900 daily home to work trips. If 20% greater ridership were realized by providing bi-directional peak hour service and some off-peak trains, ridership would be about 20,000 per day. Of these, the majority (about 16,800) would board the train between San Bernardino and Upland.

It is believed that in this computer modeling exercise, competition with express buses assigned to El Monte Busway routes greatly reduced simulated ridership on the rail line west of Upland, with such a long headway. Additionally, the model runs showed zero ridership from Pasadena to the LA CBD by commuter rail, most probably because with a 20 minute headway, waiting time would be so long that competing bus services would have a decided advantage. (This modeling work did not include the Pasadena light rail line, which would have very frequent service.)

Patronage forecasts for a light rail line with a six minute headway on the segment from Hill and Walnut in Pasadena to the LA CBD (without the extension south to Long Beach, which is how the line would actually be operated) have indicated a year 2010 ridership of 56,800. (This figure does not include any ridership that might potentially be generated by a connecting commuter rail line, or an interurban railway service extension east of Pasadena.)

Also, it should be noted that no station stops were provided in the commuter rail modeling work between Monrovia and the Pasadena CBD or east of Hill Street in the LRT forecasts. Additional stops in East Pasadena, Arcadia, and Duarte (605 Freeway Intercept) would certainly generate additional ridership.

As part of SCAG's RTP work, some preliminary patronage estimates were made for a light rail line with a 15 minute headway on freeway alignments very closely paralleling the Second Subdivision, between East Pasadena and Claremont. This hypothetical LRT route was connected at its west end with the Pasadena light rail line (frequency, five minutes) and at the east end to a fast Los Angeles-San Bernardino train service on a more southerly alignment.

The forecast for this mid-corridor LRT route produced about 16,800 home to work trips; if only 20% more riders were generated off-peak, the result would be 20,200 riders per day on this segment of the line. This is considerably better than the estimated 3,500 riders per day shown for the commuter rail modeling for this segment. While it is difficult to add the results of different model runs, it is possible that over 90,000 riders per day might eventually be generated for the total corridor if there were fast, relatively frequent transit service

along the full length of the Second Subdivision (perhaps in combination with transit routes on other rail rights-of-way--see below).

Combinations With Other Rights-Of-Way. Further study of the Second Subdivision as a transit corridor may reveal that it would be preferable to separate the longer-distance, LA-San Bernardino service from the shorter distance, Los Angeles to Pasadena line. There are several ways in which other rights-of-way might be combined with the Second Subdivision to do this:

a) One option would be to provide a limited stop bypass route around Pasadena, using the old PE right-of-way in Huntington Drive from Arcadia to Lincoln Heights, and a combination of the SP Lincoln Park spur track and the State Street Line or El Monte Busway R/W into the LA CBD (see Appendix E). Under this scenario, the local transit line on the Second Subdivision from LA to Pasadena via Highland Park would be extended east to Arcadia, which would be the local/express transfer point. This option would be suitable for a rail transit operation eastward from Arcadia on the Second Subdivision (not a commuter rail line).

b) A second option would be to combine a San Bernardino commuter rail line on the Second Subdivision with operation over the SP Azusa Branch from Azusa south to Baldwin Park, and thence west via the Baldwin Park Branch, Alhambra Line, and State Street Line to the LA CBD. In this proposal, recently suggested by LACTC staff, the local transit line from LA to Pasadena on the Santa Fe line would terminate at Azusa, which would become a transfer point.

However, with this routing scheme, it might also be possible to operate the San Bernardino-Azusa/Baldwin Park/Alhambra/State Street route as an express interurban electric railway, which would also be compatible with the Pasadena light rail line. This would permit some trains from San Bernardino to be routed direct to the Pasadena CBD over the LRT line. Under this scenario, a directional peak hour service (and perhaps some bi-directional, off-peak service) would be provided between Azusa and the LA CBD on the SP right-of-way, much of which would be limited to single track. However, the Santa Fe line east of Azusa could be double-tracked, permitting peak and off-peak service in both directions along the middle part of the corridor (e.g., from Pasadena to Rancho Cucamonga).

c) A third option would be to combine the eastern half of the Second Subdivision with the western half of the SP Baldwin Park Branch line (combined with the Alhambra and State Street Lines, as per the recent SP proposal) to provide the longer-distance LA-San Bernardino service (see Appendix C). Under this scenario, the local LRT line from LA to Pasadena on the Second Subdivision would be extended east to San Dimas, which would become a transfer point. This option might be suitable for a commuter rail service linking LA to San Bernardino or (if combined with new R/W along Badillo or other arterial streets parallel to the western segment of the Baldwin Park Branch), a light rail-compatible interurban railway.

d) A fourth option would be to combine the eastern-most segment of the Second Subdivision (San Bernardino, Rialto, Fontana, and Rancho Cucamonga) with a rapid transit line into the City of LA following the SP/UP main lines and Pomona

Freeway, via the City of Industry (see Appendix D). In this case, the transition from the Santa Fe to the SP main would be accomplished by creating a new R/W from Rancho Cucamonga to the Ontario Airport across what is now largely open land. Under this scenario, a portion of the Second Subdivision/LA-Pasadena LRT service would be extended east to Ontario, with a connection near the Ontario Airport to the LA-San Bernardino line (as well as service to the airport itself) via Euclid Avenue or the Cucamonga Creek. This would seem to be a very long-term option.

Other Possible Regional Connections. An interesting aspect of the proposal to operate electric interurban railway service over the LRT line between Pasadena and Los Angeles is the fact that the Pacific Electric service formerly routed San Bernardino trains to the following three destinations west and south of the LA CBD: (a) Santa Monica, (b) Redondo Beach, and (c) Long Beach. It is worth mentioning this here because of the following considerations:

a) The Santa Monica Branch is in the process of being abandoned, and there is considerable interest in providing light rail service on this route (see the discussion in Chapter 10).

b) The Redondo District of the ATSF extends from El Segundo to Manhattan, Hermosa, and Redondo Beaches. This line was abandoned some years ago, but the right-of-way is for the most part intact. Although Manhattan and Hermosa Beaches are not at present interested in transit service, this might be a long-term possibility, with the link from the Pasadena line provided by a combination of the Long Beach and Century Freeway lines.

c) The LA-Long Beach line is presently under construction, and will open for revenue service in 1990.

For (a) through (c), the connection from the Second Subdivision to points to the west and south might be via a west side subway connection in the LA CBD, or by way of an east-side LA CBD transit link (see Chapters 10 and 11).

d) There may also be a long-term possibility of tying in a Second Subdivision transit line with Glendale, Burbank, and the Burbank Airport. At a recent transportation conference, Mayor Carl Raggio of Glendale cited the need to look at an east-west transit connection following the 210-134 Freeway corridor and linking Pasadena, Glendale, and Burbank. This would provide workers living in the San Gabriel Valley with access to employers located in cities to the west (14).

This might require an extension of service from the 210 Freeway rail alignment west along the 134 Freeway/Colorado Boulevard, serving the Eagle Rock Plaza and the Glendale CBD, and extending west to Burbank via Glenoaks Blvd to reach the Burbank City Hall/Golden Mall area. It could then follow the San Fernando Road/SP Coast Line/5 Freeway corridor to the Burbank Airport. It would, of course, furnish a link to the northern end of the Glendale Proposition A line. An option might be to provide a Rose Bowl spur or shuttle connection en route.

e) Considering the high level of ridership that may be generated between San Bernardino, Pasadena, and Los Angeles, it may be eventually be necessary to

construct a second transit line between Pasadena and the LA CBD, parallel to the Highland Park LRT line. It will be presumed that such a route would diverge from the Second Subdivision LRT line near South Pasadena, to join the Huntington Drive alignment and connect with the SP Lincoln Park spur track along Soto Street. It would then follow either the El Monte Busway or a new alignment by way of what is now the SP's LACTC yard facility (which under this scenario would be the site of a major transit joint development project) to gain access to the Union Station redevelopment area. This route would doubtless be of interest to the City of Alhambra, which has supported a Huntington Drive LRT alternative.

The above would follow part of the Huntington Drive alignment discussed previously (option a); assuming a compatible technology, both local and express services could operate over this route. The Huntington Drive/Lincoln Park route option is discussed in more detail in Appendix E.

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14. SOUTHERN PACIFIC BURBANK BRANCH/COAST LINE COMBINATION

Basic Route. The Southern Pacific Burbank Branch begins in Chatsworth in the northwestern end of the San Fernando Valley, where a connection is made with the Coast Line (Figure 14.1). It continues south along the east side of Canoga Avenue through Canoga Park, and turns to the east in the vicinity of Woodland Hills, following the north side of Victory Boulevard to Winnetka and a median alignment along Topham Street in Tarzana, east to White Oak. At this point it curves north and east across the Sepulveda Dam Recreation Area, and again follows Victory east to the 405 Freeway.

After going under the freeway, it curves to the southeast for a short distance, and then runs through Van Nuys on a mid-block alignment just north of Oxnard Street. It next turns southeast at Woodman, follows a diagonal course down to Chandler Boulevard, and runs in a wide median along Chandler east to North Hollywood. The line then continues in an easterly direction to Vineland (thereafter following the south side of Chandler), enters the Magnolia Park Section of Burbank where it is again in a median, and finally terminates on the Coast Line east of Victory Boulevard.

The Coast Line runs diagonally across the Valley from Chatsworth to Burbank, with a west-northwest/east-southeast orientation, north of the Burbank Branch; passing through Northridge and Panorama City and just below the Burbank Airport. It is heavily used by the Southern Pacific for freight operations, and there are several Amtrak intercity round trips operating over it at present.

South of Burbank, the Coast Line follows along a south-southeasterly alignment, roughly paralleling San Fernando Road, and skirting the western border of the Burbank and Glendale CBD areas. It then enters the City of Los Angeles in the Atwater/Glassel Park area, continues southeast, passing Mount Washington in the vicinity of the very large SP Taylor Yard; and turns south along the LA River, to join the Union Pacific line along the east side of the LA River.

This latter route provides access for through trains to the SP's Los Angeles Transportation Center (LATC) trailer-on-flatcar (TOFC) facility which is located east of the LA River, across from LA Union Station. However, the SP also has trackage along the west side of the LA River, via the old Link Yard, providing access to the large Cornfield-Bullring yard area (now in process of abandonment) just to the east of Chinatown.

Possible Transit Uses. The Burbank Branch right-of-way has been the subject of considerable interest on the part of the LACTC as a candidate for the east-west San Fernando Valley light rail line (Figure 14.1). The original Proposition A ballot map showed this route connecting Canoga Park at the western end of the San Fernando Valley to Van Nuys, with a further link to the Los Angeles Civic Center (1). An early concept was to develop a light rail transit line along the Burbank Branch from Nordhof/Canoga (just south of Chatsworth), south to Woodland Hills and then east to Lankershim and Chandler in North Hollywood (2). There it would function as a feeder to the Metro Rail route serving Universal City, Hollywood, the Wilshire District, and the LA CBD.

However, the LACTC has more recently proposed to connect a Burbank Branch transit line with Warner Center via a short segment on aerial structure, along Owensmouth Avenue. This would permit the line to serve this major business/retail-commercial/residential/entertainment center in the southwestern San Fernando Valley.

The concept studied by the Santa Fe Pacific Realty Co. in 1986 (see Figure 1.5) called for an electrified commuter line or light rail facility utilizing the Burbank Branch in its entirety (3). This route would begin at Devonshire in Chatsworth, where there is considerable space for a station and park-and-ride lot; it would go south for a short distance along the Coast Line R/W to join the Burbank Branch at Plummer. It would then continue southward over the Burbank Branch to Woodland Hills, there to turn east and proceed all the way to the City of Burbank. South of Burbank, it was suggested that the transit facility would be located to one side of the SP Coast Line R/W, extending down to Glendale and continuing on to LA Union Station.

Burbank-LA CBD Transit Route. The eastern leg of the route proposed by the SFP Realty Co. following the Coast Line appears to parallel very closely the Proposition A Glendale corridor. However, the latter has generally been assumed to follow Brand Boulevard in Glendale, providing better access to that city's CBD area than the railroad right-of-way.

Also, the Coast Line has recently been under study as part of an intercity rail corridor linking San Diego and Los Angeles with Santa Barbara, with the added possibility of a commuter rail line from Ventura County to LA via Chatsworth, Burbank, and Glendale, operating over the same tracks (4). It seems desirable to avoid duplication of the Coast Line intercity service and any possible commuter rail operation service on the same main line tracks, by routing the parallel transit line away from the Coast Line to the extent possible.

A feasible alternative route from Burbank to the LA CBD might follow the Burbank Branch east to Victory Boulevard and cross over the 5 Freeway on structure to gain access to the Golden Mall redevelopment area, continue southeast on new right-of-way skirting this section which is currently vacant (all existing structures having been leveled), and then proceed past the extant Burbank CBD area, perhaps using a short tunnel or aerial alignment.

At this point, the line could follow the median of Glenoaks Boulevard into Glendale; this is the former Pacific Electric Glendale-Burbank line, and is believed to be the locally-preferred option for linking Burbank and Glendale. The section south through the Glendale CBD could follow Brand Boulevard, using a surface or tunnel alignment at the north end, and surface or aerial construction farther south.

At the southern end of Glendale, an attractive possibility would be to follow the recently-abandoned UP Glendale Branch, which runs through a light industrial area just to the east of San Fernando Road (and along the western border of Forest Lawn Cemetery). The Glendale Branch has its own opening below the Glendale Freeway, and crosses over San Fernando Road just south of this point to gain entry to Taylor Yard. The use of this branch line would obviate the need to follow the more constricted parts of San Fernando Road on costly and

unaesthetic aerial structure, and avoid using the SP Coast Line in this section (with a potentially difficult connection to the southern end of Brand Boulevard and other possible construction and liability problems in the use of this part of the main line right-of-way).

The route would probably then run south through Taylor Yard; it is assumed that redevelopment plans for Taylor will reroute the freight and Amtrak trains over to the Los Angeles River side of this linear yard facility, and that the transit line would better be placed to the east, closer to San Fernando Road.

An option would be to use a wide section of San Fernando Road for surface R/W from the UP crossing of this highway south to the Verdugo Road intersection. Here an abandoned segment of the UP Glendale Branch was converted into an east barrel of the roadway, separated from the main road by a side median (parking on both sides); the access road itself has two lanes and parking on the east side. This would appear to provide at least a 40' wide R/W. The way is clear to cross over from this east barrel to Taylor Yard just above Verdugo, where there is a gap in the buildings on the west side of the street. (From this point south, the transit line would be on the SP property, as described above.)

(Yet another option, considering the narrowness of the UP Glendale Branch R/W, might be a one-way couplet pairing one track on a surface alignment on the UP branch line with a second track [perhaps partially aerial] along the SP Coast Line north to Glendale Blvd., turning east to Brand.)

Assuming that the southern end of Taylor Yard may be redeveloped for light industrial land uses, the LRT line could fly over the freight/Amtrak line on structure and run down the LA River side just across from Elysian Park. It could utilize the present single track SP bridge under the 5 Freeway and Riverside Drive to cross over to the west bank of the river, requiring an additional span to provide a double track line (the SP river crossing could be displaced to the south, if desired for Amtrak use).

At this point, the transit line would run through the underutilized SP Link Yard on the west side of the LA River, passing beneath the North Broadway highway bridge, and gain access to Chinatown and the LA CBD area via the largely abandoned SP Cornfield-Bullring Yard complex. (It is understood that the LACTC is interested in using the old Link Yard north of Chinatown for a maintenance facility, for both the Glendale and Pasadena lines.)

The above is only one of several possible routing options. The LACTC and the Cities of Los Angeles and Glendale are currently studying north-south light rail alignment alternatives for access to downtown Glendale. These include several San Fernando Road (SP Coast Line) alignments (accessing the Glendale CBD from the west), a Brand Boulevard alignment north to Glenoaks, a Brand/Central one-way loop arrangement, and even a Glendale Freeway alignment (5). It is assumed that the Cities of Burbank and Glendale, which are interested in a light rail connection between their respective CBD areas, will want to do their own route refinement studies along this connecting non-Proposition A corridor segment.

Various Other Routing Options. If the Southern Pacific disposes of the Burbank

Branch, it will in all probability want to sell the entire line, not just certain segments. Although the original Proposition A map showed only a Canoga Park-North Hollywood route, and later route refinements have suggested that the highest priority would be a line originating in Warner Center, possession of the entire right-of-way would eventually allow extensions to Chatsworth and Burbank, provided the funding situation improves and it is possible to finance additional links in the regional transportation network. With the purchase of the complete branch line, right-of-way protection will have been accomplished for the segments that may not be part of the initial operation.

Patronage estimates conducted in 1983 indicate that for a Burbank Branch Canoga Park route, 81% of passengers boarding the line in an eastbound direction and alighting in a westbound direction during the AM peak period would use stations from Winnetka east to North Hollywood. 19% would use the De Soto/Victory stop, for Warner Center access (this totals 100%). However, an additional 22.6% on top of this (over and above the 100%) would use the Canoga Park extension (6). This suggests that both Warner Center and Chatsworth branches can be justified.

There are currently plans to improve Los Angeles-Santa Barbara intercity rail service as part of a Southwest Corridor concept reaching south to San Diego. In addition to the long-distance Coast Starlight train service, one San Diegan round trip has been extended north to Santa Barbara, and it has been proposed to extend two more of these passenger trains northward. The Los Angeles-Santa Barbara Rail Corridor Study has recommended a total of four San Diegan round trips to be routed along the Coast Line to Santa Barbara (7). There is also considerable interest in commuter rail from Ventura and Oxnard to Los Angeles via Chatsworth; and a commuter rail run from Ventura to Woodland Hills via the north-south segment of the Burbank Branch has been studied (8).

The regional implications of an eventual north-south Burbank Branch transit line extension to Chatsworth are obvious: it would provide a link to the expanded LA-Santa Barbara/LA-San Diego intercity rail service, as well as to any future Ventura-LA commuter service on the Coast Line. (It would also provide better transit access to the fast-growing northwestern end of the Valley.)

Continuation of a Valley east-west line in a westerly direction to the City/County Line near Calabasas might also be possible via an extension of the LACTC's proposed Warner Center link. This would probably require construction along the Ventura Freeway, over to a major park-and-ride intercept area at the west end of the San Fernando Valley. (Such an extension would be costly, however.)

Farther east, there has been opposition to a Chandler Boulevard transit route between the 170 Freeway and Van Nuys. Hybrid alignment proposals have been suggested from time to time which would deviate from the Burbank Branch in this section. One of these was the LACTC's Victory Boulevard aerial alignment, which was intended to provide service to the Valley Plaza/Laurel Plaza center in North Hollywood (a major retail-commercial complex including the May Company, Sears, smaller shops and theatres). A derivative of this concept which was suggested to the Citizen's Advisory Panel on San Fernando Valley Solutions combined an aerial segment along the 170 Freeway with a two to two and a half mile tunnel to rejoin the Burbank Branch near Van Nuys (9).

As neither of these hybrid alignments are among the alternatives forwarded by the Citizen's Advisory Panel for further EIR work, the Valley Plaza diversion is mentioned here as a(n albeit more costly) Burbank Branch variant for future reference only in the event that the Chandler route should remain politically unfeasible, even with the proposed mitigations.

One additional proposal for a transit route connecting with the Burbank Branch should be mentioned here:

The LACTC looked at a Vineland Avenue surface extension south from the Burbank Branch route, from North Hollywood to Universal City (10). This would run down the old Pacific Electric San Fernando Line right-of-way and gain access to Universal City via the Hollywood Freeway and a short tunnel. A very clever design was conceived, running down the power line R/W on the west side of Vineland to Camarillo, and flying over the intersection to reduce traffic interference as well as bringing the line down to the ground in a median alignment south of this point. The line would use the very wide sidewalk areas under the 134 Freeway for the required additional lane space, and follow the east side of the 101 Freeway for access to a Universal City subway station.

This Vineland Avenue LRT link is intended to provide cheaper substitute for the Universal City-North Hollywood segment of Metro Rail, as there are may be problems in funding the subway link north of Universal City.

In conjunction with the Vineland route, the SCRTD has recently completed a preliminary feasibility study on a possible extension of this light rail line south to Hollywood, following the Hollywood Freeway (11). This would be an alternative to the Metro Rail tunnel route from Hollywood to Universal City and North Hollywood. Two variants were considered (both using surface alignments along Hollywood Boulevard and Highland): a Cahuenga Boulevard route and an aerial line along the Hollywood Freeway. Although an aerial/surface route to Hollywood would be less costly and could be implemented sooner than the Metro Rail line, there are questions of speed, traffic and other impacts which would need to be addressed in an environmental impact report before this alternative could be considered for implementation.

Operations. With a North Hollywood Metro Rail terminus, it would appear that at least two separate east-west San Fernando Valley transit routes could be operated over the Burbank Branch segment between Woodland Hills and North Hollywood. One route could run from Warner Center to the Metro Rail station, and a second from Chatsworth/Canoga Park to Burbank, Glendale, and the LA CBD (via parts of the Burbank Branch, Glenoaks and Brand Boulevards, the UP Glendale Branch, Taylor Yard, the Coast Line, and the Link and Cornfield-Bullring CBD rail yards).

Under this scenario, if a four minute headway were operated over the trunk line, service could be provided every four minutes into a Metro Rail terminus at North Hollywood, and every eight minutes to each of the following destinations: Burbank, Warner Center, and Chatsworth.

With a Universal City Metro Rail terminus, three routes might be operated over

the east-west trunk line, to provide adequate service to Metro Rail: Warner Center to Universal City, Chatsworth to Universal City, and Warner Center to Burbank, Glendale, and the LA CBD.

Under the latter scenario, with a four minute headway over the trunk line, this would mean service every six minutes to both Warner Center and Universal City/Metro Rail; and every 12 minutes to Chatsworth and to Burbank/Glendale/LA CBD. To reduce surface traffic interference (where not grade separated) it would also be possible to couple up cars bound for two destinations into a single train and split them at junction points. (The reverse operation, coupling cars at junctions, is done on the Muni Metro in San Francisco, but it involves careful scheduling).

It would also be possible to operate directly from Chatsworth to Warner Center (this would involve tripper service running later in the morning rush hour than the Metro Rail/LA CBD-bound services); and the Vineland extension would make it possible to operate yet another route in "L" configuration from Burbank west to North Hollywood over the Burbank branch, and thence south to Universal City along Vineland.

Finally, it should be noted that additional runs could be made between the LA CBD and Glendale, or from LA to Burbank via Glendale. Some of these trains might be extended to North Hollywood via the Burbank Branch and south to Universal City via Vineland Avenue.

The above scenarios illustrate that considerable operational flexibility would be possible using the Burbank Branch together with several tributary rights-of-way, and demonstrate that adequate service could be provided to Warner Center, Chatsworth, the Metro Rail connection, and Burbank. Definitive operating plans would be developed by the LACTC and SCRTD in designing a Burbank Branch transit line and in preparation for the start-up of service (if and when it is certain that the Burbank Branch will be the designated east-west San Fernando Valley corridor).

Socio-Economic Data. In addition to the population and employment data used in descriptions of other high-potential lines, San Fernando Valley demographic maps developed by the Los Angeles City Planning Department and based on SCAG 1982 Modified Growth Forecasts will also be mentioned below. These maps are used to indicate densities of over 16 persons per acre (falling within our normally used "moderate density" population category) and employment figures of over 7500 persons employed per census tract, both for 1986 and 2010. A City Planning Department map showing urban centers (commercial/institutional land uses), multifamily residential areas, and industrial areas was also very helpful (12).

Population. 1984 population maps show that for the north-south segment of the Burbank Branch at the west end of the San Fernando Valley, population densities are low in Chatsworth and moderate in Canoga Park. However, the 2010 maps show that considerable growth will occur in the northwest end of the Valley, with Chatsworth increasing to moderate density. Within this category, however, the City maps indicate that the section east of the Burbank Branch along Saticoy had already attained 16+ persons per acre in 1986; by 2010, the section along Devonshire and the area just west of Warner Center are also shown to exceed the

16 persons per acre figure.

1984 maps indicate that the western end of the east-west Burbank Branch alignment passes mainly through a mixture of low and moderate density residential neighborhoods. Year 2010 maps show considerable infilling, with mainly moderate population density bordering the Burbank Branch to the north, and a very large medium density area on the south side in the vicinity of Reseda Boulevard. Considerable expansion of multifamily housing in this area is already apparent.

For Van Nuys, North Hollywood, and Magnolia Park in Burbank, the 1984 maps indicate largely moderate density residential coverage, with a large area of medium density along Chandler Boulevard east of the Valley College, and a substantial medium density area in North Hollywood near the proposed Metro Rail terminus. The 2010 maps suggest that the Chandler section will increase to high density. This growth process is very evident today along Chandler and over a wide area of North Hollywood. Additionally, within the moderate density category, 1986 City maps show over 16 persons per acre for census tracts north of the line in Van Nuys and along Woodman; by 2010, there will be a great expansion in this 16+ persons per acre category to the north and west of the Van Nuys Civic Center.

In the Golden Mall area of Burbank, in Glendale east of the SP Coast Line, and in Atwater, Glassel Park, and Mount Washington, substantial moderate density areas are shown on the 1984 maps. It should be noted that in Glendale, a Brand Boulevard alignment appears to be greatly superior to the railroad alignment, because several medium and high density residential sections are indicated east of this major north-south street. The 2010 maps indicate that there will be a considerable expansion of these medium/high density areas to the east of Brand, reinforcing this conclusion.

Employment. Both the 1984 and 2010 employment maps indicate a large area of moderate density employment in northern Chatsworth bordering the Burbank Branch to the east. They also show the line penetrating another substantial moderate density area in the southern part of Canoga Park, and bordering a large medium density employment area in Woodland Hills. The latter corresponds to Warner Center, and there is considerable building activity evident here at the present day. However, 1986 and 2010 City maps also indicate areas with over 7500 employed per census tract on both sides of the Burbank Branch in northern Canoga Park.

The 1984 maps show the line passing through another large area of moderate employment density in Van Nuys; the 2010 maps indicate an expansion of this moderate density area, and an increase to medium employment density in the Van Nuys central area. 1986 and 2010 City maps also indicate an area with over 7500 employed per census tract in the Van Nuys Airport area north of the Burbank Branch along Hayvenhurst.

In Burbank, Glendale, and the Atwater/Glassel Park area, the 1984 maps indicate major moderate density employment areas along the Coast Line. However, in Glendale, there is a large medium density area farther to the east, along both sides of Brand Boulevard. This suggests that deviation of the transit route to

Brand Boulevard in Glendale would better serve concentrations of employment in that city.

The 2010 maps indicate the southeastern end of Burbank going to medium employment density, and in Glendale, high density employment in the CBD area along northern Brand Boulevard, with medium employment density in southern Glendale between Brand and the Coast Line. This again reinforces the idea that a Brand Boulevard route would be superior.

The 1984 maps show an area of moderate density employment along the Coast Line to the west of Mount Washington; 2010 maps indicate further expansion of this area. Entry into the CBD would involve a route through or near Chinatown; this is indicated as a large medium density area on the 1984 maps. By the year 2010 parts of Chinatown are shown to be high in employment density. Finally, the northern/central part of the LA CBD served either by a light rail tunnel or via transfer to Metro Rail is indicated on the 1984 maps to have a mix of medium, high, and very high density employment. By 2010, most of this area will have a very high employment density.

Commercial Areas And Other Activity Centers. The description of special trip generators will begin along the Coast Line north of its western junction with the Burbank Branch in Chatsworth. In Chatsworth, the presumed northern terminus of the line would be at Devonshire, a major arterial: providing access to a considerable number of apartment complexes, townhouses, and other clustered housing to the north and west of the line, as well as to a commercial area to the east along Devonshire itself.

Farther south, following the Burbank Branch southward from Marilla to Parthenia, there are three mobile home parks (a form of housing denser than ordinary single family detached homes) and some modern industrial parks near the line, with apartment buildings to the west along Laurel Canyon and south on Parthenia. Continuing south, there are also numerous apartment complexes lining Roscoe and Saticoy, just to the west of Canoga from Saticoy south to Vanowen, and east of the rail line along Sherman Way. Light industrial land uses and a number of industrial parks border the line on both sides from Roscoe to Saticoy, and on the east side down to Sherman Way. Sherman Way, which crosses the R/W in an east-west direction, is a major commercial street.

Where the Burbank Branch turns southeast to join the Victory alignment at De Soto, there occur major Rockwell plant facilities to the west and south, large apartment buildings north of Victory and west of De Soto, and some major new office buildings in the northeast corner of Warner Center. Additionally, an office park, the Woodland Park Medical Group, and some apartment buildings have been developed north of Vanowen; while just to the west lies Topanga Plaza, a major shopping mall with four anchor stores.

However, proper access to Warner Center, as noted above, will require a southerly extension on aerial structure as planned by the LACTC. The Warner Center complex includes a number of high rise office buildings, the Promenade Mall (a major shopping mall with two anchor stores), a major hotel, light industrial/office parks to the east, and a number of banks and major apartment complexes to the west of the complex.

If the Warner Center spur were to be extended south to the vicinity of Ventura Boulevard, probably along Canoga, service would be provided to some very major new apartment/condominium complexes at the south end of the center, just above the Ventura Freeway. This would also allow access to major shopping plazas, a retirement hotel, and farther east at De Soto, a Target Store, several large bank buildings and office complexes, a hotel, churches, condominiums, a DWP building, and the Kaiser Permanente medical complex.

(Extension of this Warner Center branch west along the Ventura Freeway would provide access to the Valley Circle area, which has a number of office parks, commercial plazas, and apartment buildings along Park Granada, Calabasas, and Mulholland, as well as the Calabasas Road tourist area. The main reason for such an extension however would be a park/ride intercept west of The Valley along the Ventura Freeway; shuttle buses would be needed to provide access to many of the housing/commercial/office developments in the surrounding hills.)

To return to the main east-west segment of the Burbank branch, a continuation east from Warner Center would serve Los Angeles Pierce College and the Valley Occupational Center. Small commercial sections occur at Tampa and Reseda; also, from Yolanda to Etiwanda (and north along at Reseda Boulevard) the line would access a large number of apartment complexes. A Reseda Blvd. stop would provide a link via bus transfer to the major Tarzana commercial center.

The section from Balboa to the 405 Freeway would access some apartment complexes along Victory and Woodley, a new office building at Balboa, the Birmingham Senior High School, and the important Sepulveda Dam Recreation Area. Farther east, it would cross Sepulveda Boulevard, a major arterial and transit street which is undergoing rapid development. There are sizable apartment areas nearby, to the south of the Burbank Branch in this location.

The line would next cross Van Nuys Boulevard. This area includes the Valley Municipal Building, the Los Angeles County, State, and Federal buildings, and the Post Office. It also includes the commercial strip along Van Nuys Boulevard and nearby Victory Boulevard; and sections of apartment development both east and west of the Civic Center. This area is the administrative center for this part of the Valley, and a major bus transfer point. A policy growth area has been designated around the Van Nuys Civic Center area.

At Fulton Avenue, the line would serve the Los Angeles Valley College (also the Ulysses S. Grant High School, next to the college), and there is additional apartment development in this area along Burbank Blvd. Along Chandler near Laurel Canyon, there are a number of large apartment complexes. At Lankershim/Chandler, the line would pass through North Hollywood. Lankershim has seen considerable commercial redevelopment in recent years, and there are also major apartment projects in this vicinity. This is also a policy growth area, which extends south along Lankershim.

The Vineland Extension would extend south from the Burbank Branch, parallel to the Lankershim commercial area, and would serve the major commercial/entertainment/employment complex at Universal City. In between and nearby, there are some major areas of apartment development. This extension would connect the

North Hollywood and Universal City policy growth areas.

For a continuation of the transit line east along the Burbank Branch, land use is mainly residential all the way to Victory Boulevard, where there is a fair amount of commercial and light industrial development.

Crossing over the 5 Freeway, it is presumed the route would be built on new right-of-way fringing the Golden Mall area; this would serve a major new \$ 200 million, 40-acre mixed use development by the Alexander Hagen Co. This complex will include retail stores, offices, a multi-screen movie theatre, and community center; while the City of Burbank will reserve a parcel to be used for hotel development. The retail area will include a 285,000 square foot IKEA furniture store, and Sears, Mervin's, and Buffums stores (13).

On this side of the Burbank CBD, there are already several bank buildings, a high-rise apartment tower, and the Burbank High School. To the southeast of the redevelopment area lies the existing Burbank Civic Center, including City Hall, bank and office buildings, many shops lining the old Golden Mall pedestrian promenade, a movie theatre, a Holiday Inn, some major new townhouse/apartment complexes, and the Burbank Community Hospital.

The section along Glenoaks is mixed commercial and residential; however just to the southwest (on the other side of San Fernando Road), there is a prominent linear strip of light industrial/office parks along the SP Coast Line. The North Glendale Hospital is located along this section of Glenoaks Boulevard at Sonora Avenue. Sonora goes under the 5 Freeway, and a station in this location might provide the best access point for a bus shuttle to the Los Angeles Zoo and Travel Town in Griffith Park.

The Glendale CBD along Brand Boulevard includes the Glendale Galleria, Glendale Fashion Center, City Hall, Post Office and Library, a number of major bank buildings, the commercial section of Brand Boulevard, and major residential developments. This area is experiencing rapid growth, with major new projects including the Glendale City Center, a 790,000 square foot office/retail project with 18 and 22 story office towers to the north of the Galleria; the Exchange, a 423,000 square foot, 22 story office tower; 500 North Brand, a 332' high building; and others (14). Near the south end of Glendale, access would be provided to the Los Feliz retail-commercial section and Glendale Memorial Hospital.

Farther south along San Fernando Road, commercial/mixed-use sections at Fletcher Drive and Verdugo Road would be accessed, together with industrial development bordering the SP Coast Line. A policy growth area occurs on the east side of the LA River south of the Pasadena Freeway crossing.

It is understood that an employee origin-destination survey conducted by Wilbur Smith & Associates for the SCRTD (circa 1975) revealed that a considerable number of work trips originate in the Lincoln Heights area, bound for industrial employers along the San Fernando Road corridor between Burbank and the LA CBD. Hence good bus transfer facilities in the area north of Chinatown could greatly increase ridership on this segment of a Los Angeles-San Fernando Valley transit line.

The line would enter the LA CBD via Chinatown, a major commercial/tourism center (also a policy growth area). Finally, on the north side of the LA CBD, it would access the Civic Center, Federal and County buildings, LA Union Station, and Little Tokyo. Chapter 13 has already documented development proposals for this area of downtown Los Angeles.

Development Potential On Rail Yards Or Excess Right-of-Way. There is a wide section of Coast Line near Devonshire which is presently devoted to marginal industrial land uses; it is apparently in excess of 10 acres, large enough for a 1500-car parking lot, or for a joint development project of some size.

The right-of-way along the Burbank Branch itself is 100' wide all the way from Chatsworth to Whitsett. There are wider areas along this branch line which might have station or other development potential as follows:

In Chatsworth, there may be an additional 11 acres or so along or near Marilla Street. Farther down the line, on the north-south segment of the Burbank Branch, there is a section from Vanowen to a point north of Sherman Way that totals 16 acres. Considering the commercial nature of Sherman Way, this site might have some joint development potential, after station parking requirements are taken care of.

Along the east-west section of the Burbank Branch, there is a wider segment at Reseda with about 11 acres; this may suffice only for station parking. At Balboa, there are about nine acres; development has already begun here, probably involving the SP property. Again at Van Nuys Boulevard, there is a wider area comprising about 13 acres, perhaps enough for a minor joint development project in addition to station parking.

From Whitsett to the Los Angeles/Burbank city line, the R/W is only 60' wide; and east of this point it is 35'. However, there is a section at Lankershim of about 10 acres, which would be involved in a Metro Rail station development project; or in the event a Vineland alignment were chosen, it could be a light rail station/joint development site.

The Coast Line is generally 100' wide. The Coast Line section just west of the 5 Freeway and across from the Golden Mall appears to include wider sections totaling about 15 acres. Considering that there might be a transit station on the Victory Boulevard side, and with the proximity to major new development in the Burbank CBD, this might have joint development potential. As it is next to the freeway, it might be possible to combine railroad and Caltrans owned property to undertake an air rights project spanning the freeway (like the Glass House in Oklahoma, a building incorporating a restaurant overlooking an interstate highway). Such a development would lie adjacent to the transit guideway crossing the freeway on aerial structure, providing a view of vehicular motion on several levels.

The 10 acres available along the Coast Line at Glendale Blvd. may be better suited to expansion of the existing Glendale Amtrak station, which has recently been refurbished and is somewhat of a landmark building in this area.

Below the Glendale Freeway crossing is the major Taylor Yard facility. This appears to total 146 acres. A large part of this property may be up for redevelopment in the near future. This would be a promising site for a major transit/real estate joint venture project.

South of this point lie the Link Yard and the Cornfield/Bullring Yard complex, situated next to Chinatown. These railroad yards appear to total about 54 acres. Considering their nearness to Chinatown (a policy growth area), there could be considerable joint development potential in association with a Chinatown transit station.

Finally, for LAUPT, about 50 acres is available. This has already been planned for use in a major project involving the Amtrak station, Metro Rail and bus transfer facilities, commercial and office development, and recreational space.

Freeway Conditions. A route using the SP Burbank and Coast Lines to access downtown Los Angeles would parallel the 101/134 Ventura Freeway east to Burbank/Glendale, the 5 Golden State Freeway south and east to the vicinity of the LA CBD, and a short segment of the 110 Pasadena freeway which provides access to the west side of the downtown area.

Freeway peak hour volumes are on the order of 18,000-19,000 for the Ventura Freeway west of the interchange with the 101 Hollywood Freeway, and about 12,000 for the 134 Freeway east to Glendale. Peak hour volumes on the 5 Freeway from Glendale to the LA CBD range from 15,000 to 18,000.

Congestion is severe during the AM peak period on all of these freeways, with a volume/capacity ratio over 1.0 (level of service F) for more than one hour on the Ventura Freeway and for over three hours on sections of both the Golden State and Pasadena Freeways close to the Los Angeles CBD. A level of service F is also encountered in the PM peak, for over two hours on the segment of Pasadena Freeway accessing the Golden State Freeway, and also on parts of the Ventura Freeway west of the Hollywood Freeway interchange. Heavy congestion can also be encountered in an eastbound ("reverse peak") direction during the afternoon rush hour, with a level of service F for over an hour along portions of the Ventura Freeway.

Accident rates are also high, ranging from 26 per mile per year for the Ventura Freeway west of the 405 interchange to 63 per mile per year east of this point. Accident rates for the Golden State Freeway range from 33-39 per mile per year north of the junction with the 110 Freeway to 81 per mile per year south here; while accident rates on the Pasadena Freeway link to the LA CBD are very high, from 69 to 110 per mile per year, from the 5 Freeway into downtown Los Angeles.

The combination of very high traffic volumes, heavy recurrent congestion, and high accident rates which further compound the congestion problem, suggests that there would be excellent trip-generation potential for transit facilities developed on parallel railroad rights-of-way. This would be the case for a Burbank Branch light rail line serving Metro Rail, for a rail line linking Burbank and Glendale to downtown LA, or for a through service connecting the San Fernando Valley with the LA CBD (without a transfer).

Transit Service. About a half dozen SCRTD express bus lines serve the San Fernando Valley, operating over segments of the Hollywood and Ventura Freeways and covering the Sherman Way, Ventura Boulevard, Van Nuys, Chandler, Lankershim, and other service areas. There is also a contract bus route serving the Encino park-and-ride lot and operated over the Ventura Freeway. Several RTD express lines are routed via the Golden State Freeway and serve the Lankershim and Victory Blvd. areas; and there is a single express line serving Burbank via San Fernando Road. Additionally, ample local bus service is provided between Burbank, Glendale, and the LA CBD.

Status. Since the SP Burbank Branch has carried relatively little freight during the past ten years or so, it has been considered a prime target for abandonment by the railroad.

Opposition to the use of the Burbank Branch for transit by the Chandler Boulevard and Topham Street communities led in 1987 to routing decisions on an east-west light rail line in the San Fernando Valley being put on hold. At the time, five alignments were under consideration: the Coast Line, the Burbank Branch, a Victory (aerial)/Burbank hybrid, an LA River route, and a Ventura Freeway alternative.

The Los Angeles City Council formed a Citizen's Advisory Panel to evaluate these and other potential routing options. After months of presentations and deliberations on the merits of various routes, the Panel recommended two routes to be carried forward in the EIR process: the Ventura Freeway and the Burbank Branch. The Burbank Branch alignment was to be studied in three alternative forms: surface with extensive mitigation in residential areas (with grade separations where needed and a shallow trench/sound berm construction to reduce noise), subway-surface, and all-subway. A western extension of Metro Rail was also to be included.

At this point, therefore, it is uncertain whether a Burbank Branch or a Ventura route will be chosen for the east-west San Fernando Valley line.

The City of Burbank is believed to have under study a light rail line connecting Universal City with Burbank via Olive Avenue; this proposed route would probably require expensive subway/aerial construction. It is presumed a link would also be provided south and east to Glendale. The City of Glendale has recently expressed interest in advancing the Proposition A route from Glendale to the LA CBD. As noted above, study is underway of alternative alignments for this transit service.

Other Regional Connections. Several regional links may be possible for transit lines using the SP Burbank Branch/Coast Main Line combination:

a). At a recent transportation conference, Mr. Robert Ovrum, the City Manager for Burbank, indicated that the City of Burbank supports both the Metro Rail project and the San Fernando Valley light rail line; and would like to see the Valley line extended to Burbank. At the same conference, Mayor Raggio of Glendale suggested linking the eastern San Gabriel Valley with Glendale along the 210-134 corridor. Mr. George McGinnis, who represented Walt Disney Imagineering at the conference, stated that a Burbank-Glendale-Pasadena

connection should be added to the regional plan, and stressed the need for service to the Burbank Airport (15).

It is apparent that a link from an east-west San Fernando Valley line to Burbank could be made via the SP Burbank Branch; the connection to Glendale might be via Glenoaks or combinations of other rights-of-way such as the SP Coast Line and the 134 Freeway. Continuation east to the San Gabriel Valley would probably be via the 134 Freeway corridor/Colorado Boulevard, while further extension in an easterly direction into the San Gabriel Valley could be made by way of the ATSF Second Subdivision. It may someday therefore be possible to operate service all the way from San Bernardino to the western end of the San Fernando Valley, using a combination of railroad, abandoned Red Car, and freeway rights-of-way.

However, different technologies might be used for portions of such a very long regional corridor, and it is quite possible that owing to a scarcity of surface R/W between Pasadena and Glendale, a San Gabriel-San Fernando Valley link might be provided by a monorail or other "new technology" shuttle, rather than by a more conventional transit mode.

b). Connections might be made at Burbank with a possible commuter rail service to Saugus on the SP Coast and Saugus Lines, or to a San Fernando Road transit line north to San Fernando/Sylmar on the same corridor.

c). The regional link between the Burbank Branch and the expanded Amtrak service now under development between Los Angeles and Santa Barbara (as well as to a possible future Ventura-LA commuter line) has been discussed above.

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Old, underutilized railroad yards provide opportunities for public/private mixed-use joint development projects, focusing on new transit facilities.

15. OTHER RAILROAD RIGHTS-OF-WAY EXAMINED AND DISCUSSION OF PRIORITIES

15.1 Introduction.

During Phase III of the Railroad Right-of-Way Evaluation project, a fresh assessment was made of a number of railroad lines which were not in the "high-opportunity" group identified during Phase I of the study. This entailed determination of possible transit uses, extensive windshield surveys of the lines during 1988 and 1989 to ascertain which activity centers and special trip generators might be served by transit facilities on these rights-of-way, a review of real estate development plans in the vicinity of each, and evaluation of the railroad corporate situation, to determine which lines might be candidates for abandonment over the next decade or so.

The Phase III work was not limited to branch lines, but also included several main lines. In addition to active railroad lines, abandoned lines and some former Pacific Electric ("Red Car") and Los Angeles Railways ("Yellow Car") rights-of-way were examined at this time.

In addition, while the lines studied in detail during Phase I would serve the LA CBD (directly or indirectly), it was felt that investigation of additional rights-of-way in Orange, Riverside, and San Bernardino Counties was desirable, particularly in light of heavy population growth in the Inland Empire area, and the policy recommendations of SCAG's Growth Management Plan which stresses an improved balance between jobs and housing within counties and sub-regions, land increased employment in outlying areas.

This suggested that greater emphasis should be placed on identifying rights-of-way which could promote reverse commute patterns, and enhance older CBDs such as the Cities of Riverside and San Bernardino as well as other activity high-activity centers in Orange, Riverside, and San Bernardino Counties.

Further, the Phase III effort was driven by the very strong interest expressed by many elected officials, transportation planners, chambers of commerce, and citizens' groups in right-of-way preservation for future mobility.

As evidence of this interest in right-of-way preservation, there is a bill now pending in the State Legislature to develop a comprehensive, state-wide plan that will encourage the protection of railroad rights-of-way. SB No. 1562, introduced by Senators Presley, Ayala, and Craven, would enact the California Commuter and Intercity Transit Right-of-Way Preservation Act. It would authorize transportation planning agencies, county transportation authorities and commissions, and the San Diego Metropolitan Transit Development Board to prepare, adopt and submit to the California Transportation Commission (CTC), Commuter and Intercity Rail Right-of-Way Inventories for the areas under their jurisdiction, by April 30, 1990 (to be updated every two years).

SB 1562 would also require Caltrans to adopt an Intercity Rail Right-of-Way Inventory, and submit this to the CTC at the same time; while the CTC would prepare a draft statewide plan encompassing all the rail right-of-way acquisitions included in these plans and adopt the inventory by September 30.

1990. The intent is to foster the development of an efficient passenger rail and urban transit system in California, including intercity and commuter trains, urban rail transit systems, and exclusive busways. This bill has been endorsed by SCAG's Executive Committee.

For all of these reasons, it was decided to assess the potential of these other existing and former railroad lines to provide a "Second Tier" of rights-of-way for future transit implementation.

The results of this work are summarized in Table 15. Detailed descriptions of the rail corridors examined are given in Appendices C, D, and E. Appendix C is concerned with branch lines currently in use for rail freight, while Appendix D deals with several heavily used main lines. Appendix E considers certain abandoned railroad lines and former Red and Yellow Car rights-of-way (additionally, Appendix F cites earlier work on PE rights-of-way).

Appendices C, D, and E will provide information on possible transit uses, details of land use surrounding these lines (of importance in evaluating transit potential), and other factors which may favor development for transit, or tend to discourage transit utilization, as the case may be.

Appendix G is a discussion of the reasons why certain other main lines and branches were not studied, while Appendix H looks at intercity and commuter rail development potential (requiring track sharing with rail freight services), involving some of the railroad lines which were excluded from consideration for regular transit use.

15.2 The Issues Of Preservation, Transit Potential, And Joint Development.

Before discussing possible priorities in future transit and community development relating to railroad rights-of-way, several important issues need to be delineated.

First, there is the issue of right-of-way protection. One set of priorities will be concerned with preserving useful rights-of-way which have either recently been abandoned, are now in the process of abandonment, or soon will be abandoned. Even if the use of certain rights-of-way may be long-term, the fact that this is a high-growth region--with the prospect for infilling and development of areas that are now vacant or underutilized--suggests that a prudent course of action in a great many cases is right-of-way conservation.

A second issue is priority for transit service implementation, based on high patronage potential at the present day or in the near future: this relates to relief of traffic congestion and improving mobility for commuters and other travelers.

A third issue is development potential of contiguous and nearby properties. New joint development projects--and value capture where existing commercial property will be improved by transit development--can help immensely in improving our ability to fund transit projects on many corridors. Joint development can, of course, also be very important in community development and establishment of favorable land use patterns. While Phase I of this study

tended to emphasize development of railroad-owned properties, other vacant and marginally-used land should also be considered in more detail in future work.

All of these issues are to some degree related, although the priorities for preservation, transit implementation, and joint development will be different for each line. Table 15 provides an overview of the need for preservation (the extent to which various rights-of-way are endangered), ridership potential (on a relative scale), and opportunities for joint development involving railroad-owned property, for all of the rights-of-way investigated in the course of this study.

It is recognized that priorities for development of transit facilities lying entirely within a single county are set by the county transportation commissions and transit districts, which are responsible for their design, funding, and implementation. These agencies also have under consideration other transit corridors (not on railroad rights-of-way) which will also require substantial capital expenditures. County agencies also have a leading role to play in funding intercounty projects and a major participatory function in their planning.

The rough assessment of patronage potential indicated on Table 15 for the railroad corridors listed should not be taken as a recommendation that specific transit facilities should be constructed first. Priorities in transit development will be different for each county, and for projects coordinated between two adjacent counties and crossing county lines. The information given on relative levels of ridership is advisory only.

Similarly, information on joint development potential may be useful in helping public agencies and the private sector (especially the railroad industry) identify projects which may be mutually beneficial. Considering the scarcity of transit capital dollars in relation to the number of projects needed to maintain regional mobility, we cannot afford to ignore opportunities to involve the private sector in funding these transportation facilities.

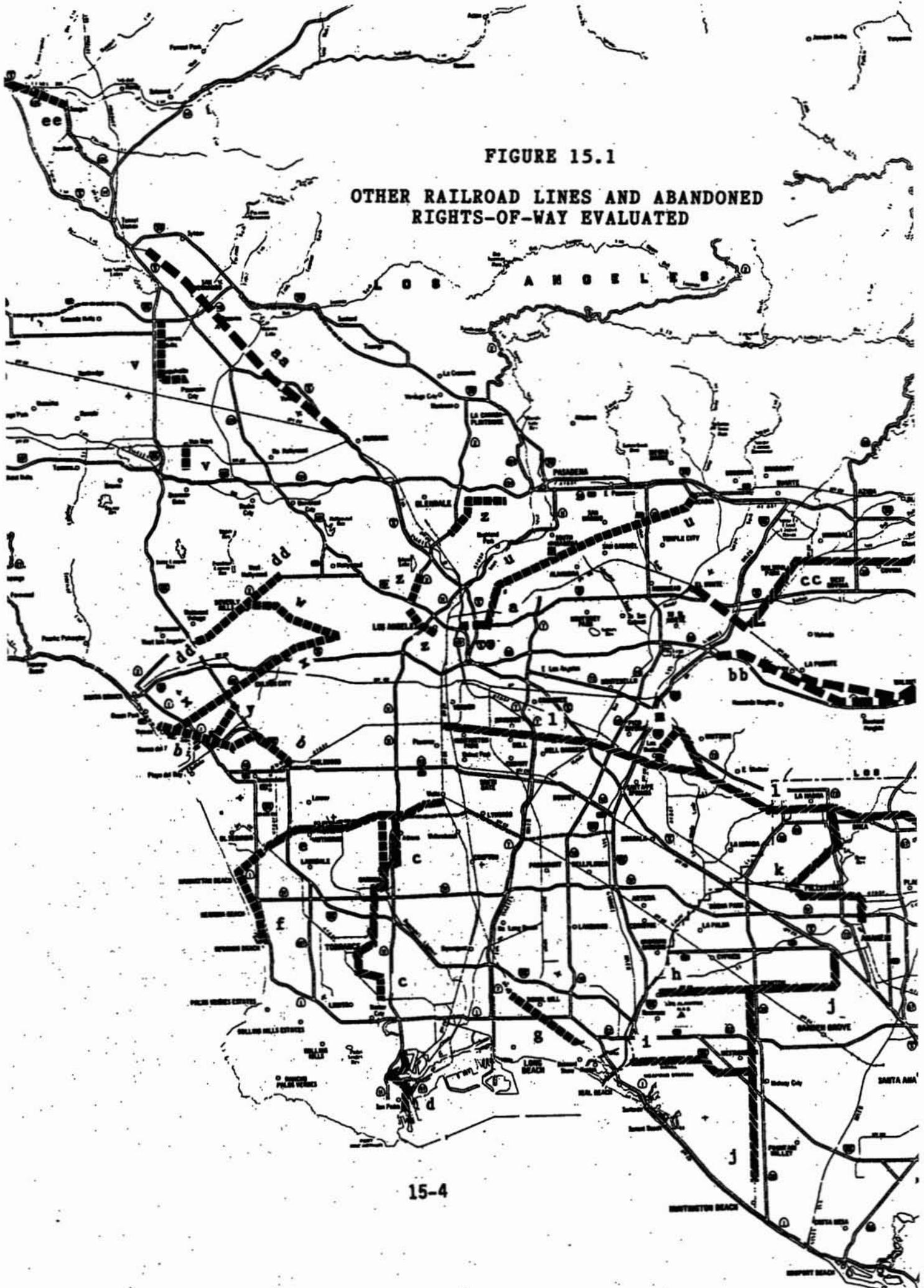
From the viewpoint of long-range transit planning, however, the issue of right-of-way preservation is of extreme importance and is a major regional issue, as noted in SCAG's Regional Mobility Plan. Failure to conserve our remaining railroad rights-of-way could have serious negative consequences for future regional mobility, for our ability to afford future transit construction, and for the regional economy as a whole.

15.3 Priorities For Right-of-Way Preservation.

Table 15 has listed the five Phase I "high-opportunity" lines first. Of these, the SP Santa Monica Branch, West Santa Ana Branch, and Burbank Branch are in the greatest danger of being abandoned; in fact the southeastern end of the West Santa Ana Branch has already been abandoned, and the western end of the Santa Monica Branch is in the process of abandonment. The Second Subdivision is less critical from a preservation viewpoint, as the Santa Fe may choose to continue operation on this main line for some time (its abandonment is tied to a major double-tracking project on the Third Subdivision). The Harbor Subdivision ranks lowest of the five from the viewpoint of need for protection, as it will remain

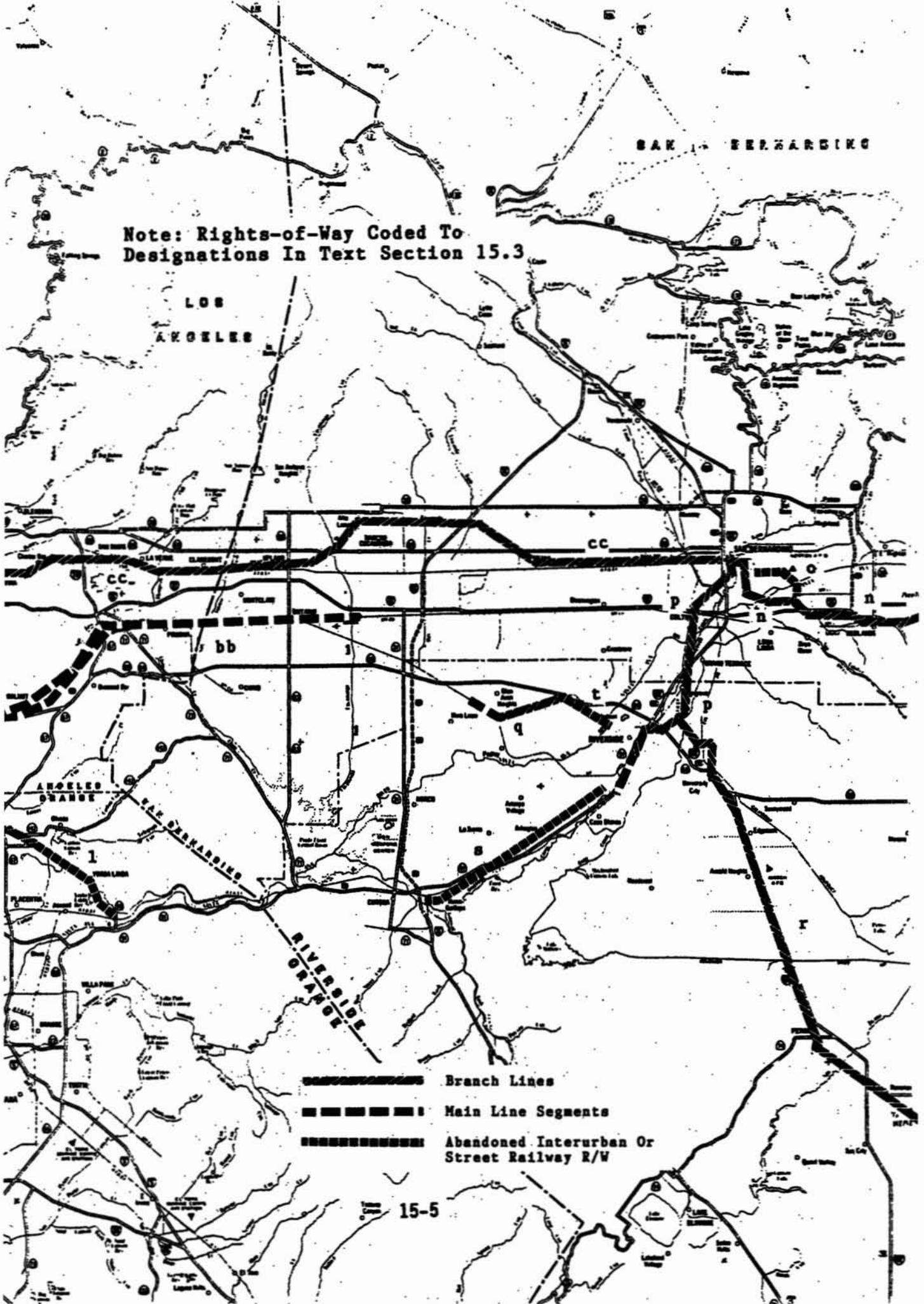
FIGURE 15.1

OTHER RAILROAD LINES AND ABANDONED RIGHTS-OF-WAY EVALUATED



Note: Rights-of-Way Coded To Designations In Text Section 15.3

LOS ANGELES



-  Branch Lines
-  Main Line Segments
-  Abandoned Interurban Or Street Railway R/W

in heavy freight use until the Alameda Corridor is implemented (and at least part of it will continue to be used for freight after that).

However, many other rights-of-way with high transit potential are either endangered now or may be threatened in the near future, and so merit preservation for future transit development. These are the following (see also Figure 15.1):

LOS ANGELES COUNTY BRANCH LINES

a) The Lincoln Park Spur, combined with the former PE rights-of-way in Huntington Drive, could be of importance in supplying supplementary service from Los Angeles to Pasadena via a high-demand sub-corridor, and in providing added track capacity for longer-distance transit routes in the San Gabriel Valley. These rights-of-way should be protected from any further encroachment for this reason. The Lincoln Park Spur track has very little freight traffic, and although its physical location (partly surrounded by parkland and parking lots) would make conversion to other uses difficult, it should be considered on the endangered list.

b). The abandoned Alla-Inglewood Branches could be of importance in providing transit service to the Fox Hills Mall area, Howard Hughes Center and Playa del Rey development areas, and Marina del Rey; they could also provide a link from the west end of the proposed Santa Monica (Exposition Boulevard) transit line to the LAX area, South Bay, and Long Beach via the ATSF Harbor Subdivision, and parts of the Coastal Corridor. As the easternmost end of the R/W has already been built upon, and the remaining segments pass through areas of high growth, these rights-of-way should be considered highly endangered.

c). The SP Torrance Branch could be valuable in developing a transit line along the San Pedro/Harbor Freeway Proposition A corridor and in serving high-growth areas of south-central Los Angeles, Gardena, Harbor Gateway, Torrance, and Wilmington. It could either be tied in with the Harbor Busway development or provide a feeder into the LA-Long Beach "Blue" line. The southern end of the existing trackage is in danger of abandonment; freight traffic on the remainder is modest.

d). The southern end of the SP San Pedro Branch, used by the Harbor Belt Line, could be part of a southerly extension of (c). With the relocation of bulk terminals to Terminal Island under the ports' 2020 Plan, this track could be redundant for freight purposes and preservation for transit should be considered.

e). The SP El Segundo Branch if tied in with the Norwalk-El Segundo "Green" line (Century Freeway line) could provide access to local trip generators such as Northrop Aircraft, Hawthorne Plaza, and the "Moneta Gardens" higher-density residential area. It could also provide added capacity to the Century Freeway transit line if someday needed. However, as this route closely parallels the Century line, it probably represents the lowest priority line of the seven LA County railroad R/W listed here. Freight traffic on this branch line is modest, but Northrop presently depends upon it for shipment of oversize loads.

f). The ATSF Redondo District. This could provide a link from the LAX area to Manhattan Beach, Hermosa Beach, and the Redondo Beach King's Harbor area (a major commercial/tourism center). Its use for transit, however, would depend upon local support at some time in the more distant future. Most of the R/W has been preserved as parkland and is hence thought to be protected; the remaining, short segments at the north and south ends may be endangered.

g). Protection of the abandoned SP East Long Beach Branch/PE Newport Line R/W should be considered as it could provide a future link from the LA-Long Beach line to Orange County (where it would tie in with the SP Los Alamitos Branch or US Naval Railroad). This right-of-way is partially in public ownership, and partly in private hands. As several short sections of the R/W have been built on and development for housing has been proposed more than once, it is highly endangered.

ORANGE COUNTY BRANCH LINES

h). The SP Los Alamitos Branch could be important in providing access to high-growth sections of Los Alamitos, Cypress, and Stanton, and could tie in with the West Santa Ana Branch transit line to Santa Ana. It could also be linked with a Stanton Branch line to the Anaheim CBD or Disneyland and to an intercounty line serving Long Beach. This line will probably be abandoned soon, and should be considered highly endangered.

i). The U.S. Naval Railroad together with the abandoned SP East Long Beach Branch could provide a link via the Stanton Branch from either Huntington Beach and Westminster or Anaheim (CBD or Disneyland) to the Cal State Long Beach/VA Hospital area and the LA-Long Beach Line. (There are a number of possible connections that could be made from LA County to Orange County, utilizing the Los Alamitos Branch, Naval Railroad, East Long Beach Branch, and a possible new alignment serving Belmont Shore in Long Beach.) The U.S. Naval Railroad has only modest freight traffic, and may be endangered for that reason.

j). The SP Stanton Branch could provide a connection from Huntington Beach to a future major transit center that could be developed at the junction with the West Santa Ana and Los Alamitos Branches, and the Beach Boulevard crossing in Stanton. From this point, a Stanton Branch transit line could proceed east to Disneyland and the Anaheim Stadium area and/or the Anaheim CBD, where a link could be made to Fullerton and points north via the UP Anaheim Branch. The Stanton Branch has only a modest level of freight traffic, and could become endangered in the not too distant future.

k). The eastern segment of the UP Anaheim Branch could provide a link from the Stanton Branch and the Anaheim CBD to downtown Fullerton, the Hughes Aircraft Plant, the major medical/commercial cluster at Harbor/Bastenchury, and northern Fullerton/La Habra. It could also provide a link to a La Habra Branch transit line serving northern Orange County. The southern end of the UP Anaheim Branch has been abandoned and is in danger of being lost; the remainder has only a modest level of freight traffic and should be considered endangered.

BRANCH LINES LINKING LA AND ORANGE COUNTIES

l). The SP La Habra Branch could provide a transit link in northern Orange County to major commercial, business, industrial, and residential areas in Brea and La Habra; it could also provide a commuter link to Los Angeles via Whittier, Santa Fe Springs, Pico Rivera, and Commerce (perhaps via the I-5 Metro Rail connection). The eastern half of the La Habra Branch has only a modest level of freight traffic and may soon be in danger of abandonment.

m). The SP Whittier Branch combined with the western segment of the UP Anaheim Branch could provide a local feeder route linking the La Habra Branch with the Whittier CBD. The SP Whittier Branch has been abandoned and can be considered a threatened R/W, while the UP Anaheim Branch has little traffic and should be considered endangered.

BRANCH LINES IN RIVERSIDE AND SAN BERNARDINO COUNTIES

n). The ATSF Redlands Subdivision could provide an important link from Redlands to the City of San Bernardino. This line is in danger of abandonment, as the ATSF would like to sell it to a short-line freight carrier, which would then provide service to the few remaining customers.

o). The abandoned northern/eastern end of the SP San Bernardino Branch. This R/W, if tied in with a transit line on the Redlands Subdivision, could provide a connection with Norton Air Force Base, which will probably be redeveloped for other purposes.

p). The SP San Bernardino and Riverside Branches could provide a link between the San Bernardino and Riverside CBDs, and from the ATSF Redlands Subdivision to the UP Crestmore Branch. There is little freight service on these branch lines, and they may soon be considered for abandonment. In addition, old rail yards at the south end of the Riverside Branch could permit a connection to be made with the former PE Riverside-Corona Line R/W farther south in Riverside; the yard area itself may have considerable joint development potential.

q). The UP Crestmore Branch combined with the Mission Boulevard median R/W could provide service to Riverside CBD, and could be linked to the ATSF Redlands line via the SP San Bernardino and Riverside Branches. The Crestmore Branch has only one major customer and (although it is not endangered at present) operation by a short line carrier along with the above-mentioned lines in Riverside and San Bernardino Counties may be considered preferable to the current operation. (These rights-of-way might also provide a link to the Ontario CBD and Ontario International Airport via the UP main line, whose R/W may be wide enough to permit addition of separate transit tracks.)

r). The ATSF San Jacinto Subdivision combined with the SP Riverside and San Bernardino Branches could provide a link from fast-growing areas of Riverside County in Hemet and Perris to the Riverside CBD, and also to the San Bernardino CBD. This line is in danger of abandonment, as the ATSF is currently looking for a short-line freight carrier to provide service to the few remaining customers.

PACIFIC ELECTRIC AND OTHER FORMER ELECTRIC TRACTION RIGHTS-OF-WAY

Although the following are believed to be publicly-owned for the most part, there is also reason to preserve for possible future transit use the following abandoned Red Car and Yellow Car rights-of-way:

s). The former PE Riverside-Corona line in Magnolia Avenue could be useful in providing a southwesterly extension of a transit line using the SP Riverside and San Bernardino Branches, or an extension of a San Jacinto transit route. The median and lateral rights-of-way should be protected against encroachment.

t). The former interurban or utility right-of-way in the median of Mission Boulevard, northwest of the City of Riverside, would be needed to provide a connection from the UP Crestmore Branch to the Riverside CBD and to other endangered branch lines in this area. It should also be guarded against encroachment.

u). The PE Pasadena Short Line and Monrovia-Glendora Line median rights-of-way in Huntington Drive and Fair Oaks may someday be needed to provide a second transit route to the Pasadena CBD or as a bypass around Pasadena as part of a longer-distance transit line (combined with the Lincoln Park Spur). They should be protected against encroachment.

v). The former PE rights-of-way in Van Nuys Boulevard, Parthenia Street, and Sepulveda Boulevard in the San Fernando Valley (PE San Fernando Line) should be preserved against further incursion, for possible future use in development of the north-south Proposition A corridor serving the San Fernando Valley.

w). The San Vicente/Burton Way (PE Beverly Hills-Venice Line) median R/W should be protected against further incursion until a decision is made on the the Metro Rail western extension; the Burton Way R/W might be needed to provide space for a portal accessing an underground alignment through Beverly Hills.

x). The Venice Boulevard right-of-way (former Venice Short Line) would provide access to Venice (the beach area), as well as Culver City and the future Mid City Center development area. Most of this R/W was converted from a median to lateral R/W strips some years ago; the latter have been encroached upon in places, and further development is expected on the median in Venice. Steps may be needed to protect this R/W against further incursions.

y). The Culver Boulevard right-of-way (former Redondo Beach-DeL Rey Line). This would provide a link between the Coastal Corridor and the north-south Proposition A corridor serving West Los Angeles, Westwood, and the San Fernando Valley. Part of the R/W has been used to construct storage facilities; as a side-of-road R/W, it can be considered highly endangered.

z). The PE tunnel in the LA CBD, combined with the Downtown People Mover tunnel and the Glendale, Eagle Rock and Colorado Blvd. median rights-of-way. The tunnels could someday be combined with the Glendale and Eagle Rock Blvd. R/W to provide a supplementary north-south line; and the Colorado Blvd. median combined with the use of Route 134 could furnish part of a Pasadena-Glendale transit connection. Part of the PE tunnel has been blocked and destroyed; the

remainder should be preserved, along with the People Mover R/W and the surface medians.

RAILROAD MAIN LINES

It should be noted that there may be future transit opportunities associated with the following main lines whose route integrity is not threatened; however there could be encroachment on property bordering the R/W which might have joint development potential:

aa). The SP Saugus Line/San Fernando Road corridor could provide access to a plausible future major growth area in the San Fernando Valley, with a link via other rights-of-way to Burbank, Glendale, and the LA CBD. Lateral strips of the Saugus Line R/W have been leased out for parking, but otherwise most of the Saugus Line is intact.

bb). Parts of the SP Alhambra Line and UP Second Subdivision could if combined with other rights-of-way including the Pomona Freeway provide a major link from the LA CBD to the Ontario Airport. Consideration might be given to preserving lateral segments of R/W in Pomona and Montclair where the SP and UP lines run very close together, and median R/W between the two main lines in Montclair and Ontario which could someday be of value for transit joint development.

BRANCH LINES REQUIRING FURTHER DETAILED STUDY

The following rights-of-way are endangered, but will require further detailed engineering and environmental studies to determine their usefulness for transit purposes:

cc). The SP Baldwin Park Branch. The western half of this line is rather narrow for development as a transit facility, and use of the R/W could result in some residential impacts. In addition, it may duplicate the extension of the El Monte Busway/HOV lane combination eastward through Baldwin Park, West Covina, and Covina (which will provide better coverage of major commercial shopping centers). The eastern half of the Baldwin Park Branch rather closely parallels parts of the ATSF Second Subdivision. It is not certain whether eastern Los Angeles and western San Bernardino Counties could support two major transit routes serving San Dimas, La Verne, Claremont, Upland, Rancho Cucamonga, Fontana, Rialto, and the San Bernardino CBD.

However, the recent Southern Pacific offer to sell the Baldwin Park Branch for transit use, combined with the State Street Line and an easement on the connecting segment of the Alhambra Line, suggests that it be given serious consideration. One option appears to be a single track commuter rail line; another would pair the western half of the line with a parallel track created from medians of nearby, wide arterial streets. If not preserved for transit, consideration should be given to preserving the R/W for recreational uses (bikeways, equestrian trails, hiking trails, etc.).

dd). The Santa Monica Boulevard right-of-way (former SP West LA Branch) may be of only marginal use for transit in its present condition. A critical segment in Beverly Hills has been built upon (mainly low parking structures) and may be

difficult to use in Metro Rail development. The West Hollywood section (now used as a park) probably has too many grade crossings to be made part of a through route, though use for a tourist trolley line might be possible. The segment from Wilshire Boulevard in Beverly Hills to the 405 Freeway might be usable as a short busway or for some arterial highway expansion. Its use for fixed guideway transit would appear to rather closely duplicate the Santa Monica Branch (Exposition Blvd.) line to the south and the Metro Rail extension in tunnel to Westwood to the north. Recreational uses (creation of a linear park) should perhaps be considered for parts of this former rail line.

ee). The SP Santa Paula Branch would have very little value as a through route incorporating the abandoned eastern segments. Most of the area traversed is agricultural, with a very low population density. It is possible that a short segment at the east end could be tied in with a Saugus Line commuter service as a link to Magic Mountain; while the Ventura County segment from Santa Paula west might be usable for a Ventura County-Santa Barbara commuter rail operation. Again, recreational uses (bikeways or riding trails) may be desirable in keeping with the rural nature of much of the route.

RIGHTS-OF-WAY USEFUL IN DEVELOPING THE FIVE HIGH-OPPORTUNITY TRANSIT CORRIDORS STUDIED IN PHASE I

Finally, the following rights-of-way should be considered for preservation in conjunction with the development of transit on the five lines discussed in Chapters 10-14:

- 1). The right-of-way extending north from the SP Wilmington Branch above Washington Boulevard, and leading towards the Produce Mart, should be considered for preservation in conjunction with a revenue or non-revenue link from the LA-Long Beach Line to LAUPT, and thence to the Pasadena line (Figure 10.1).
- 2). Former PE rights-of-way and SP/UP industrial and yard trackage in Wilmington and Long Beach should be preserved to guarantee access to the Long Beach CBD for a Harbor Subdivision transit line (Figure 11.1).
- 3). The recently-abandoned UP Glendale Branch could be of major importance in providing a link from SP's Taylor Yard to Brand Blvd. in the City of Glendale for that city's Proposition A line. This in turn could be instrumental in development of a link to the San Fernando Valley via Burbank (Figure 14.1).
- 4). The former PE Burbank-Glendale right-of-way in Glenoaks Boulevard should be protected against incursion, as a potential link from Glendale to Burbank (Figure 14.1).
- 5). The Vineland Avenue R/W in North Hollywood should be protected against incursion, as a link from the SP Burbank Branch to the Metro Rail station in Universal City (Figure 14.1).

RIGHTS-OF-WAY NOT EXAMINED

The rights-of-way discussed in this section do not exhaust the list of former railroad and PE lines. Certain other rights-of-way should be examined for

transit potential in follow-up studies. These would include the ATSF Elsinore District, the proposed "Railroad Canyon" R/W from Lake Elsinore to Perris, the SP Chino Branch, and the former PE right-of-way running down the median of Euclid Avenue in Ontario. Farther west, they include former electric traction rights-of-way in Crenshaw Boulevard in southwest Los Angeles, the median R/W in Vermont Avenue in south-central LA, and a former LARy (Yellow Car) R/W in Gage Avenue together with the SP Wingfoot Spur near Florence (both of which might serve the new central mail-processing center). Lists of some of these additional rights-of-way are provided in Appendix F.

15.4 Priorities For Transit Development.

No priorities with respect to transit development will be assigned to the rights-of-way discussed above. To a large extent this is a local matter, depending upon the availability of funding and other factors. Further work would be needed in any case to develop preliminary patronage forecasts, as part of Regional Mobility Plan implementation and in local planning efforts.

15.5 Priorities For Joint Development.

No detailed study of overall joint development potential has been undertaken as part of this project; the emphasis here has been on identifying surplus railroad properties such as old rail yards which would provide opportunities for redevelopment, involving the railroad industry itself. As noted in Chapters 10 through 14, the largest parcels associated with the Phase I corridors would be Taylor Yard along San Fernando Road south of Glendale, the Cornfield-Bullring Yard area near Chinatown, the ATSF/Metro Rail/Amtrak yard area along the LA River, the ATSF station area in Pasadena, and the major ATSF yard and station area in San Bernardino.

Other railroad-owned properties which might have some potential could include the SP LATC or "shops" facility near the LA CBD, the old Union Pacific station area at the south end of the UP Anaheim Branch, the northern end of the SP San Bernardino Branch, and the UP/ATSF/SP yard and depot area in Riverside.

Looking at total spectrum of transit joint development possibilities, which include land already under development and the possibility of redeveloping vacant land surrounding railroad lines in the SCAG region (regardless of ownership), there may be vast opportunities for transit-related value capture. A proper evaluation of this subject goes far beyond the purview of this study. However, Chapters 10 through 14 and Appendices C through E present detailed descriptions of existing commercial land use and development plans for property along the rights-of-way surveyed. Reference to these sections of the report can help to guide future investigation of this subject.

No immediate priorities can be assigned to joint development relating to the corridors investigated in this study; however, joint development potential should be considered as a part of the financial package used to fund any of our major regional transit facilities.

15.6 Commuter And Intercity Rail Potential.

The subject of commuter rail and intercity rail potential is covered in some detail in Appendix H of this report. Only a brief summary will be given here.

At present, a relatively high level of intercity rail service is provided on the Los Angeles-San Diego Corridor (Santa Fe Third and Fourth Subdivisions); an eighth San Diegan round trip has recently been added, with plans for two additional round trips. After several years of study, a Los Angeles-San Diego Rail Corridor Agency has been formed to implement major improvements to the track and control system, furnish additional stations, and work to improve train speeds along this corridor. Study is underway of the public purchase of the Santa Fe Fourth Subdivision R/W from Fullerton south to San Diego.

A single San Diegan round trip has been extended north to Santa Barbara on the SP Coast Line, and the Los Angeles-Santa Barbara State Rail Corridor Study (recently completed) has determine ways of improving the speed, comfort, and frequency of this service. There is considerable interest in integrating the Santa Barbara-Los Angeles LA-San Diego rail services into a Southwest Corridor.

A Los Angeles to southern Orange County commuter service was investigated as part of the earlier LOSSAN corridor work, and Los Angeles-Ventura commuter rail service was included as Phase I of the LA-Santa Barbara study effort. There have also been recent studies of a Los Angeles-Saugus commute service on the SP Saugus Line, and of a Riverside-Irvine commuter service. Commuter rail is also an alternative for the Los Angeles-San Bernardino corridor (see Chapter 13).

The intercity and commuter services mentioned above would largely operate over railroad main lines, shared with transcontinental and local freight trains. They can provide a means of extending rail passenger transportation system coverage over additional rail corridors which are expected to remain in private hands for the foreseeable future: supplementing conventional transit systems, and providing for longer-distance commutation and business/recreational trip needs which represent distinctly different market segments than those satisfied by local transit routes.

TABLE 15. PRIORITIES FOR RIGHT-OF-WAY PRESERVATION,
WITH TRANSIT AND JOINT DEVELOPMENT POTENTIAL

Route	Urgency of Preservation*	Transit Patronage Potential	Joint Development Potential-RR Lands
SP Santa Monica Br. - via Flower St. - via Alameda St./ LA River	critical "	high lower than via Flower Street	low moderate
ATSF Harbor Subdiv. - via Harbor Fwy. - via Alameda St./ LA River	less urgent "	high lower than via Harbor Fwy.	low moderate
SP West Santa Ana Branch	critical	high	low
ATSF 2nd Subdiv.	less urgent	high	high
SP Burbank Br.	critical	high	high in combination with Coast Line
UP Glendale Br.	critical	high if combined, w. Burbank Br./Glendale line	"
SP Coast Line	(not endangered)	"	high
SP Saugus Line	(not endangered)	moderately high pending future development	high (esp. Coast Line route segment)
SP Santa Paula Br.	less urgent but part abandoned	low depending upon section	low
SP Lincoln Park Spur	less urgent	moderately high (w. Huntington Drive)	moderate
SP Inglewood/ Alla Branches	critical	high	N.A.
SP Torrance Br.	S end critical/ remainder less urgent	moderately high	low
SP San Pedro Br. (south end only, used by Harbor Belt Line)	less urgent	moderately high in combination with Torrance Br.	moderate
SP El Segundo Br.	less urgent	moderate	low

TABLE 15 (Cont'd). PRIORITIES IN RIGHT-OF-WAY PRESERVATION,
WITH TRANSIT AND JOINT DEVELOPMENT POTENTIAL

Route	Urgency of Preservation*	Transit Patronage Potential	Joint Development Potential-RR Lands
ATSF Redondo District	N/S ends may be critical remainder publicly-owned	moderately high	N.A.
SP East Long Beach Br.	parts critical; R/W already encroached upon	moderately high	N.A.
SP Los Alamitos Br.	critical	moderately high	low
US Naval Railroad	less urgent	moderately high	low
SP Stanton Br.	less urgent	moderately high	low?
UP Anaheim Br.	critical/part abandoned	moderately high	moderate?
SP La Habra Br.	E half may be critical W half less urgent	moderately high	low?
SP Whittier Br.	abandoned/critical	moderate (combined with La Habra Br.)	N.A.
SP Baldwin Park Br.	critical	low to moderately high depending upon connections	low?
UP 2nd Subdivision/ SP Alhambra Line	(not endangered)	high	moderate
ATSF Redlands Subdivision	critical?	moderate	moderate
SP San Bernardino/ Riverside Branches	critical?	moderate	moderate
UP Crestmore Br. (w. Mission Blvd. R/W)	less urgent	moderate	low
ATSF San Jacinto Subdivision	critical?	moderate	moderate
PE Riverside-Corona Line (Magnolia)	publicly owned/protected?	moderate	N.A.
PE Pasadena Short Line (Huntington Dr.)	publicly owned/protected?	moderately high if part of a LA-San Bernardino Line	N.A.

TABLE 15 (Cont'd). PRIORITIES IN RIGHT-OF-WAY PRESERVATION,
WITH TRANSIT AND JOINT DEVELOPMENT POTENTIAL

Route	Urgency of Preservation*	Transit Patronage Potential	Joint Development Potential-RR Lands
PE San Fernando Line (Van Nuys/Parthenia/Sepulveda)	publicly owned/protected?	high if part of SFV N-S line	N.A.
PE Vineland Ave R/W	publicly owned/some encroachment	high if combined with Burbank Br.	N.A.
PE Burbank-Glendale Line (Glenoaks)	publicly owned/protected?	high if combined with Burbank Br.	high if combined w. Coast Line
PE Venice Short L. (Venice Blvd.)	publicly owned but encroached on	moderately high	N.A.
PE Redondo Bch.-Del Ray Line (Culver Blvd.)	critical/part encroached on	high if part of SFV-W. LA line	N.A.
PE Hollywood-Venice Line (San Vicente/Burton Way)	publicly owned/protected?	very high if part of Metro Rail route	N.A.
SP West LA Br. (Santa Monica Blvd.)	critical/key sections already lost	very high if part of Metro Rail route	N.A.
PE and People Mover Tunnels	publicly-owned but encroached on	moderate if combined w. Glendale/Eagle Rock Blvd.	N.A.
PE Glendale Line/LA Ry. Eagle Rock Blvd. Line	publicly-owned/protected?	moderate	N.A.
LA Ry. Colorado Blvd. Line	publicly-owned/protected?	moderately high	N.A.

* Urgency of preservation means preservation for any use that may be foreseen for a linear right-of-way, including linear parks and recreational uses. A high urgency may be indicated for preservation even though transit potential would appear to be low.

16. DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

16.1 Agency And Jurisdictional Responsibility For Right-of-Way Protection.

The delineation of responsibility for right-of-way acquisition and preservation, and precisely how these tasks would be accomplished, constitutes a major regional issue. SCAG's Regional Mobility Plan calls for the identification and protection of potential rights-of-way along corridors connecting subregions and major activity centers, for future transportation purposes. This would be accomplished through local governmental action (1).

As noted in Chapter 8, the County Transportation Commissions are responsible for development of major transit facilities within county boundaries, such as busways, light rail, rapid transit, or monorail lines. In relation to this, it is implied that the Commissions are responsible for right-of-way acquisition/protection required for implementation of these lines.

The LACTC is currently engaged in appraisal of a number of Southern Pacific and Santa Fe rights-of-way, and in relation to this has asked its Interagency Management Committee (IMC) to serve as an advisory committee. The OCTC is also actively involved in railroad right-of-way purchase for transit purchases, and the RCTC is engaged in discussion with the Santa Fe Railway regarding Riverside County right-of-way needs.

Protection of former rail rights-of-way that are already in public hands is generally the responsibility of the cities, although Caltrans is involved in the case of former interurban lines along state highway corridors (with the expectation that these may someday be needed for highway widening).

The Interstate Commerce Commission (ICC) has primary jurisdiction over railroad abandonment, including main lines and branches. Under the Staggers Act (which provides railroad regulatory relief), the Federal government has greatly streamlined the abandonment process. According to current ICC procedures (49-CFR-1152, which includes statutory deadlines stated in the regulations), a railroad intending to eliminate a line first publishes a revised System Diagram Map four months prior to its application for abandonment, placing the line to be dropped in Category 1 and clearly marking it as such on the map. A notice of intent is also filed 15-30 days before the actual application (2).

This System Diagram Map is circulated to designated state clearing houses. Public entities, such as cities, county commissions, and state rail corporations (which can assemble a short line package) have the right of first refusal, to permit them to purchase such abandoned lines within three to six months.

After the application for abandonment is filed, the public has 30 days in which to protest or comment, and within 45 days of the filing date, the ICC will decide whether or not to investigate. If not, it will file a decision 75 days after the filing date. If it does investigate, it will make its decision to grant the abandonment 165 days after the application is filed. Discretionary appeal of the initial decision is possible, and a final decision (on appeal) will be made 255 days after the application date. The burden of proof is upon

shippers of rail freight to prove the need to maintain service.

The railroads can ask for an exemption from this procedure, if there have been no freight movements on a line in the preceding two years. In the case of a line with a minor level of freight traffic, a railroad may bypass the formal abandonment process by selling it to another party (such as a public agency) for transportation purposes; approval of such a sale by the ICC will be conditioned upon maintenance of freight service by the buyer (3).

Under state statute (PUC Code 761-765), the California PUC does have jurisdiction over abandonment of spur lines, which are generally shorter than branches (it is also involved in maintaining passenger services, if any, on rail lines which might be abandoned). Abandonment procedures (ICC or PUC) may not be necessary in cases of track consolidation where no customers are cut off from freight service (as was the case in the recent SP Santa Ana Branch service relocation to the ATSF Fourth Subdivision).

Existing law also authorizes Caltrans to purchase abandoned railroad rights-of-way and offer them to counties, transit districts, and cities for public transit purposes, using money in the Abandoned Railroad Right-of-Way Account. Caltrans has a priority list including some 66 abandoned lines, dating to 1978 (it has never been updated) and applicable to any transportation use (public transit, highways, bikeways, trails, etc.). However, effectively all the money in the Abandoned Railroad Account has been used up as of this year (with a residual reverting to the TP&D Account). Despite the lack of funding, the Abandoned Railroad Right-of-Way Account is still on the books, in the event the State Legislature replenishes the account or appropriates money for new R/W purchase. Caltrans can also condemn and acquire by eminent domain rights-of-way underlying abandoned railroad lines.

It has recently been proposed that the State of California expand its involvement in right-of-way preservation. As noted in Chapter 15, Senate Bill 1562 would authorize local agencies to prepare Commuter and Intercity Rail Right-of-Way Inventories, and require that Caltrans develop a statewide Intercity Rail Right-of-Way Inventory, all of which would be submitted to the California Transportation Commission. This would include focus upon railroad rights-of-way, identify potential right-of-way acquisitions, and require conformity with adopted regional transportation plans.

The role of private enterprise in preserving railroad rights-of-way is a problematical one at present. Historically, private railroads, street railways, and interurban railways constructed rail rights-of-way for the purpose of serving real estate development. More recently, private developers have had a major role to play in breaking up former rights-of-way and using them for housing and commercial development; hence in recent decades the private sector role has been largely a negative one with respect to R/W preservation. As noted in Chapter 6, public agencies may require developers to grant easements to permit future public transit access to major commercial projects, but in this case the private role is a passive one (although occasionally developers have used old rail rights-of-way for roadways and alleys to provide auto access to their properties).

For the most part, the present role of private entities in preserving rail rights-of-way for public transportation use is limited to short line carriers, whose primary intent is to maintain and expand freight service (allowing possible future use for transit) and to railroad museums and tourist railroads. However, considering that private corporations are becoming increasingly interested in providing their own public transit service (e.g., the Irvine and Long Beach monorail projects--see Chapter 6), there could be a greatly expanded private role in right-of-way protection in the future, related to public/private transportation and real estate development projects.

There are a number of jurisdictions and public agencies involved in railroad right-of-way protection, rail right-of-way purchase, and in the regulation of the abandonment process: the ICC, California PUC, Caltrans, California Transportation Commission, County Transportation Commissions, transit districts, and cities. It is apparent that the roles of various jurisdictions in right-of-way preservation overlap to some extent, especially with regard to R/W that cross county lines, and with respect to those that stretch between adjacent cities within each county or that are part of State highway corridors. The responsibilities of all of these agencies and jurisdictions with respect to right-of-way acquisition and preservation, and protection of rights-of-way already in public hands, will need to be more clearly delineated.

Additionally, the private sector role in right-of-way preservation needs to be more clearly defined. Creative ways need to be found to involve commercial developers and short line freight carriers (and even tourist railroads) in the acquisition and protection of rail rights-of-way for public transportation purposes, often involving public/private joint ventures.

16.2 Financial Issues.

Transportation officials and lawmakers are in nearly universal agreement that California is facing a major transportation funding crisis. Very heavy demands have been placed upon traditional sources of transit funding such as UMTA Section 3 and Section 9 moneys, and on State Transportation Development Act, State Transportation Assistance, and Article XIX Guideway funds. Thus far, only Los Angeles and Riverside Counties have approved 1/2 percent sales taxes for transit construction and operations. Although Los Angeles County's half cent sales tax has been in effect for the better part of a decade, demand for these funds is great, and additional revenue sources will be required for completion of the Proposition A fixed guideway/busway network (4).

A recent transit "summit conference" convened by the Governor concluded that the State transportation system would need an additional \$ 20 billion over the next decade to avert the deterioration of the highway system, and keep pace with traffic demands. Legislative leaders favor a substantial increase in the current 9 cent/gallon gasoline tax; however, polls have determined that the majority of voters would oppose an increase above three cents per gallon. The Gann limit on spending may also need to be lifted in order to make any gasoline tax increase effective (5).

Several proposals have recently been made to increase the state gasoline tax. Senators David Roberti and Quentin Kopp have proposed a 10 cent/gallon increase.

to raise \$ 16 billion over the next 10 years for various transportation projects --including \$ 5 billion for transit (6). Assemblyman Richard Katz has proposed a five cent/gallon initial gasoline tax increase (raised every two years in accord with a formula based on the rate of inflation), combined with a 30% truck weight fee increase. The Katz proposal would increase the State gasoline tax by 15 cents/gallon by the year 2000, and raise \$ 20 billion over the ten-year period, including \$ 3.75 billion for mass transit guideway construction and a billion dollars to aid mass transportation operations, subject to maintenance of efficient operations (7,8).

The State Senate recently approved a 10-cent/gallon gasoline tax increase, defining gasoline taxes as user fees, to exempt these revenues from the state spending limit (9); while the Assembly has passed the Katz bill to raise the gasoline tax by five cents (10). Following negotiations between the Legislature and Governor George Deukmejian, agreement has been reached on an 18.5 billion, 10-year transportation program requiring a nine cent per gallon gasoline tax increase. This will provide an immediate five cent increase followed by yearly one cent per gallon increases for the four years following (11).

This would depend upon voter approval of a June, 1990 ballot measure asking voters to raise the State's constitutional funding limit. Assemblyman Gil Ferguson, one of the authors of the plan, has stated that businesses in the State are losing \$ 12 million a day because sales people, distributors, and others are caught up in traffic jams. The proposed legislative package, based largely on the Katz proposal, would raise \$ 13 billion in gasoline tax revenues, \$ 500 million in additional sales taxes on gasoline, \$ 2 billion in increased truck weight fees, and \$ 3 billion through bond sales. The revenues raised would include \$ 3.5 billion for mass transit construction, \$ 5 billion for either highway facilities or transit, and the remainder for highway construction/maintenance, highway efficiency measures, and environmental programs (12).

California government and business leaders are particularly anxious that a State gasoline tax increase be enacted before the Federal gasoline tax is increased (partially as a means of reducing the budget deficit). It is felt that a Federal tax increase would make it very difficult politically to raise the State tax thereafter (13).

Another recently-proposed funding measure has been Assemblyman Costa's Clean Air and Transportation Improvement Act of 1990, which would raise \$ 1.5 billion for passenger rail capital improvements on a population basis through the sale of general-obligation bonds. This would include funds for acquisition of rights-of-way, commuter rail improvements, and various rail transit projects (14). This will also be submitted directly before the voters as the California Clean Air and Rail Transportation Bond Act initiative.

SCAG's Regional Mobility Plan has determined that of approximately \$ 30 billion required for transit capital construction over the next several decades, only \$ 12 billion is expected to be provided from existing, identified sources. If the proposed gasoline tax is passed, this would raise approximately one third of the \$ 18 billion shortfall (15).

In light of the substantial hurdles remaining to be overcome by the proposed

State gasoline tax increase, uncertainty over the amount of money that would actually be raised through the sale of bonds, and the fact that there will still be a shortfall in transit capital moneys, there is all the more reason to consider transit/real estate joint development as a supplementary source of transit revenues. As noted in Chapter 5 of this report, authorities in this field estimate that from 20 to 40 percent of transit capital costs can be raised using various value capture techniques.

To actually achieve the 40 percent level (or perhaps even higher) would require a major effort on the part of the county transportation commissions, transit development agencies, cities, and the private sector (probably including the railroad industry in the case of real-estate development along certain railroad rights-of-way). The fact that certain developers have been willing to fund transit stations and even short monorail and light rail shuttle lines is encouraging, as is the fact that the railroad industry has become increasingly interested in real estate project development in urban areas.

It is uncertain, at this point in time, whether transit joint development/urban renewal projects on the scale of the London Docklands enterprise or the Hudson River Waterfront Project would be possible in the Los Angeles area. However, we have much to gain by seeking to emulate the major transit joint development efforts now underway in many other cities, in relation to establishing new transit corridors along our own railroad rights-of-way, involving new public/private joint venture projects on adjacent land.

Conversely, it must be recognized that (even under the most optimistic scenario) more than half of the funding needed for new transit capital projects will need to come from other sources, joint development and value capture measures should not be construed as a panacea for our current transit funding problems. Funding will in many cases remain heavily dependent on revenue sources such as sales taxes, automobile user fees, or bond sales.

In particular, there may be a problem in obtaining money "up front," as certain kinds of value capture revenues will not be available until after the transit facilities have been in operation for a certain period of time. For some corridors, this will require that supplementary sources of funds be obtained to permit initial right-of-way purchase as well as transit construction.

It should be added, that delineation of responsibility for funding major transit facilities within the SCAG region--especially those that cross county lines--is a major regional issue, and one which will need to be resolved if we are to realize the goals of the Regional Mobility Plan, in the areas of right-of-way protection and construction of transit facilities (including those developed on railroad rights-of-way).

16.3 Other Major Findings.

1) Regional growth trends indicate that highway congestion will continue to be a serious problem over the next several decades, resulting in longer commutes, increasing driver frustration, and a continuation of air pollution problems. Development of fixed guideway public transport and reserved bus lanes will be an increasingly important strategy for solving these problems. The use of railroad

rights-of-way for transit is particularly attractive because many of these rail corridors serve existing activity centers, representing a mix of residential, commercial, institutional, recreational, and industrial land uses that will promote all-day ridership, increasing the farebox return and reducing operating subsidies; while promoting community development and the evolution of favorable land use patterns, including an improved jobs/housing balance.

2) Rail freight service, and particularly movement of high-valued, containerized intermodal cargo and liquid and solid bulk commodities, is vital to our region's economy and will be instrumental in keeping the SCAG region in the forefront of Pacific Rim trade development. Interference with time-sensitive rail freight cannot be allowed, and the railroad main lines and certain heavily-used branch lines need to be kept intact for the transport of freight. This is essential not only for economic reasons, but also to avoid any unnecessary diversion of freight to trucking which could have negative consequences from the viewpoint of traffic congestion and air pollution.

4) For this reason, transit development on railroad main lines would generally be limited to (a) excess lateral R/W, (b) aerial lines, or (c) commuter rail--the latter with substantial track, signaling, and other facility improvements required to maintain rail freight service at the same level as before the introduction of passenger service.

5) The most promising rail lines for transit development purposes will be branches and occasionally main lines which have low levels of freight service and may be abandoned in the near future. The use of branch line rights-of-way will allow cheaper surface (or aerial) transit construction--as opposed to condemnation of already built-up areas for R/W or expensive subway construction. Also, it will allow all-day transit service to be provided without the need to consider railroad scheduling constraints or the requirement to grade separate the transit facility at railroad spurs or industrial leads.

6) The Alameda Corridor Project, which would consolidate rail freight traffic between the Los Angeles CBD area and the Ports of Los Angeles and Long Beach, could be instrumental in freeing certain railroad branch lines from through freight duty, and increasing the availability of these lines for transit use.

7) No recommendation will be made here in favor of any particular transit technology for implementation of transit on existing or former railroad rights-of-way. In other cities, busways, light rail, rapid transit, commuter trains, and new technologies have been so-employed with success. It is however desirable to promote cost-effective surface transit construction where this can be done without major highway cross-traffic interference, and to design our transit systems to allow limited, express, or skip-stop service where feasible. Single tracking in the case of LRT should usually be avoided because it limits operational flexibility and forces rigid scheduling, with overly-long headways.

8) Railroad industry representatives have been very receptive to the idea of selling off marginal branch lines for transit use, while maintaining freight service at night--similar to the joint operation of the San Diego and Imperial Valley short line freight carrier and the San Diego Trolley on the same tracks. Otherwise, the railroads may need to relocate customers as part of their

abandonment procedure, a process which is expensive and time-consuming. This is a factor which may favor light rail on certain corridors.

9) Development of a transit system incorporating major elements on railroad rights-of-way does not appear to conflict with existing county transit plans. In fact, the LACTC in Los Angeles County and OCTD in Orange County were early promoters of this concept. The LACTC is presently constructing the LA-Long Beach line along the SP Wilmington Branch rail freight corridor and on parts of the abandoned East Long Beach Branch, and is studying the use of railroad lines for transit on the Pasadena, Glendale, and Coastal Corridors, and in the San Fernando Valley; while the OCTC in Orange County is currently promoting an earlier OCTD concept for transit service on the SP West Santa Ana Branch/PE right-of-way corridor.

10) Transit construction along railroad rights-of-way in our region will complement, rather than conflict with, development of other transit facilities in subway and on freeways. For instance, the Metro Rail line along the Wilshire Boulevard, Vermont Avenue, and Hollywood Freeway alignments will cover a service area with very high volume of traffic and where no cheap surface rights-of-way are available; and the Metro Rail and LRT tunnels in the LA CBD will be essential for downtown access and distribution for a transit routes which do follow railroad corridors. Similarly, the Century Freeway line can provide access to LAX for the proposed West Santa Ana Branch rail transit service.

11) Certain rail freight lines could be instrumental in developing other Los Angeles County Proposition A corridors in the future, including the SP Torrance Branch which parallels the Harbor Freeway corridor and the ATSF Harbor Sub-division which may be useful in developing the east-west line from South Bay to Long Beach.

12) The Exposition Boulevard/Santa Monica Branch transit line would follow a completely different corridor than the proposed Metro Rail western extension, and should be viewed as a complementary facility, not a competing project.

Similarly, the Santa Fe Pacific Realty Co. proposal for linking Burbank with North Hollywood and thus extending the east-west San Fernando Valley line to the LA CBD (as modified here) should not conflict with Metro Rail. As elaborated in Chapter 14, the main emphasis would be to provide a tie-in with the locally-preferred route from Burbank to Glendale, the Glendale Proposition A line, and the SP Taylor Yard site--thus serving local centers and a major joint development project on a different corridor, rather than providing major competition with the Metro Rail line to the Valley.

13) Many of the other potential transit routes described in this report which do not correspond directly to LA County Proposition A corridors (such as a 134 Freeway/Colorado Boulevard link) would utilize rights-of-way that are already publicly owned or are otherwise protected (e.g. railroad main lines), and should require little in the way of property acquisition. They may provide opportunities for transit development, after additional funding can be secured.

14) The development of an Orange County transit system using railroad rights-of-way is complementary to, and does not conflict with, the Orange County

transitway program. The transitways are basically a system for connecting freeway HOV lanes at major interchanges, so that carpools, vanpools, and buses do not need to enter congested mixed-flow lanes to move from one freeway to another. Initially there would be no local stations on the HOV lanes and transitways. Hence, the transitways would emphasize express buses, subscription buses, and vanpools, i.e. a rather different travel market segment than that served by an automated rapid transit or light rail line stopping at local centers along a former railroad right-of-way.

15) Diagonal, northwest-southeast transportation corridors are at a premium in Orange County. The SP West Santa Ana Branch is several miles away from either the 5 Freeway or the 405 Freeway, and would provide transportation access along a different sub-corridor than the area immediately adjacent to either highway facility. Similarly, the La Habra Branch rail lines whose transit potential is discussed in Appendix C lies far to the north of any parallel freeway in this county.

16) Possible transit routes on Orange County's railroad rights-of-way with a north-south or east-west (cardinal) orientation, like the SP Stanton and Los Alamitos branches, would not closely parallel the HOV lane/transitway system (for example, the UP Anaheim Branch is far to the west of the proposed Route 57 HOV lane). To the contrary, parts of the transitway system may eventually need to be provided with on-line stations (very much like the El Monte Busway Cal State and USC Medical Center stops) to allow buses on the HOV lanes to function as feeders for transit routes developed on intersecting rail lines.

The transitway/HOV system would provide the only means of transit access to points such as the Santa Ana Fashion Square, South Coast Plaza, and Cal State University at Fullerton, and (initially at least) along the 55 Freeway corridor. If in addition to the transitways a rail/fixed guideway network is built on former railroad rights-of-way, it will be possible to develop a transportation system providing coverage of activity centers over much of Orange county.

17) Segments of the Southern Pacific Stanton Branch closely parallel both the Katella alignment and southern portion of the Beach Boulevard alignment, which are proposed for fixed guideway transit in the Orange County Preliminary Long Range Plan.

18) Although some of the newer industrial/commercial sections of Orange County (like Tustin and Irvine) are less well provided with railroad rights-of-way than are older residential sections in the western part of the county, it may be easier to provide transit links to these "new" sections because of the very wide spacing between buildings. This makes it possible to construct aerial guideways in side-of-road situations and over parking lots between buildings, with relatively little visual intrusion. (The same situation applies to cities such as Anaheim which are undergoing extensive CBD renewal.)

On the other hand, in "older" sections of the county where considerable infilling has occurred, the use of both railroad rights-of-way and freeways for public transportation may be necessary for future urban mobility, in order to avoid very costly subway construction, possible negative aesthetic impacts caused by aerial structures over arterial highways, or disruptive property

condemnation.

19) Some of the railroad rights-of-way in older sections of Orange County may be suitable for relatively inexpensive surface right-of-way construction with a minimum of interference with cross traffic, owing to mid-block locations and the fact that most of the residential neighborhoods are already provided with sound walls facing the rail lines. Diagonal corridors, such as the West Santa Ana Branch, would however appear to need a high degree of grade separation because of traffic interference at major arterial intersections.

20) Thus far, Riverside and San Bernardino Counties have focused upon the use of railroad rights-of-way to satisfy longer-distance travel needs (carrying commuters from bedroom communities in these counties to employment areas in Los Angeles and Orange Counties). Proposals by the Santa Fe Railway to sell off the Second Subdivision and the San Jacinto Branch would facilitate the development of interurban transit facilities from San Bernardino to Los Angeles, and Hemet/Perris to Riverside.

However, development of a Riverside-Orange County or Riverside-Los Angeles commuter service may be hampered by the need to use the ATSF Third Subdivision (which is the Santa Fe's main transcontinental freight route). Express bus service on the 91 Freeway HOV lanes will probably be required to supplement peak hour commuter trains on this corridor.

21) Development of transit facilities on existing railroad lines and former rail rights-of-way could also serve local travel markets in San Bernardino and Riverside Counties (as well as future, major employment areas within these counties). Local transit routes may also be feasible, utilizing railroad rights-of-way from Redlands to Glen Avon and/or Corona, via downtown San Bernardino and Riverside. In this regard it will be noted that smaller CBD areas like San Bernardino and Riverside are not likely to face the severe transit access problems encountered in the LA CBD, which require extensive underground construction. Much cheaper alternatives such as surface transit malls (and some aerial construction) should be possible for routing fixed-guideway transit lines through downtown Riverside and San Bernardino.

22) In Ventura County, there are relatively few railroad rights-of-way which would be useful for conventional fixed guideway transit development (e.g., light rail or light rapid transit) to serve local transportation needs. It is suggested that Ventura County would be best served by commuter and intercity rail development on the SP Coast Line for longer distance trips, and by bus service for local transit.

16.4 Recommendations.

The following study recommendations, while not adopted SCAG policy per se, are in compliance with the policy element of the Regional Mobility Plan, with regard right-of-way protection, corridor and transportation project development, and transportation-land use coordination (16), and are also consistent with SCAG's Growth Management Plan:

1) As part of the Regional Mobility Plan implementation program, a strategic

plan should be developed for right-of-way preservation and development. This plan would:

- o Devise a plan for acquisition of railroad rights-of-way when these become available (i.e. when they are about to be abandoned), to preserve the option of future transit and community development.
 - o Establish a plan for protection of railroad and interurban (e.g., Pacific Electric) and street railway rights-of-way already in public hands, to guard against further encroachment, incursions, break-up, or permanent redevelopment for non-transit purposes.
 - o Determine who would be responsible for right-of-way acquisition and protection, and how these tasks will be accomplished.
 - o Delineate responsibilities for transit and community development of railroad rights-of-way, consistent to the extent practicable with existing agency roles and recognizing the possible need for new institutional arrangements where rights-of-way cross county boundaries.
 - o Find ways to finance construction of transit facilities on railroad rights-of-way, determine funding responsibilities by agency and jurisdiction, and establish a private sector role.
- 2) The development of transit facilities along appropriate railroad lines determined to have high transit and joint development potential should be pursued where practicable and environmentally feasible.
- 3) The present survey has concentrated on existing railroad rights-of-way. In addition, some abandoned Red Car and Yellow Car rights-of-way have been included in the evaluation. This study, although extensive, has not been an exhaustive survey of abandoned rail lines. It is recommended that a more thorough evaluation be made of certain other abandoned rights-of-way, such as the Santa Fe Elsinore District and a number of additional, former PE rights-of-way.
- 4) A through inventory should be made of freeway, arterial, flood control channel, and power line rights-of-way, as well as linear strips of parkland, vacant land, and underutilized, low density industrial land which could be useful in developing future transit facilities. No comprehensive study has yet been made of these rights-of-way, which often need to be used in combination with railroad rights-of-way to piece together viable transit routes.
- 5) Detailed engineering, operational, and environmental studies should be conducted to determine the best way to provide a longer-distance transit or commuter rail service from Los Angeles to San Bernardino, via the San Gabriel and Pomona Valleys. This work should include investigation of the potential use of the SP Baldwin Park Branch, and other alternative routing schemes, for providing through service linking Los Angeles and San Bernardino Counties.
- 6) Joint development with office/commercial/residential/mixed use projects, and other value-capture strategies should be given serious consideration in planning new public transit and commuter rail facilities, to enhance new and future

activity centers, focus growth at transportation nodes on linear corridors (such as railroad rights-of-way), promote community development, and engender growth in areas needing recycling and redevelopment.

7) In particular, transit joint ventures on railroad rights-of-way should be used to encourage clustering of new and relocating activity on the periphery of the urbanized area, to produce a more favorable balance between employment and residential land uses, and maintain favorable land use patterns, as per goals and policies of the Growth Management Plan.

8) Considering the scarcity of funding for major transportation improvements, both at the State and Federal levels, further study should be conducted of value-capture methods and public/private joint ventures as means of financing transit construction and operations in the SCAG region. This should include railroad-owned and non railroad-owned property, existing development, under-utilized light industrial areas and vacant land; it should also include creative ways of involving the railroad industry in transit development.

9) Future investigations of the potential to use railroad rights-of-way for transit and community development should include as evaluation criteria compatibility with local land use and growth plans, and the ability of local areas to support density changes (e.g., employment growth). Such studies should determine whether areas that currently lack the density to support fixed-guideway systems, could potentially support them under viable transit-oriented joint development scenarios; and whether use of these rights-of-way would promote future patterns of land use and development that will reduce infrastructure construction and make better use of already-existing facilities.

10) For abandoned rights-of-way that will not immediately be used for public transportation purposes, temporary land uses that will provide an interim economic return to the agencies owning the rights-of-way should be encouraged so long as they are consistent with community standards and will not impair future conversion to transit.

11) Planning for future mobility is an interactive and cooperative venture within the region, which takes place simultaneously at several levels. At the level of regional planning, efforts to implement SCAG's Regional Mobility Plan should include assessment of the ridership potential of transit networks incorporating significant route mileage of fixed guideway and busway lines on railroad and former interurban rights-of-way (most of which are identified in this report), in refining the intra-regional line-haul system.

12) The County Transportation Commissions should make their own detailed assessments of the potential to use existing and former railroad rights-of-way in developing transit facilities, and should consider nominating such transit/railroad rights-of-way for inclusion in the Regional Mobility Plan.

13) City planning and redevelopment agencies should consider ways in which development on railroad-owned properties and other land contiguous with railroad lines that have transit potential can contribute to local land use and community development goals, and should consider using local funds for right-of-way purchase, to supplement or augment right-of-way acquisition efforts of the

County Transportation Commissions.

14) The private sector, including chambers of commerce, real estate development interests, and the railroad industry itself (including short line carriers) should become actively involved in right-of-way preservation and in promoting the development of cost-effective public transit on former railroad lines; public institutions should support and promote their active participation in providing transit infrastructure.

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