the sunset coast line

route of the new red cars

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George W. Brewster
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and to his colleagues on the Board of Supervisors,

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and to the residents of Los Angeles County.

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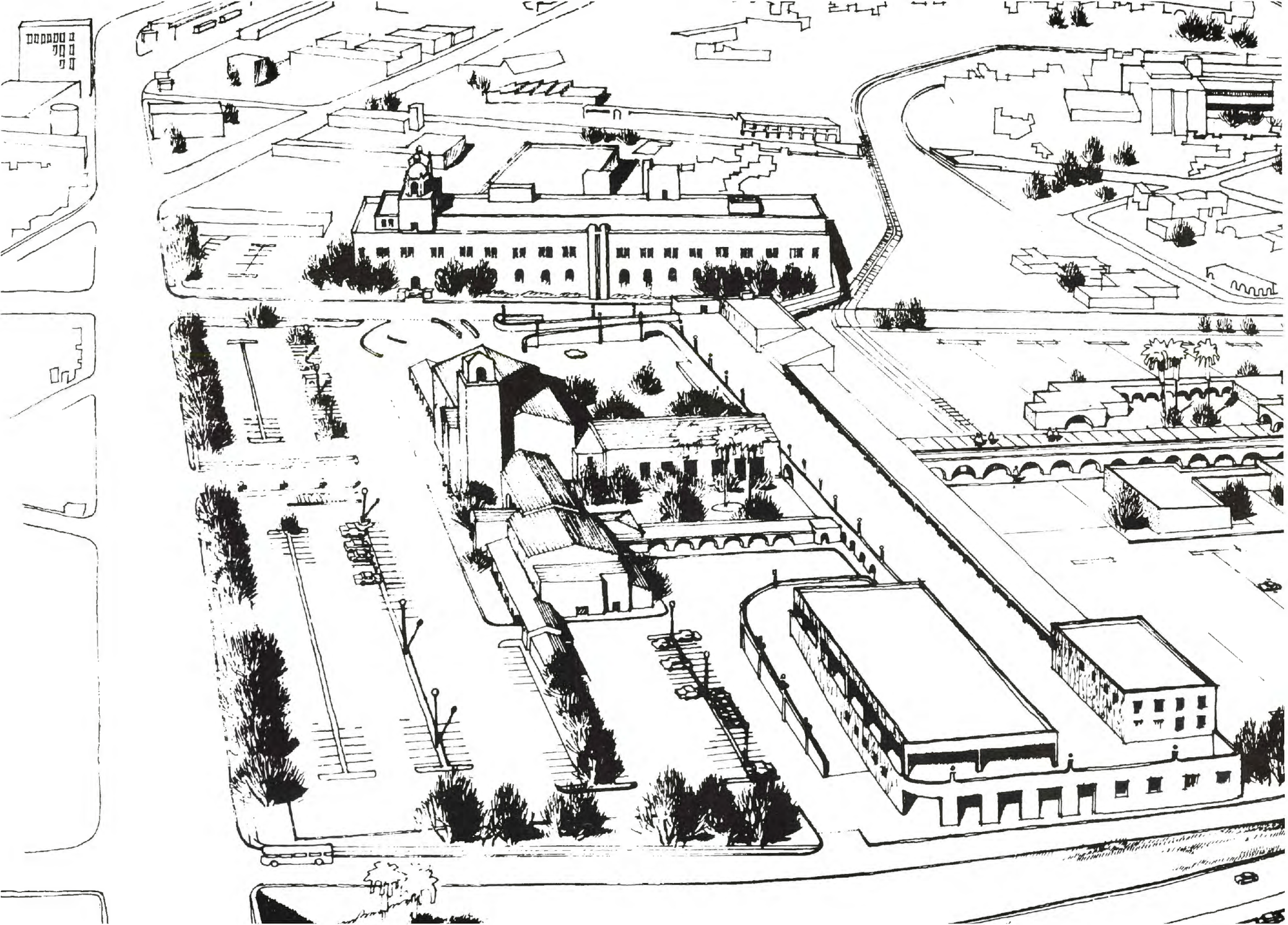

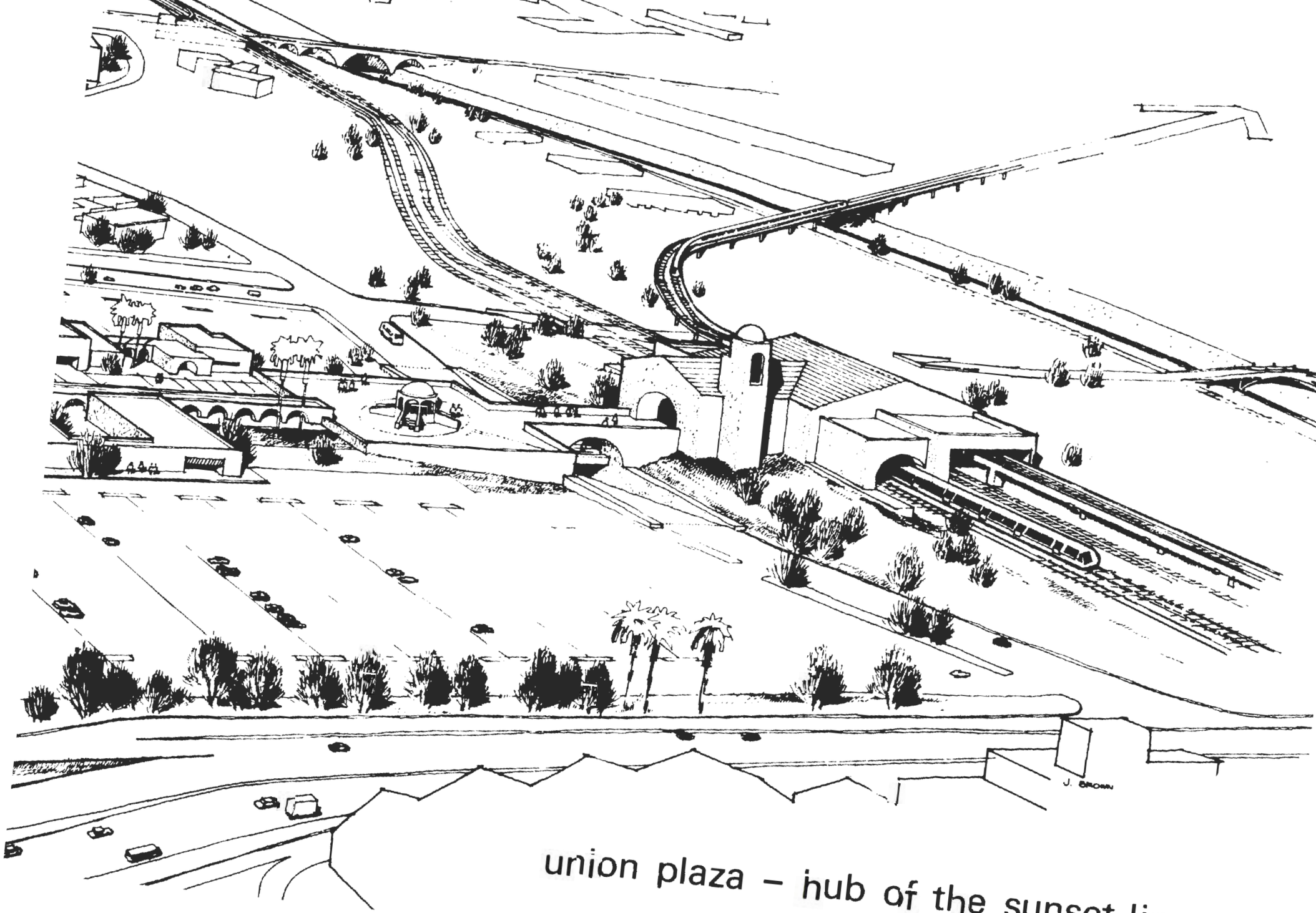

union plaza – hub of the sunset line

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SUNSET COAST LINE

OFFICIAL BALLOT
JUNE 8, 1976

introduction

It is true that Los Angeles cannot hope to duplicate the old PE lines – the Big Red Cars traveled those lines in a network of rails that totalled over 1100 miles. They tied together a third of Southern California.

Most of that PE right-of-way has now vanished, and today is too costly to replace.

But it can be restored in part, and upgraded, and given a new vitality.

The Sunset Coast Line provides those qualities, and a whole lot more – 85 mile per hour track. Local trains, Interurban trains, Airporters direct to LAX, excursion cars, and direct service to Orange County.

But not 1100 miles of new rail. In the highly urbanized geography of today, it is possible to chart transit lines on existing rights-of-way that come within one and one-half miles of the homes and jobs of 80 percent of the residents of the County. This can be done with 230 miles of Heavy Rail Main Line and 51 miles of Light Rail and Monorail feeder lines.

Those are some of the qualifications of the Sunset to succeed the old Pacific Electric.

The Pacific Electric system did not simply die – it was killed. Deliberately or accidentally (and there still is a dispute), it was riddled by grade crossings and outflanked by freeways until there was not enough pulse to push the Red Cars.

The tragedy in its passing is that its fine network was not preserved. Only a fraction of its old routes still are identifiable today.

Los Angeles might be having a love affair with the auto, but after 30 years, there is not a flicker of feeling for the bus. And their fumes add to our problems with the air.

Even the gasoline shortage and the 25 cent bus fare failed to affect us emotionally. There was to be no shotgun wedding with buses.

Because the heart still returns to the rails, people still talk about The Big Red Cars, and ask these sensible questions:

- Why isn't there a transit line over the freeways?
- Why don't they use existing rail lines?
- What about those flood control channels?
- When are they going to try a monorail?

The Sunset Coast Line, this proposal, brings all that talk and nostalgia and hope together – into an 85 mile an hour Main Line that is guaranteed to break up any love affair – it'll pry us right out of our autos and take us where we want to go, in style, in comfort, and faster than any law-abiding car.

It'll be a whole new romance for commuters, and they'll like themselves in the morning, and in the evening as well.

We have attempted to analyze why past transit proposals have failed at election time. Among the failings, we believe, is that they were vague and did not go far enough.

A tunnel here, and a flash of rail there, do not constitute a transit system. At least, not in this County of seven million.

Out here, a line must go to where the people are. This one does. In a few pages from now we'll start listing the cities and towns that will be brought together by the Sunset Coast Line. The route descriptions alone will take a whole chapter, as we detail how each division ties together the communities within its corridor.

It will have 230 miles of welded-rail, heavy duty track, totally grade-separated, built to carry full trains at 85 miles per hour.

That is called Heavy Rail.

It will have 51 additional miles of feeder routes.

One or two of these routes will be simply extensions of the Main Line. Others will use new tracks to be built along existing rights-of-way of what once was the old Pacific Electric.

That style of transit is called Light Rail.

Light Rail has become a favored project of the Federal Government, as it gives grants for transit construction. While Main Line tracks must be totally grade-separated and high speed, it is recognized that certain of the feeder routes coming into the Main Line can be slower speed, and thus more convenient for commuters and shoppers, who prefer more frequent suburban stops.

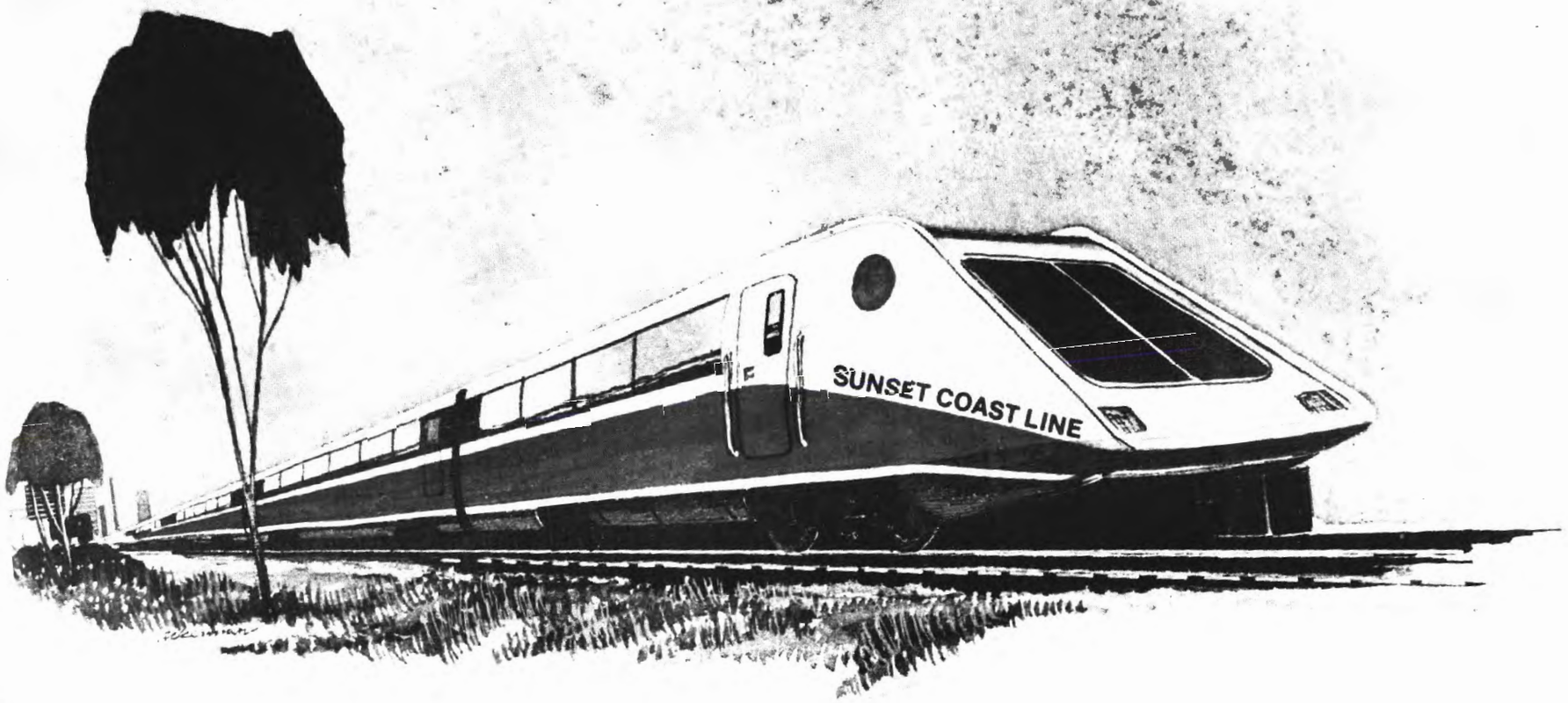
Among the advantages of Light Rail is that the same transit cars, or trains, can be used on both the Light Rail and Heavy Rail sections of the system. Patrons will not be required to transfer to other vehicles as their train enters the Main Line.

An example of a proposed Light Rail addition to the Sunset Main Line will occur in Canoga Park. Trains on the Inter-Valley line have worked west to Canoga Avenue, where some will swing off the Heavy Rail onto the Pacific Electric route northward toward Chatsworth.

Some of the feeder lines in the system will be Monorail – elevated light-guideway structures that will carry newly-designed cars. The top speed of the Monorail links will be approximately 50-60 miles per hour. The distribution-feeder networks will require patrons to transfer when joining or leaving the main line. The Monorail system we are discussing here is usually defined as Group Rapid Transit or automated light-guideway, but inasmuch as a single suspension beam supports the cars, the term Monorail—which is more readily understood by the general public—is used throughout this proposal.

It is a totally-balanced system, built for Main Line speed, plus the convenience of Light Rail extensions and Monorail feeders.

The Sunset system will not make buses obsolete, but it will completely change their character in Los Angeles County. It will allow buses to penetrate neighborhoods and intensify their service in commercial zones. All buses will connect with a rail station. And because the Sunset Coast Line goes almost everywhere, those bus trips will be short.



Typical Rail Car for the Sunset Coast Line

THE SUNSET MAIN LINE

Essentially, there will be three basic types of service: Local, Red Car Interurban, and Airporter.

Local trains will be assigned back and forth on specific, directional routes – San Fernando-to-San Pedro would be an example of a north/south route. Santa Monica-to-Pomona would illustrate a Local service on an east/west route.

Local trains will run on any point of the Main Line, approximately five minutes apart.

The Red Car Interurbans will be assigned to runs that will overlap several transit divisions, but will run less frequently than Locals.

One Interurban run will be scheduled from San Fernando to Pomona, for example.

This means that a person wishing to travel from San Fernando to Pomona has two choices: boarding a southbound Local and transferring to an eastbound Local at Westwood – or, waiting for the Red Car Interurban that will go directly to Pomona, without the need to transfer.

There will be a number of Red Car Interurban routes, each providing service every 30 minutes.

The Locals and Red Car Interurbans each will consist of five-car trains.

The Airporter trains, to LAX, will be only two cars length, with each car serviced by an attendant (to help with luggage, both boarding and alighting).

Because of the space requirements for the luggage, Airporter cars will carry fewer seats than Locals. Passengers on these trains also will pay a premium fare for direct airline terminal convenience, as well as for the service of the attendant.

Airporter trains will leave each of the outer points (Pomona, Long Beach, San Fernando, etc.) of the Main Line on the half-hour, with the result that an Airporter Train will be circling the Central Terminal Area at LAX every two and one-half minutes.

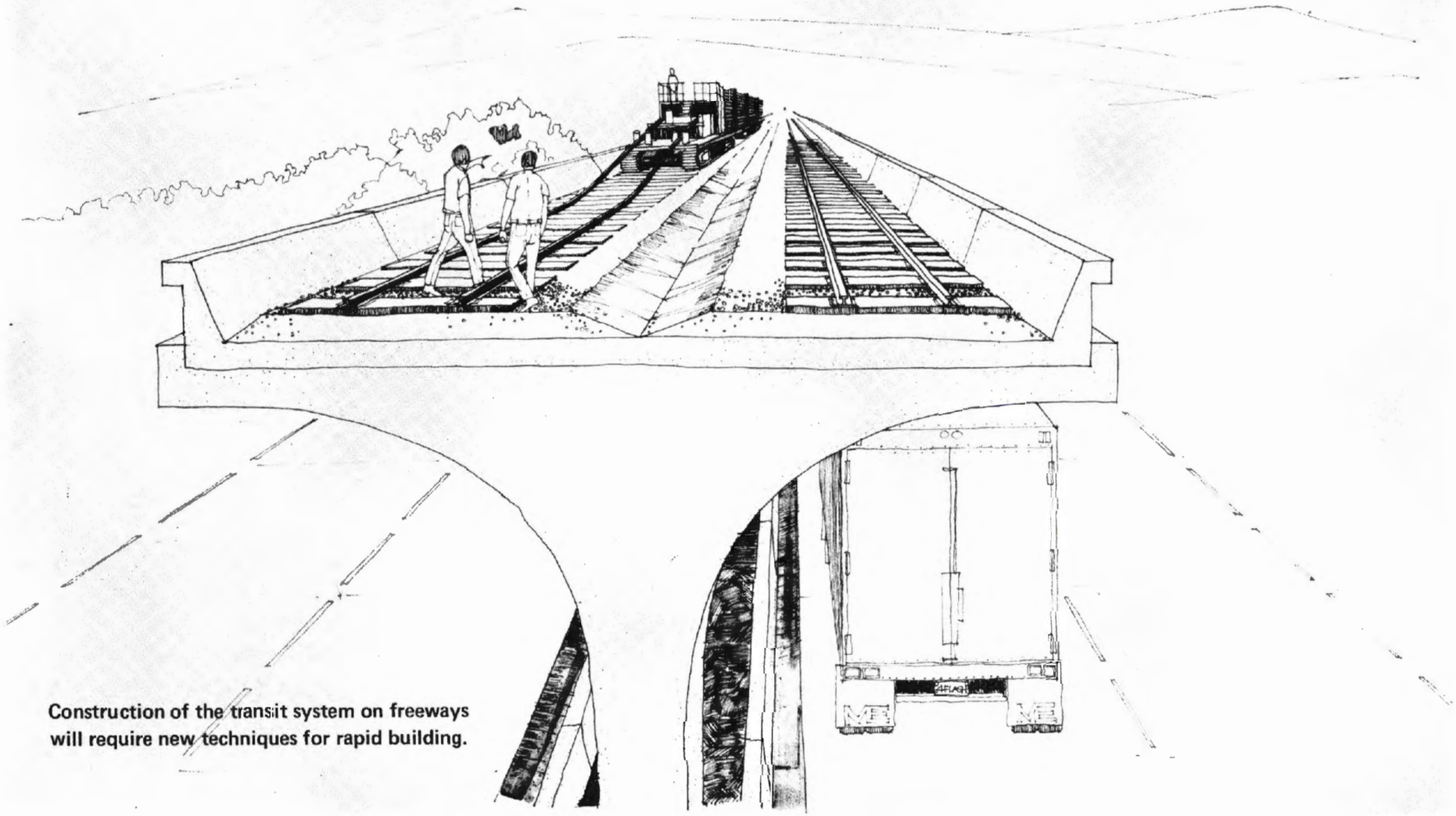
Service to LAX also will be available by boarding any of the Locals, and making the necessary transfers to a Local shuttle service between the Airport junction and the Central Terminal.

Thus, Airport passengers will have the choice of direct service half-hourly, or immediate service by transfer connections on Locals.

Because of the travel distances involved, both Red Car Interurbans and Airporter Trains will have automated refreshment service and restrooms.

In full service, there will be at least 30 Airporter Trains, 40 Red Car Interurban Trains, and 148 Local trains on the Main Line during full operational hours. This will fully utilize the fleet of 1000 cars, keeping an additional six percent in reserve for maintenance or repairs.

Full service would be scheduled from 6 a.m. to 12 midnight. From 12 midnight to 6 a.m., Airporter and Red Car Interurbans would not operate, and Locals would depart from terminals only once every 30 minutes.



Construction of the transit system on freeways will require new techniques for rapid building.

ROUTING

The purpose of the County-wide transit line is to provide service, close-in and far-flung – to tie together such points as Long Beach, Torrance, Union Station, Pomona, San Fernando, and so on.

The 44 cities on the Main Line can be reached through a variety of existing pathways. Pomona to Union Station, for example, is a line that can be built along existing rail rights-of-way, or by constructing along (or above) the San Bernardino Freeway.

For the purpose of this presentation, we will describe routes that would utilize primarily freeway corridors, rather than the parallel rail or flood control pathways. Our reason for this is to develop a presentation that is simple and consistent in concept – and the most familiar to motorists.

But this does not mean that the freeway from Union Station to Pomona necessarily would be the route we would use to get to Pomona, however. It would be our choice to build on the path that is fastest and most economical. Because of construction problems inherent in freeway alterations, it is likely that building on freeways could take much longer than a parallel route, such as elevated tracks over a railroad right-of-way.

Another illustration of our use of a freeway route for description purposes is the 605 Freeway from Duarte south to Long Beach. That freeway parallels the San Gabriel River, which is a Los Angeles County Flood Control Channel. The savings in time and dollars by building transit lines on the flood control embankment are very clear, and the embankment will be the probable choice – even though the route we describe will be known to motorists as the 605.

Speed and simplicity of construction relate directly to cost and inflation factors. There are stong economic reasons to build on the pathway that will be the most quick.

THE ECONOMIES

Admittedly, the system will be expensive. But comparably, it is far less costly than the transit proposals that have been placed before voters in the past.

There are several reasons for these economies. For one thing, we are avoiding tunneling on any long stretches. The highest-priced construction we would use at length (elevated tracks) would cost only one-half of what a tunnel would cost. And our elevated stations cost less than a third of the price of a subway station built to handle the same traffic and trains.

The Sunset Coast Line does not propose massive condemnation of private property. Instead, it will use what already is there – some freeway stretches, sections of railroad rights-of-way, and embankments of certain flood control channels. Those are existing pathways that are capable of conversion to other or additional uses.

Some privately owned land will be necessary for purchase in order to construct shops, yards, certain stations, and some track interchanges. But such parcels will account for less than one percent of the construction right-of-way.

We would like to build the system in a year. But we cannot – it is too large, there are not enough skilled workers, and just the plans alone, will take longer than that to prepare.

But suppose we could do it in a year – if we could complete the whole system in 1977, it could be built for less than one-half of the final cost which we must compute.

All of it – the Heavy Rail, Light Rail, Monorail, Union Station Annex, 1,060 heavy cars, the Monorail cars – everything, could be built for between three and four billion dollars today. And that figure includes contingencies. But our final figures must compute inflation, as well.

Inflation for one year is not too damaging. But when computed for ten or more years it is apparent why inflation bears so heavily on cost.

The bulk of the system will be built in approximately 12 years. The final touches will take two or three years more.

THE CONTRACT

We have said 230 miles of Heavy Rail, plus 51 miles of Feeders in Light Rail or Monorail.

When the cities and towns and stations are named within those 281 miles of system, the whole proposal will become a contract between the people and their government.

This is because the ballot issue will name those cities and towns. Thus, construction funds cannot be diverted to other routes, or concentrated for different purposes. The Project can expand, but it cannot be diminished.

It was the failure to offer this guarantee, we feel, that also contributed to the defeats of the previous transit ballot issues.

THE GUARANTEE

In our references to the Sunset system, we frequently describe it as County-wide. It actually is not quite that inclusive. It falls short of reaching the Ventura or Kern County Lines. But it does get to Orange and San Bernardino Counties, and comes almost to the base of the Santa Susana Pass.

So in reality, it is pretty much of a County-wide project — totally supported and controlled by County voters.

In this plan the voters do not rely on Washington, D.C. for help, because they cannot afford the 90-100 years it would take for federal funding to complete the project. And all the voters want from Sacramento is the right to build on freeways for which they already have paid.

The plan does dovetail with the Federally sponsored Starter Line (Union Station to Long Beach), and it would employ the extensive services of Caltrans personnel (if they wish) in the design and construction work that would utilize freeways.

But it remains the property of the voters of this County. If they buy it on the June ballot, they will own it.

And they have the right to demand of their elected County-wide representatives that it be built in accordance with the way it was sold.

That right, that direct voter/official contact, also has been lacking in the past transit ballot issues and perhaps contributed to the negative vote.

We are proposing to correct that here, through a

partnership* between the RTD and the County of Los Angeles, in which the County will serve the RTD as Project Manager and Prime Contractor.

The County would establish a new entity, the Department of Transit Development, which would draw together existing County and specialist personnel into an experienced, driving organization that will be geared and dedicated to underwriting and meeting that guarantee in the ballot proposition – that these lines will go where we promised they would go, and when we said they would.

Thus, the RTD could offer voters both a positive contract, and a guarantee of the means of enforcing accountability for that contract. The County Government can be guarantor for both the public and the RTD.

This arrangement would allow the RTD to remain directly involved in and fully committed to the development of the highly complex Starter Line.

*In the County partnership, the RTD also would be required to work directly with the City of Los Angeles in determining the type of service and routing in the Wilshire Corridor, the $50 million Central Business District Distribution System, the Chatsworth, Sherman Way, UCLA, and USC Monorail systems and the Slauson Light Rail route. When those decisions are made, the County again would serve as Project Manager and Prime Contractor for the actual construction involved. The same relationship would apply, and RTD assistance also would be required in each city to be served by Light Rail or Monorail lines. The cities would make the actual decisions as to specific alignments of the corridors or networks – based on local needs and traffic patterns – with help and guidance from the RTD.

TEN CENTS A DAY

There is an art to telling a story, or disclosing an event. Newspapers, for example, tell it all at once – the headline or the first paragraph can give it away. Other styles recognize the value of suspense. They lead the reader to the bottomline.

Our headline is TRANSIT – 281 miles of it.
And the bottomline is COST – 10 cents a day.

Ten cents a day will be the average cost for each resident in Los Angeles County in the sales tax issue that we propose.

Those ten cents will build the finest transit system in the world. It will be the newest, fastest, and most comfortable.

And to both the headline* and the bottomline*, there is this footnote:
*It will improve the air considerably.

COSTS

In any construction project, there is a broad range of cost approaches. A transit line involves tasks that are very basic (landfills, tunnel excavations, track-laying, etc.) and highly complicated (signaling, computerized train controls, etc.).

The records of the construction industry can be examined on a national scale, to provide guidance for what we can expect to experience here.

For one thing, in costs we can expect the worst.

The experiences of the San Francisco, Washington, D.C., Atlanta, and other transit projects all have shown dramatic cost over-runs. This means that in those project components in which the over-runs occurred, we can expect similar (or even more severe) difficulties out here.

For that reason, we have studied the cost ranges for construction in 1976 dollars and have selected always the figures in the top of the range as our model for purposes of computation.

For example, tunnel construction is figured by the industry to average between $17.3 million and $24.6 million per mile for deep bore tunneling methods.

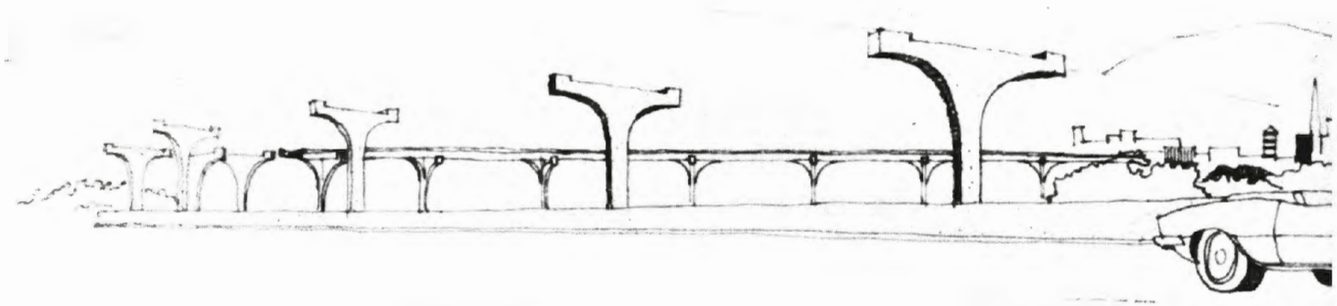
That $24.6 million also is increased by engineering, contingency, and inflationary factors, which will be demonstrated later in this presentation. But by settling on $24.6 million as the basic figure from which to build, we have eliminated most of the surprises. There is a good chance the figure might go somewhat lower, but we have done all we could to make sure it would not go higher.

The result is that our cost totals will be realistic. We are not trying to fool the public, and there is no point in fooling ourselves.

What we have done here is to insure that part-way through the project there will be no likelihood that funds are about to run out.

We have assumed the financial responsibility for showing true figures, that will get the job done.

The primary method of saving major costs for this project has been to use present transit corridors such as freeways, flood control channels and railroad rights-of-way, for rapid transit routings wherever possible. Within these three types of existing corridors, the preferential selection has been based on ease of construction, speed of construction and environmental considerations for any given route section, in order to achieve the highest degree of cost effectiveness compatible with the overall design of the system. Work on freeway corridors, as illustrated here, will call for innovative constuction techniques in order to maintain freeway traffic flows during construction.



OPERATIONS

The RTD will begin operating each link as construction of the line progresses.

The conditions for an operational link are mainly these: access to shops and yards, power connections, signal controls. If those conditions are met, the links do not necessarily have to be inter-connecting.

In all likelihood, the above-ground section of the Starter Line (Union Station south to Long Beach) will be the first element in either system to become operational. That can be expected by 1982.

For the six years after that, about 45 miles of new trackage will be made operational each year.

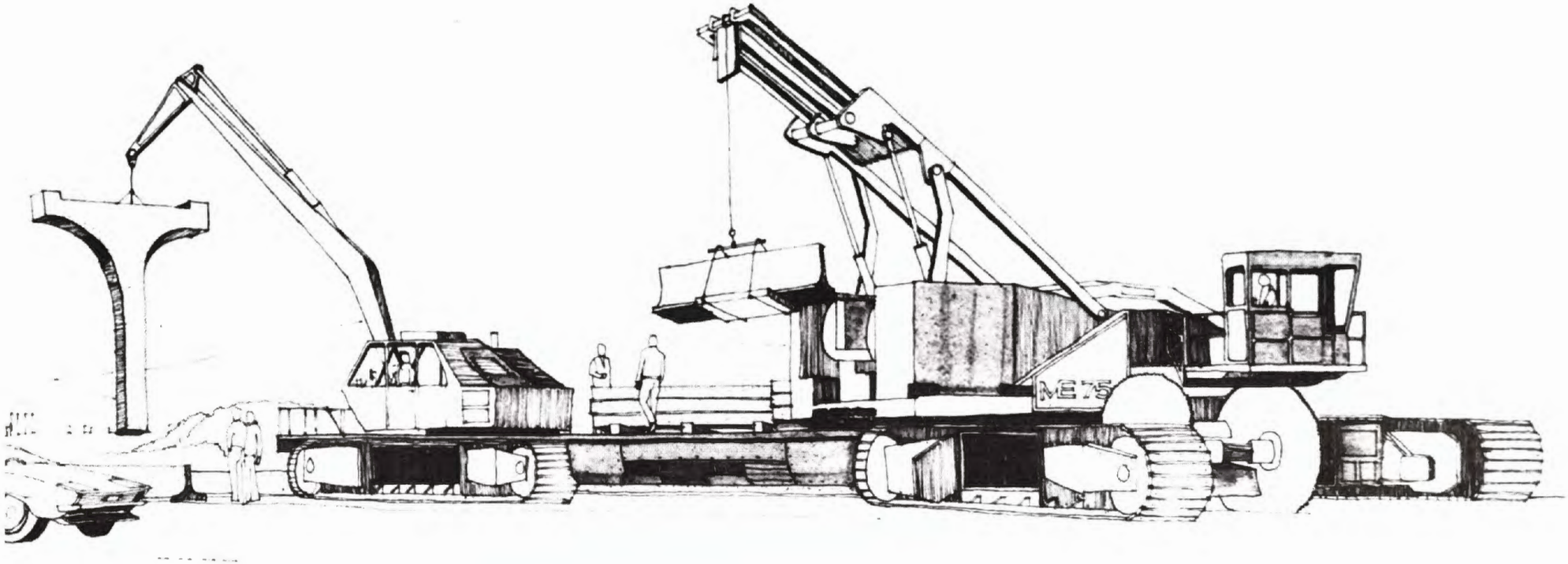
East-west connections to the Starter Line (above-ground) should have been made by 1980, so that Starter Line activity will not be interrupted by construction work on these junctions.

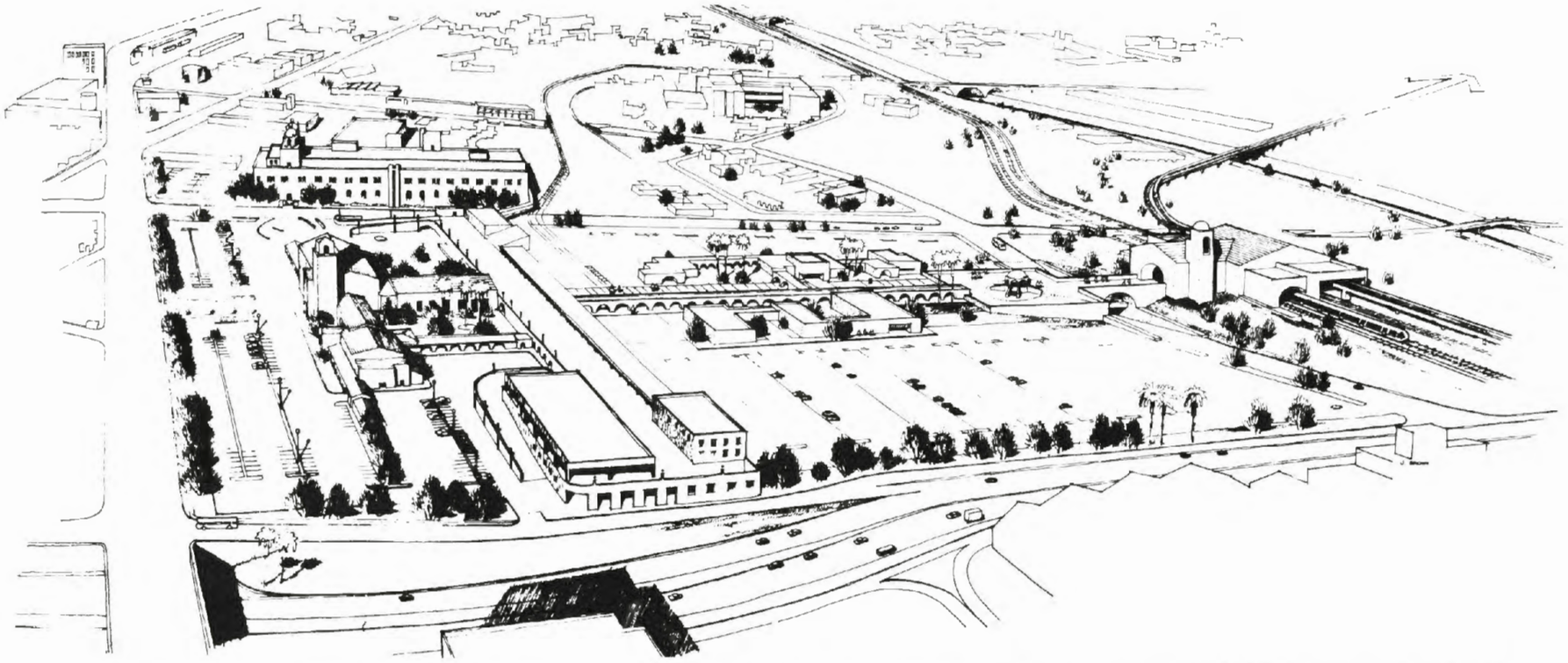
Because of delays expected in completion of the downtown subway section of the Starter Line, the RTD will be required to develop through-service detours, using the River Bypass and Exposition (or Santa Monica Freeway) route for access.

The whole system will be nearly complete when the Downtown Subway and Central Business District Distribution lines go into RTD service, approximately 10 years from now. Parts of the CBD Distribution can be built earlier, but key portions will depend on transfer facilities in the subway stations, and must await their completion.

On the Main Line (other than Monorail and Downtown Subway route), it is likely that the RTD will be operating 500 car service by 1984, and 800 car service on interconnected lines by 1986.

Because of probable congestion on the River Bypass, 1000 car service should be delayed until the Downtown Subway is finished.





In this rendering of Union Station Plaza the present Union Station building is located in the center left of the picture with the Post Office structure just above it. A concourse then leads approximately 600 yards east (traveling through a new group of RTD operational buildings) to the new Mission style Union Station Annex at the far right. The Annex will house SUNSET, AMTRAK, AND CBD feeder rail lines in both above-ground and subway configurations.

UNION STATION

The present Union Station itself will not work well in a transit system (the tracks are stub ended; parking is inadequate; there is no room for the transit lines or companion facilities), but it would fit handsomely as part of a new Union Station Plaza complex, which must provide these requirements:

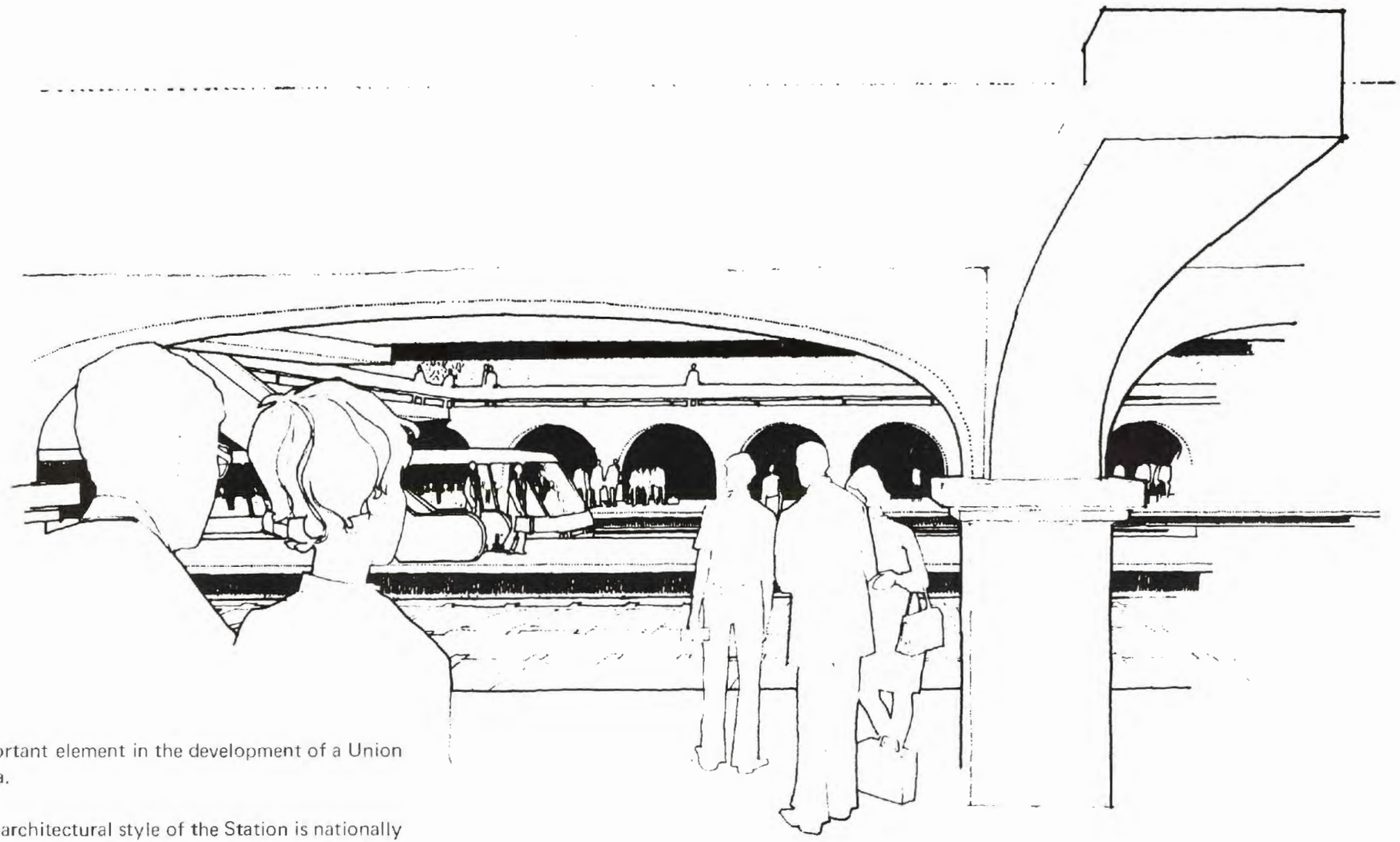
1. The need for an RTD operational headquarters for its rail transit network.
2. The network's need for a multi-track facility to handle all the lines coming together at one point in the heart of the system.
3. The community's need for parking, bus operations (RTD and commercial), and AMTRAK service alongside the multi-track RTD facility.

And all three of these needs can be organized and satisfied by developing an Annex to Union Station.

Funds for that development are budgeted in the County-wide Sunset project. However, it is not all automatic, because arrangements for the required land must be made with its present owners, which include the three major railroads which hold the present Terminal, other private ownerships, and the City of Los Angeles.

If agreements can be reached, the design work should begin within 30 days after passage of the ballot issue. This speed is necessary because the track removal and location, subway construction both north and south, and the signal, control and communications design and development are highly critical and lengthy elements of the overall transit project. For example, the Control system (wherever it is headquartered) must have been tested and ready for RTD use by 1982, when the first leg of the Starter Line is expected to be operational.

We do not know what the future holds for the present Union Station building. But we are aware it is considered as a desirable property, and an



Pedestrian Concourse in the New Union Station

important element in the development of a Union Plaza.

The architectural style of the Station is nationally recognized, and helps set the visual tone of the Los Angeles area. In fact, we would borrow from its Mission style, and design the entire Annex complex in the same theme. And we would carry that theme into the stations and other structures of the system that will be built out on the lines.

The Proposed Starter Line - Union Station to Long Beach

STARTER LINE

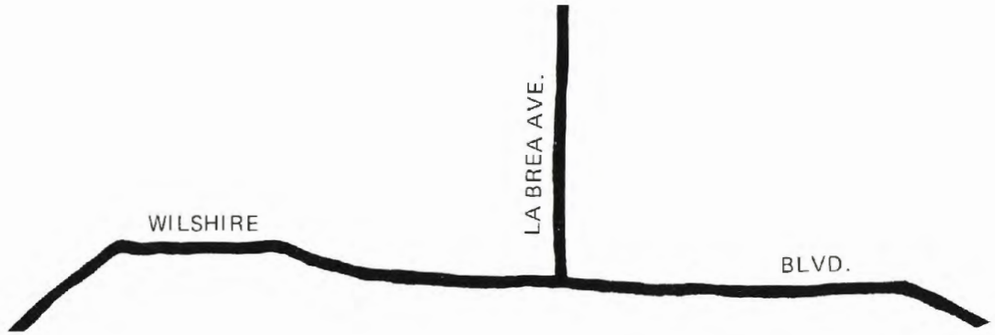
Unlike the County-wide Sunset Coast Line, which is totally financed by County residents, the Union Station to Long Beach Starter Line is supported by a combination of diverted regional gasoline taxes (20%), and matched Federal funds (80%). The result of this multi-agency support has required the obtaining of both local approval and Federal agreement as to route, manner of service, consideration of alternatives, etc.

The Union Station/Long Beach job will cost roughly $910 million. Assuming a full four to one Federal match, it is expected the line can obtain no more than $820 million for construction, with no funds available for transit cars or operations.

Federal matching funds will not be allocated to the Starter Line unless there is assurance that operating and vehicle funds will be available. The budget of the County-wide Sunset Coast Line has included provisions for both the transit vehicles and all operating costs for the Starter Line.

(Included in the regional funding is an assumed Caltrans allocation of between $60 and $65 million, according to statements of November, 1975. That figure is down from a June, 1975, forecast of $100 million from Caltrans. As of January, 1976, there has been no confirmation from the State Highway Commission that it is prepared to fulfill the current Caltrans pledge, although it is hoped there will be no further deterioration in State funding.)

It is hoped that the Starter Line Control and Communications base will be established as an integral part of the main RTD Operational Headquarters for the whole system at Union Station Plaza. Funds for this development are included in the County-wide plan.



WILSHIRE CORRIDOR

When the parties to the Starter Line agreement adopted the Union Station-to-Long Beach routing, they simultaneously dropped the Wilshire Corridor from any first-phase development with Federal funds.

The Wilshire Corridor has not lost its importance, however, and must be included in any first-phase development with local funds.

There is a belief held by many that the Wilshire Corridor problem has been the weight that held down required public support of the last two transit ballot issues — residents County-wide suspected that the Wilshire line was using much of the funding in an expensive subway development, with little or nothing left over for the rest of the County.

That belief must be reckoned with if we are to expect the proposed ballot issue to pass in June.

Therefore, the Wilshire Corridor must be given the same funding treatment as the rest of the Main Line throughout the County. The principal construction method elsewhere is an elevated structure that carries an 85-mile-per-hour double track. That structure costs approximately $13.3 million per mile in 1976 dollars to build.

The Wilshire Corridor runs about ten miles between Beverly Hills and a proposed subway station at 8th and Figueroa, connecting with the Starter Line. Offering one elevated station (at $3 million each) for every one mile of track, the total proposed cost would be $149 million in 1976 dollars. That figure would be escalated on the same basis as the rest of the line for engineering, contingency, and inflation.

Those funds then would be offered to the cities of Los Angeles and Beverly Hills. If they wished to have an elevated line, construction could begin swiftly. Should the smaller and more graceful Monorail be preferable, construction again could begin quickly after the decision was made.

If the cities should decide on a subway for Wilshire, the extra funds necessarily must be provided by the two cities (or either city that desired the subway), by assessment districts or other special means on which the cities would decide.

If the Federal government offers a later round of matching money (in approximately six or eight years) it might be possible to obtain the extra funding from that source. However, under 10 percent annual inflation, the value of the basic $149 million local grant (from the County-wide system project) will dwindle rapidly. For that reason, the Project would require a decision within a reasonable period after ballot approval.

We recognize that the two cities and the Wilshire interests might wish to observe the design and techniques used in Heavy Rail, Light Rail, and Monorail construction elsewhere in the system before coming to a decision.

Within the first four years of the project, a number of these construction starts will have been made.

Therefore, the project could allow up to 48 months (after the ballot approval) for these deliberations. Inflation by then already would have added 40 percent to the cost of the Wilshire Project, and could not be allowed to continue further without a construction start of some form. If the decision is for a subway under Wilshire, this will require approximately three years for preliminary and final engineering, plus a minimum of five years for construction.

Assuming full utilization of the four year observation/decision period, the Wilshire subway would become the last major link to be completed in the entire system and conceivably could delay the finishing of certain connecting portions of the Downtown Starter Line Subway and Distribution network.

The RTD will be required to work with the cities of Los Angeles and Beverly Hills, in guiding them to a Wilshire solution. If the decision is for subway, and funding is available, the RTD would be requested to allow the County to withdraw from management of that element of the overall construction project, after assigning the $149 million in local funding. However, should the decision be for elevated Main Line, or Monorail, the County then would serve as Project Management for the Wilshire Corridor.

THE LA BREA CONNECTOR

Tied with the Wilshire Corridor is the link between Wilshire and the San Fernando Valley.

About half of that link will be built as part of the County-wide project from the Ventura Freeway interchange in the Valley, southeast through Cahuenga Pass on an elevated structure that will end with a station near the Hollywood Bowl.

The Project has budgeted funds to continue that line, elevated, along La Brea (or any routing selected by the City of Los Angeles) to a station connection and line junction with the Wilshire tracks.

The basis of this funding is the same $13.3 million per mile arrangement as for the Wilshire Corridor, itself.

But again, we do not know whether the City of Los Angeles will be interested in an elevated structure for this La Brea linkage.

As with Wilshire, a decision must be made within a reasonable period after passage of the ballot issue, so that funds will not be too seriously diluted by inflation.

If there has been no decision (aerial, subway, monorail, etc.) by Los Angeles City after 48 months, the Project then would reclaim these funds and apply them to the development of an elevated structure above the median of the Hollywood Freeway, from the Hollywood Bowl Station, southeast to a connection at Union Station.

This diversion of funds will become mandatory after 48 months because San Fernando Valley traffic cannot come to a complete halt at the Hollywood Bowl, once the other portions of the system have been finished.

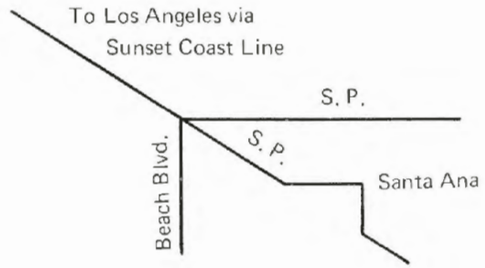
ORANGE COUNTY CONNECTIONS

It is likely that voter approval of this County-wide Los Angeles system will spur similar voter approval of transit projects in adjoining counties as well.

One of our routes is specifically developed for an Orange County connection — the link from Watts Junction to La Palma, terminates at the Orange County Line. This service will utilize (by aerial construction) an old Pacific Electric right-of-way now owned by Southern Pacific.

That same right-of-way extends, straight as an arrow, to the northwest border of Santa Ana, and is considered by Orange County as the first transit line they would develop from newly-voted funds.

We can assume that the Orange County construction would parallel our own, with an actual inter-County link being forged by 1982. We would hope that within this decade our own Red Car Interurbans will range beyond our County borders, out to Anaheim Stadium, Disneyland, Knotts, and the other recreational and urban centers that will be linked by the Orange County system.



CONSTRUCTION PHASING

We tend to consider the whole Project (including the Starter Line) as Phase One of our County-wide transit system development.

But even within Phase One, there must be a sequence of events. The first such event will be the simultaneous construction of track junctions and switching elements along the outer perimeter of the Main Line, and at Starter Line intersections. There are 11 of these junctions.

Timely development of complicated junction structures will ensure against delays when line building reaches these points.

These junctions are necessary to permit the Red Car Interurban and Airporters to travel long distances through many operating divisions without requiring passengers to transfer.

There will be some simple transfer points in the system, but they will not require junction track work and thus can be incorporated into station design.

That outer construction will also be assurance to the outlying cities that they will not be forgotten, or come in last. It is our intention to work from the outside in, and from the inside out.

The overall project will develop through completion of work on an extensive series of major contracts, whose intent will be to evenly balance construction throughout the system, while providing for an orderly development of operating lines.

Certain contracts will cover work that will progress throughout the construction life of the project and for which preparations must begin immediately after approval of the ballot issue.

The Union Station Annex (track removal and relocation, operational housing, subway preparation, AMTRAK and bus feeders, etc.) and Line Control System are examples of long-term jobs.

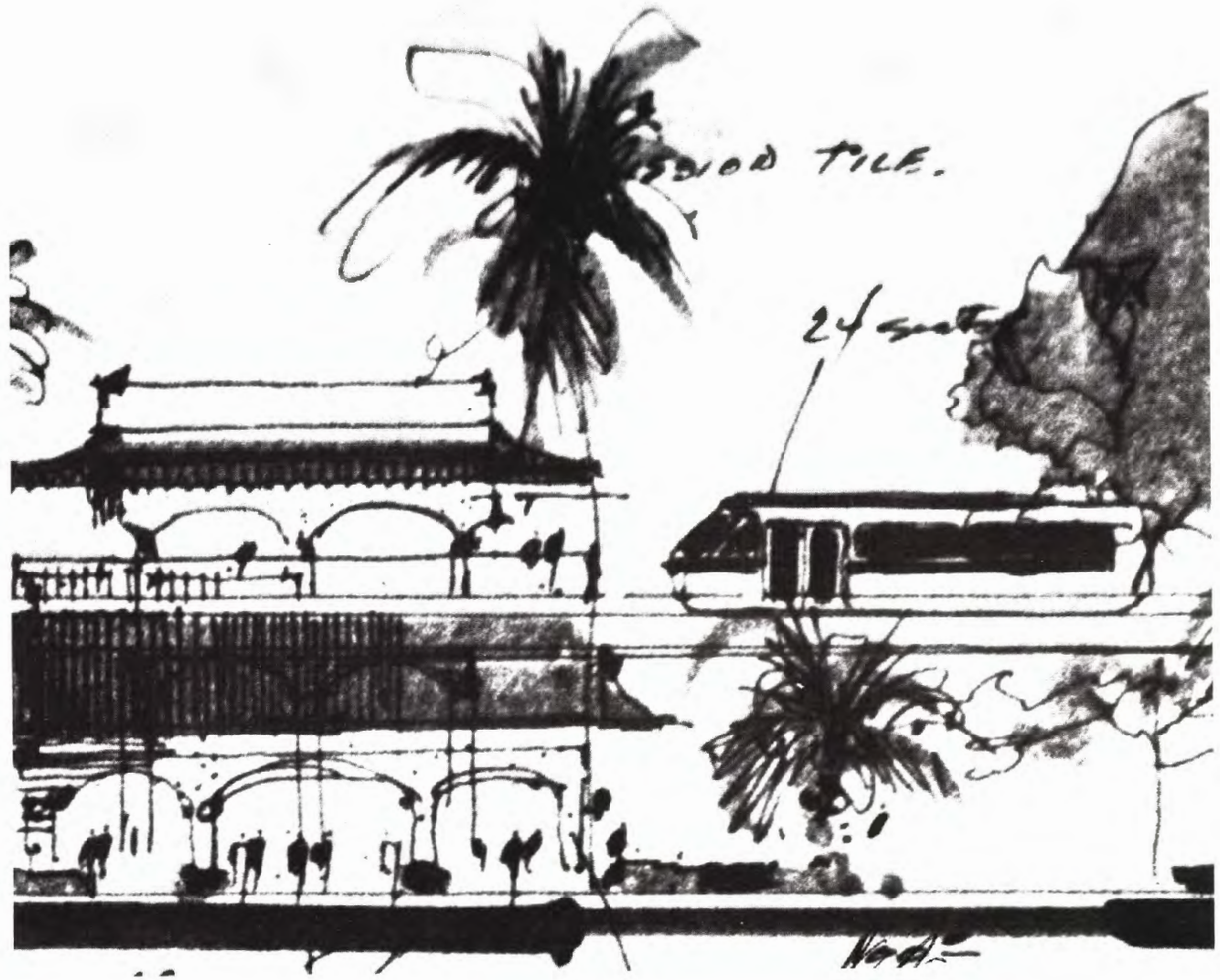
Other activities also suggest immediate starts in order to save inflation costs – the developing of yards and shops to be among them.

Station construction contracts will be separate from but will require coordination with line construction jobs. Sunset line development will be broken into 46 major jobs, some of which will be further segmented because of size and timing. In many cases several jobs will begin simultaneously at widely separated points throughout the system.

In the first year of actual track construction, for example, starts will be made on line development in the South Bay, San Fernando Valley, and San Gabriel Valley. The following year would see work begin inward from Santa Monica and the Orange County border.

The overall project will be the largest single construction effort in the history of western America. The main segments and divisions of work will call on the resources and capacities of countless private firms in the fields of design, engineering, and construction. The additional assignments that could go to Caltrans will occupy many State teams in a whole new range of construction problems and solutions.

In all, the Sunset project will be a lengthy, intense, and sizeable test of the skills and efforts of the construction, design and engineering industries, which will be called on to create the world's largest, fastest, and finest rail transit system.



THE FUTURE

This book is concerned with Phase One, the basic County-wide system. But we recognize that the County will not remain static as we build. There must be plans for the future.

Construction of the Sunset Coast Line will place emphasis on the value and use of specific existing pathways. We urge that those remaining not be ignored, built over, or somehow misplaced.

Therefore, we suggest that all cities look closely at any abandoned Pacific Electric routes that course through them, and view them not as clutter, but as the potential for new transit connections — either as elevated additions to the Main Line or grade-separated extensions for Light Rail with its many convenient opportunities for stops.

Other railroad rights-of-way also could be considered for elevated connections. The same holds true for freeway medians. And there are major and minor flood control channels that travel large sectors of the County.

We can propose some additional construction, as Phase Two, to begin in about twelve years, around 1988:

Heavy Rail

- - Main Line extension of the San Diego Freeway from Dominguez Junction southeastward to Rossmore (Los Angeles/Orange County line).

- - Main Line on the Golden State Freeway northward from Burbank Junction from San Fernando and southward from the Ventura/Golden State Junction to the junction with the Glendale Freeway route.

- - Main Line from Woodland Hills to Calabasas.

Light Rail

- - Light rail extension (grade separated) on Foothill Freeway from Marengo to Devil's Gate Station (Jet Propulsion Laboratory).

- - Expand elevated Slauson line east to the Commerce Junction with the Main Line and west to Marina del Rey.

Monorail

- - Line from Union Station to Rose Bowl, via Arroyo Seco, with support pillars placed in the flood control channel.

- - Extend monorail from Boyle Heights down Whittier Boulevard to the San Gabriel River line to the heavy rail station at Workman Mill Road.

(Of primary importance will be a north/south Monorail connection between the Foothill and San Bernardino lines throughout the center of the San Gabriel Valley, at approximately Rosemead. We would prefer that such a line be built as a part of this Phase One County-wide project, but the lack of an adequate existing pathway such as rail right-of-way, etc., have prevented our naming an actual route. Consequently, we are reserving funds for this or an adjacent, parallel route. If the cities and residents to be affected and served by such a route would agree to accept it, construction of this Monorail line could begin simultaneously with the building of the other Monorail lines scheduled to start before 1980.

The present El Monte busway has made provision for an extension to the north through a set of connecting ramps at Del Mar. These structures perhaps could be adapted to some feeder use, if the City of San Gabriel would desire this.)

These seem logical now as extenders for what we propose to build as Phase One. But the future is not that easy to settle. It will be up to the RTD to work closely with all communities in the County, arranging an inventory of future buildable routes.

Phase Two will be slower and smaller, but it also can be constructed with the same sales tax continuation, as we proceed a day at a time, at 10 cents a day.

Within 30 years it is likely that another 40 miles of Heavy Rail Main Line track should be constructed.

Beyond that, the opportunities for Light Rail extensions and Monorail feeders are endless — and cities should be urged to initiate financing plans to develop them in conjunction with the RTD.

Planning departments of the cities and the County should give consideration to feeder line requirements of future massive shopping centers of major residential subdivisions, so as to allow for direct connections between them and the Main Line.

While any future extensions of the Main Line must be totally compatible with Heavy Rail or Light Rail specifications, that requirement does not apply to the Monorail feeders. Monorail cars do not enter the Main Line, so they can be of any individual design. In fact, if Monorail lines are not interconnecting, there is no reason for their mutual compatibility.

This freedom of design will permit each successive Monorail development to be designed in a method that can take advantage of the continuing improvements in the state of Monorail art.

The adaptability, convenience, and lower cost of Monorail layouts suggest that they will become the primary means of transit expansion into the communities of Los Angeles County.

Future Monorail lines built to serve commercial streets parallel to the Main Line will allow for a reduction of stations on the Main Line track and thus permit higher speeds between principal Main Line stations.

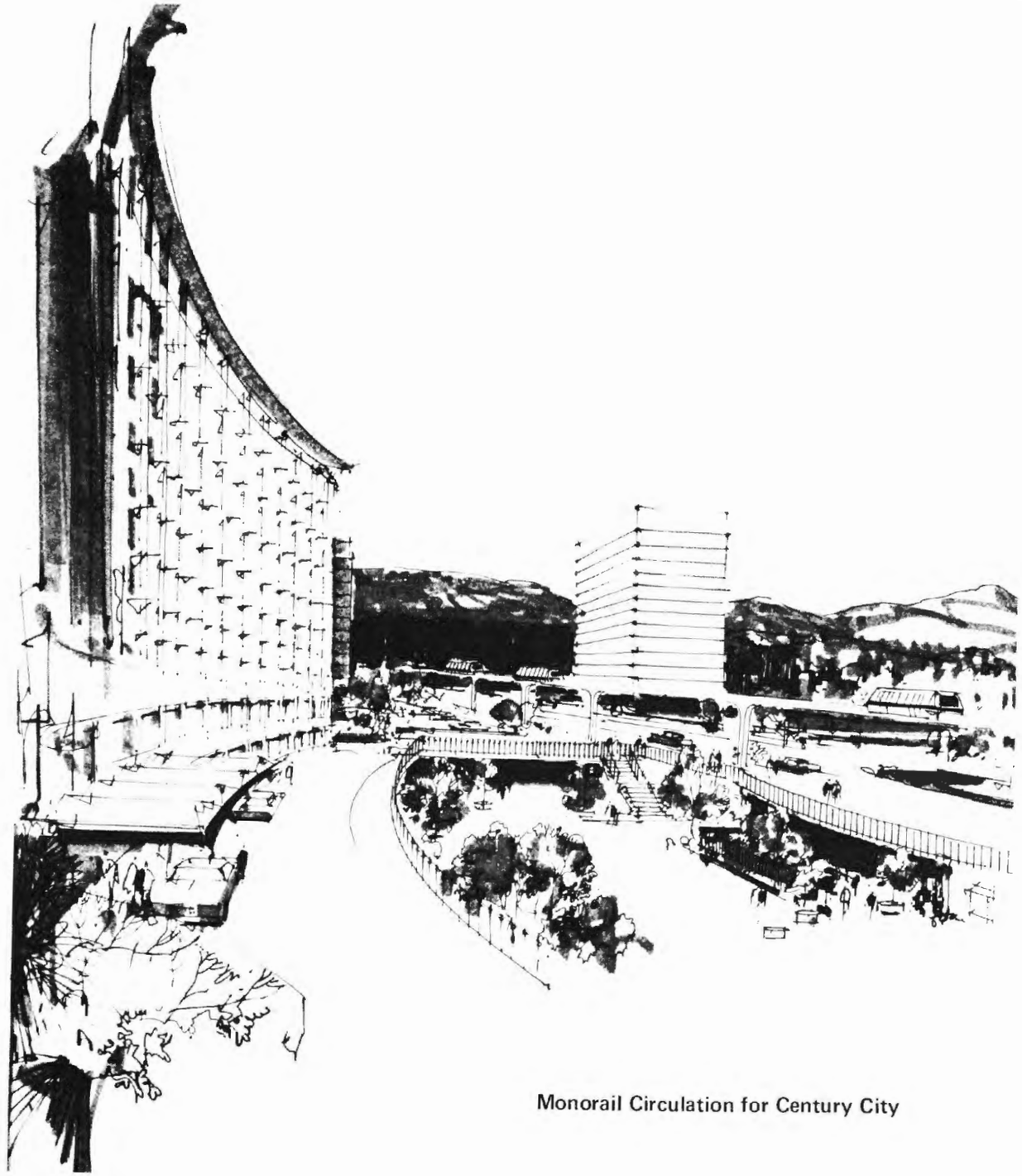
Although the Sunset Main Line will have high running speed averages as presently planned, it is obvious that future years will see calls for more and more through service with fewer station stops.

This probably will serve to streamline the schedules of the Red Car Interurbans.

The speedup can be accomplished by gradually developing turn-out tracks at stations and through adding another set of double tracks between stations.

Of these alternatives, the station turn-outs are less costly, although they will slow local trains waiting for clearance to return to the Main Line.

By either method, a goal probably will be to establish a Red Car Interurban service, with stops not more frequent than once every 10 miles.



Monorail Circulation for Century City

ABOUT THE NAME, SUNSET COAST LINE

We know full well that any transit system is going to wind up with a name – one that will help or hinder.

The ballot issue needs all the help it can get.

So we stayed away from names of the type that recently were the vogue – the alphabetical abbreviations that range from east to west. Their systems have been stricken by so many calamities (gigantic cost over-runs – enormous construction delays, and cars that won't budge – etc.) that we felt the Los Angeles County voters might associate us with them.

So we decided on something we could spell out.

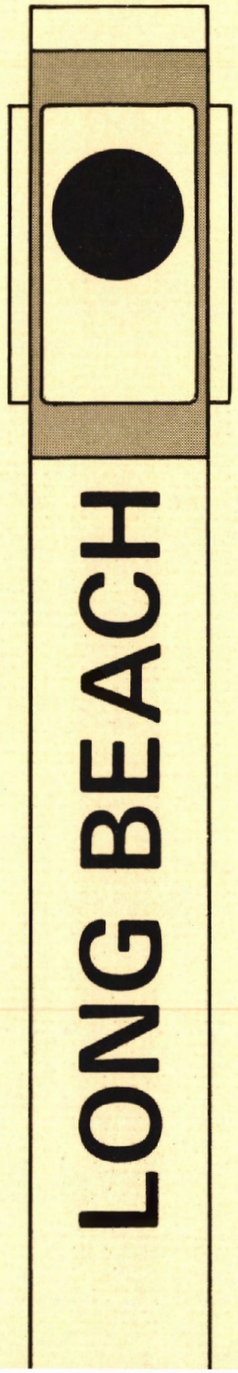
We also wanted to tell where we are, and what it is we will be doing.

The name, Pacific Electric, did those things well. But it belongs to someone else (and it wasn't grade-separated, either). So we settled on Sunset Coast Line. It is the kind of name that pretty much says all there is to say, keeps some nostalgia, while still looking forward to the future. Someday its tracks might be converted to air cushion, with speeds up to 150 miles per hour on certain longer stretches of the Main Line – and the name still will be good.

Of course, by then people might want to shorten the name somewhat, to suggest feelings of warmth and familiarity. A name with three or two words could be just too long.

So we suspect it will become known as the Sunset. In fact, it possibly will be called that while it is still going only 85.

Monorail Along Wilshire Boulevard



technical evaluation

system description

The proposal detailed in this report is a description of a fixed rail guideway electrified rapid transit system comprised of approximately 230 miles of radial and circumferential lines and a network of approximately 51 miles of light-rail and monorail feeder-distribution lines interconnecting with the heavy rail, high-speed system.

It would be the only system in this country providing a flexible approach, with feeder and distribution systems designed to meet the specific transit needs of various cities and communities. Approximately 500 million dollars (escalated) has been allocated for the development of:

1. Light guideway automated group rapid transit closed loop distribution networks (monorail).
2. Light rail feeder corridors.
3. Dual mode (electrified and non-electrified) rail feeder corridors.

While some extensions of the third rail main line are contemplated in the future to enlarge the high-speed network, it is envisioned that the primary expansion of the whole system would lie within the development of feeder or distribution lines and networks into the communities of the region.

The crucial first step, however, is to obtain and construct the long distance corridors which will tie together the Los Angeles basin while it is still possible to finance such a monumental project.

No single rapid transit technology currently in operation or under development in the United States today offers any kind of total solution for public transportation in the Los Angeles metropolitan area. Traditional transit planning yardsticks simply do not apply to such a large urbanized geographical area.

In fact, past studies here have concentrated on service to only those transportation corridors containing the highest population or employment densities for the region – ignoring the reality that many other sections of the County have work densities or trip-end densities equal to cities such as Atlanta, Miami and Denver.

characteristics of the system

The Sunset system then, has been designed to incorporate a multi-modal approach within a fixed guideway system required by the characteristics of our region: long reaches of heavy rail to connect the basin (more than doubling the capacity of the freeways where such rights-of-way are used) and feeder and distribution systems reaching into individual cities and districts. A system of lesser scope would neither divert enough auto traffic to make it cost effective nor offer wide enough service to justify financial support by all the residents of the County.

In addition to the light rail and light guideway feeder and distribution systems, it is expected that the feeder network would be greatly augmented by improved bus and dial-a-ride operations. Long haul buses would be converted to grid operations, feeding the main line stations. Development of dial-a-ride systems would also be intensified, since the effect of an operational County-wide rapid transit network would be to greatly increase both patronage and cost effectiveness of the auxiliary feeder operations.

For comparative purposes, Table 1 provides a thumb-nail description of the characteristics of this system and all the other rapid transit operating properties in North America. The summary indicates the system proposed for Los Angeles is 13% larger — in terms of system mileage — than that of New York.

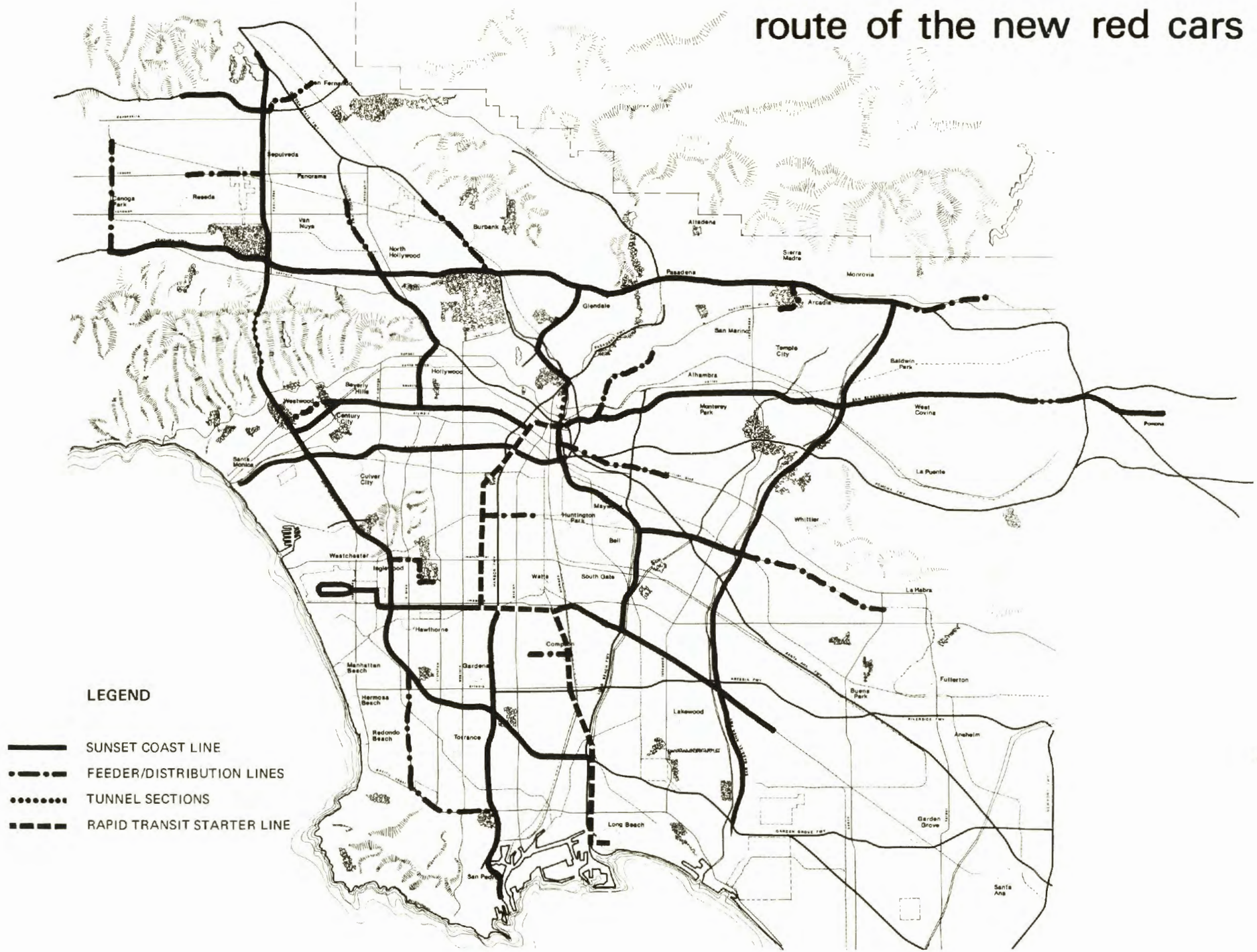
RAPID TRANSIT SYSTEMS

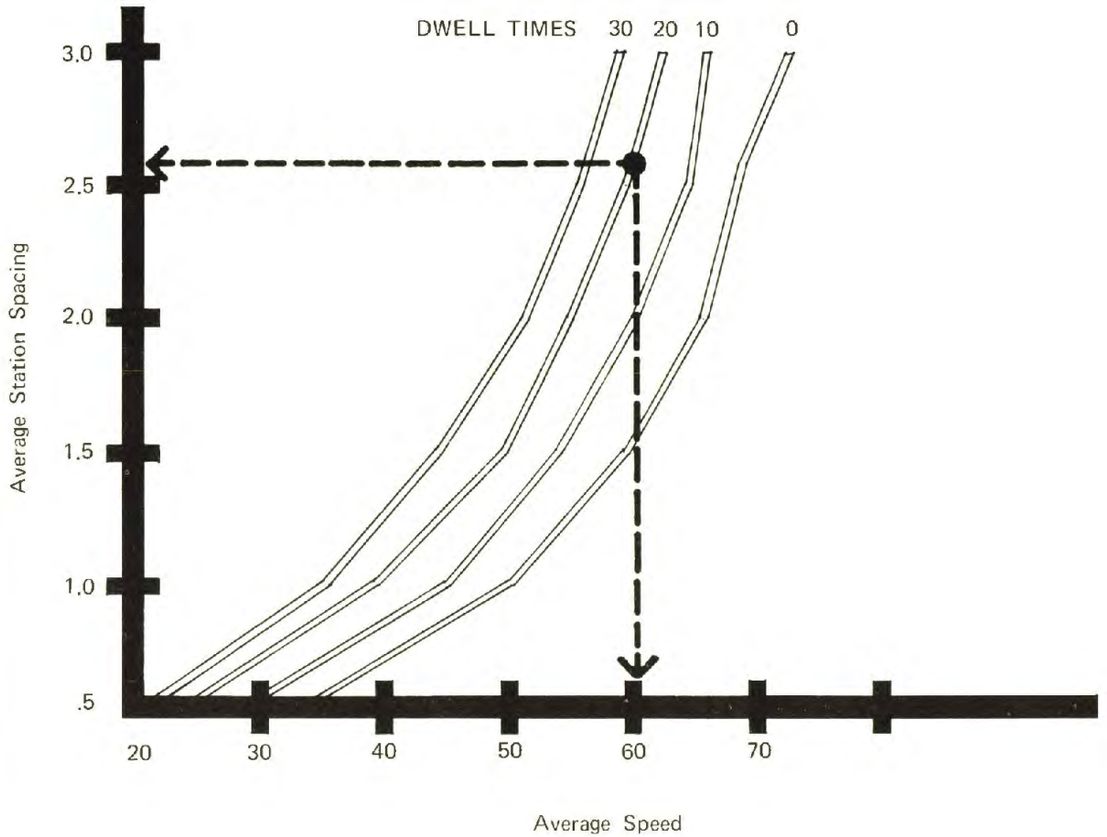
Transit System	System Miles	No. of Stations	Average Station Spacing	No. of Cars	Car/ Mile
San Francisco	75	34	2.20	450	6.0
Chicago	90	148	.70	1302	14.41
Cleveland	19	18	1.12	118	6.2
Boston	77.3	46	.62	436	5.6
Atlanta	52.9	37	1.46	338[a]	6.38
Baltimore	28	10	2.80	160[a]	5.71
Montreal	15.9	28	.56	346	21.7
New York	246	476	.50	6859	26.78
New York-New Jersey	14.2	13	1.09	299	21.0
Philadelphia-New Jersey	14.5	12	1.20	75	5.1
Los Angeles	281.7	191		1680[c]	16.59
(Main Line)	230	89	2.58	1060	4.60
(Monorail)	51.7	102	.44	620	11.99
Philadelphia	30.2	52	.58	493	16.3
Staten Island	14.0	(b)	(b)	52	3.70
Toronto	23.4	45	.29	410	1.70
Washington DC	98.0	86	1.13	300[a]	3.06

Notes: a. No cars in operation at this time.
b. No data available.
c. 1000 cars; 60 domed bi-level cars; 620 monorail cars.

Table 1

route of the new red cars





Graph 1 – Station Spacing/Average Speed

STATION SPACING AND SPEED

The average speed of a rapid transit system is determined primarily by the number of stations along the line, rather than by the top-speed characteristic of the vehicles. The design target of the Sunset system is a 55 to 60 miles-per-hour average, which can be accomplished by 2-1/2-mile station spacing, 20 second dwell time, and an 85-miles-per-hour top train speed. If the average speed under actual operating conditions proves to be 20 percent less than the design target speed, the Sunset Coast Line still would be the fastest system in the United States.

No problems are anticipated in obtaining electrical-powered cars capable of the 85-mile-an-hour limit. In fact, that speed limit has been assumed to conform with signalization and control limitations, since 100-miles-per-hour cars are available. This, in turn, means that the gear ratios on the cars can provide high acceleration and deceleration factors, which will further serve the obtaining of the top design average.

The rail technology to be employed will be within the existing state-of-the-art; that is, modernized versions of hardware currently operating at various locations throughout the country or similar to hardware presently being developed with a near term completion date.

The Interurban and Airporter services described will employ 85-foot cars that generally will duplicate or slightly exceed the characteristics of the Advanced Concept Train, which is being developed under terms of a U.S. Department of Transportation contract.

The Local cars would also be 85 feet in length and generally will duplicate or slightly exceed the

service capabilities and technical specifications of equipment that is now being used in the New York area.

On alignments utilizing freeways, the station locations generally are dictated by the intersections along these freeways. Each freeway-to-freeway intersection would provide a station, as well as the principal arterials intersecting the rapid transit line. While the actual locations of stations must ultimately be worked out with the cities along the lines, preliminary judgments have been made as to general station locations, in order to develop the technical description of the system. Thus, 89 MainLine stations have been identified along the course of the 230 miles of Heavy Rail Main Line. The average spacing between stations for this system is 2.58 miles. Using calculations developed by the U.S. Department of Transportation, based upon research conducted by Soberman and Lang,[1] a theoretical average train speed of 60 miles per hour could be assumed on this network. This speed is premised upon a maximum train operating speed of 85 miles per hour, a 20 second dwell time at stations, and an average spacing between stations of slightly above 2-1/2 miles. The following graph illustrates the relationship between distance between stations and average train operating speed.

A map, based on train operating conditions referenced above and more fully outlined in the section on Vehicles, illustrates the isochrones for travel time from Union Station to various locations along the routes radiating from the Central Business District. This map also indicates that the system proposed would provide the fastest mass rapid transit system in the country. (See Figure 15)

1. Lang, A., and Soberman, R., *Urban Rail Transit; Its Economics and Technology*, MIT Press, Cambridge, Massachusetts, 1964.

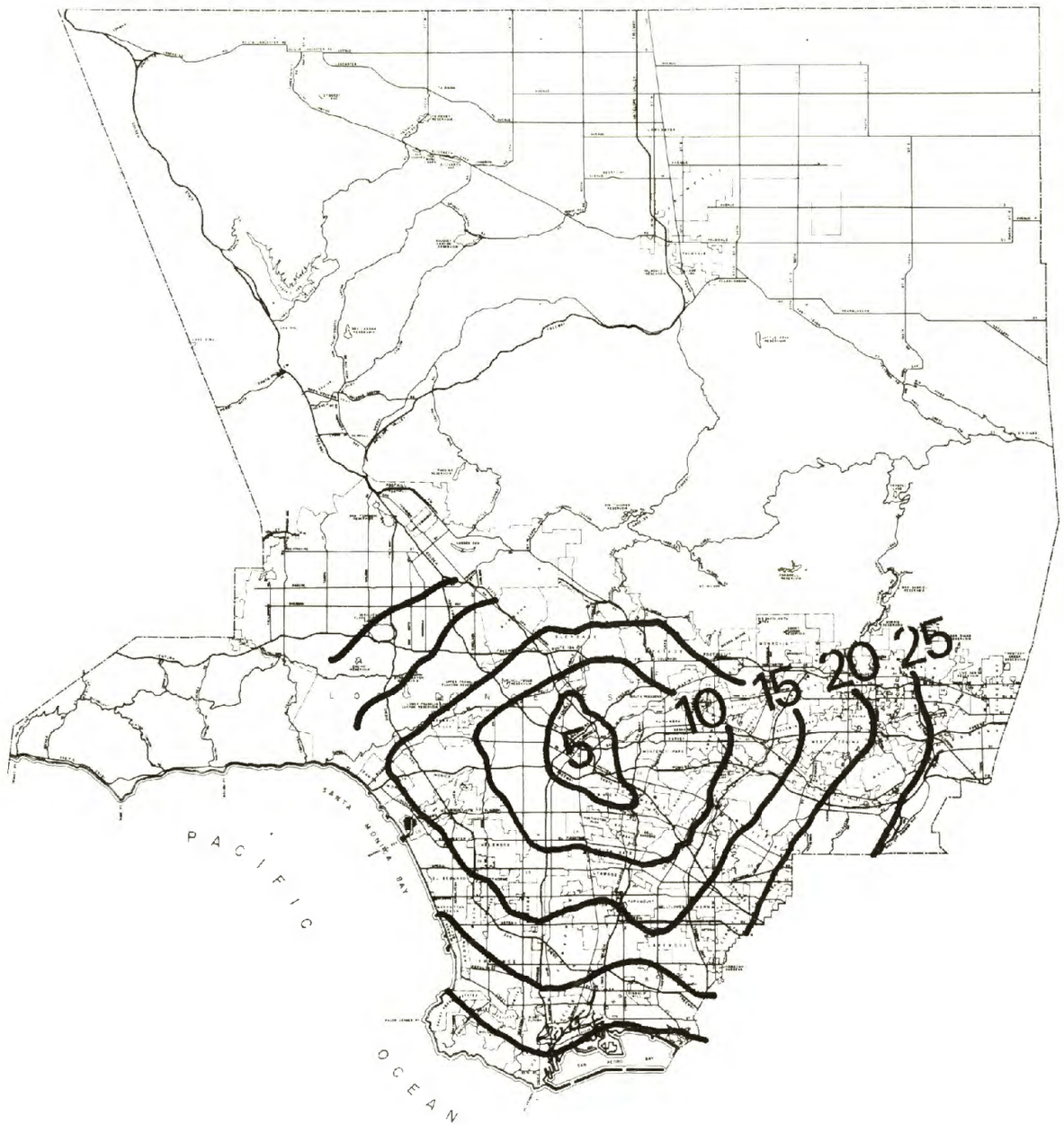


Figure 15 — Approximate Travel Time Contours

INTERLINE RAIL JUNCTIONS

Again it should be noted that if actual operations prove the average speed to be in the 50 to 55 miles-per-hour range, the Sunset Coast Line would still provide travel times from point to point that exceed anything possible with the automobile under even medium density freeway conditions. Travel times by car during heavy traffic conditions on freeways, or on surface streets at any time, could not begin to compete with the rapid transit system.

The feeder and distribution systems, of course, would operate at lower average speeds than the Main Line, since those routes are designed to facilitate local travel, and their station spacings average .44 miles between stops.

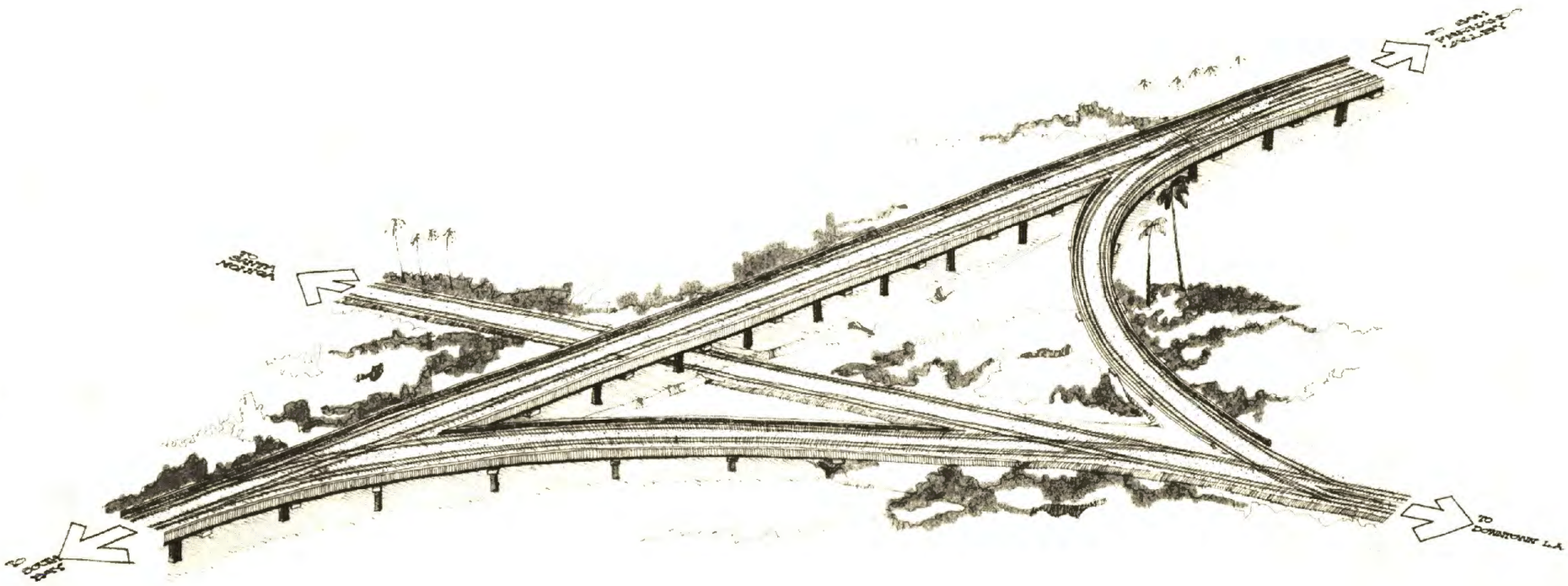
The concept of an interline rail junction has been included in this proposal to provide the flexibility for diversion of trains at key intersections along the routes. The concept, while not radical in its foundation, is basically unique as applied in this situation.

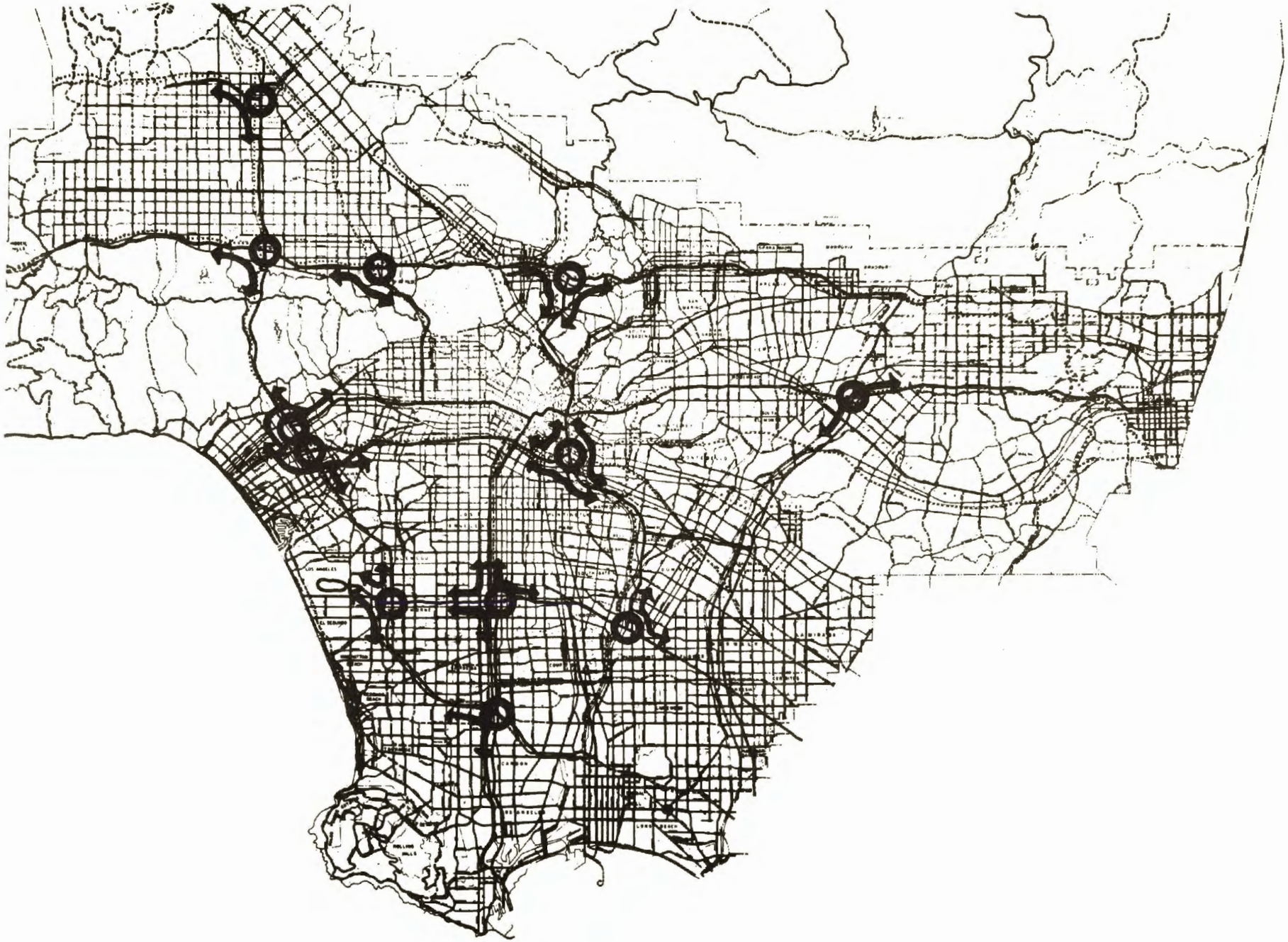
The net effect of such traffic diversion is to provide an additional level of service, without requiring transfers from one line to another for different areas within the region. This service by definition is an Interurban service.

The Airporter trains, originating at the endpoints of each of the transit corridors, provide a direct service to the Los Angeles International Airport.

These trains use the junctions to circumvent traffic delays on main lines during peak hours, and to achieve the most direct routing during off peak hours.

A secondary effect of the use of frequent interline rail junctions would be to provide a high degree of flexibility in removing out-of-service trains from the system without forcing a break-down on peak load lines. BART, for example, has suffered frequent collapse of schedules because out-of-service trains have had to be towed back over main lines to repair yards during peak travel hours. The following map illustrates those line intersections where these interline rail junctions would be provided.





Location of Interline Rail Junctions

FARES AND FARE COLLECTION

Several divergent philosophies and strategies for either fare collection or a fare-free system have been considered for the project.

Examination has been made of the highly complex, totally automated fare collection method of the Bay Area Rapid Transit system. BART employs a solid state electronic circuit, using magnetically encoded tickets to collect and store future fares and to permit entry and exit from the system.

The stored-ride method was determined to be unnecessarily complex and entirely too expensive at this stage in the development of our Los Angeles County project. This is especially true in view of our predetermined policy for this proposal, i.e., that fares during at least the first decade of operation approach as closely as possible a no-fare structure. This policy has been based on the concept that the generation that pays for the construction of a public transportation system should not have to pay again for its use.

Given a low-fare policy, highly automated systems capable of determining fractional fares on a cost-per-mile basis are superflous. In fact, any fare collection method based on length of trip is not cost effective when applied to a tax-subsidized transit system. In one New York system, officials estimate it costs 15¢ to collect a 35¢ fare.

Upon consideration, it seems most feasible that stations on the mainline transit system would provide a fare collection device that would not require a station attendant and not be based upon a complex electronic circuitry. The approach would be to utilize simple coin turnstiles to segregate the paid and unpaid areas of the station, with automatic coin changing facilities provided. The Light Rail and Monorail feeder and distribution systems could operate without charge to the riders, thus providing further inducement towards full ridership on the transit system, as well as encouraging local community participation in the development of effective distribution systems.

Well into the future, as the entire system is moved into more significant fare collections to offset operating expenses, a sophisticated, automated point-of-destination fare collection system could be installed.

CONTROL AND COMMUNICATIONS

After analysis of the highly complex control and communications system concept employed by the Bay Area Rapid Transit System, and the problems it has encountered to date, the recommendation of this report is that the proposed rail transit system for the Los Angeles area employ, at the outset, a conventional wayside block signal system with automatic override for automatic train stop protection. Centralized computer control systems would be provided, however, to maintain car location displays, signal control and two-way car communications.

Central computers controlling such functions as performance level adjustments, station dwell time adjustments, revision of entering order where routes merge, change in length of trains entering service, additional withdrawal of trains from service, and route schedule alteration, would not be built into the system until such time as the operational sophistication of the equipment had achieved a level of reliability to justify the expenditure. The controlling philosophy is to establish an operating and reliable service for the public.

AESTHETICS

Aesthetic considerations in connection with route configurations involve the architecture and landscaping of the transit corridor and stations.

Primary considerations in the aesthetic treatment of the aerial structure include:

- Minimizing of the shadow effect of the guideway
- A motif for the structure to conform generally with Southern California mission influence
- High quality design and finish
- Ample landscaping for park-like atmosphere
- Acoustical considerations

Thoughtful design incorporated into the transit facilities can make them so compatible with their surroundings that they will function as an integral part of the community.

One of the major policies underlying the development of the Sunset system has been the determination that new rail lines should follow existing transit corridors. This policy has several benefits, including lower capital cost for construction and an avoidance of the financial and environmental penalties that accompany widespread condemnation of private land. This policy further avoids the many problems involved in the alteration of existing land use patterns, which would be the case if new corridors were carved through the communities of the county. And finally, in terms of aesthetic considerations, the use of existing transportation corridors greatly simplifies the problems of minimizing the visual impact of aerial alignments.

To put it simply: an aerial guideway structure carrying modern high-speed trains above the median of a freeway looks as if it belongs there. The decision to use Light Rail and Monorail systems for the feeders that extend into the communities further minimizes the visual impact of the system. The Monorail structures, for example, require only light guideway supports, which means the system can be designed in a graceful manner.

In addition, the utility relocation work which is required for the construction of any non-freeway alignment offers an opportunity for aesthetic creativity. For example, the construction of a light aerial guideway for monorail vehicles down Hawthorne Boulevard in Torrance will make it possible to place underground the electrical and telephone lines that are now visible along the boulevard.

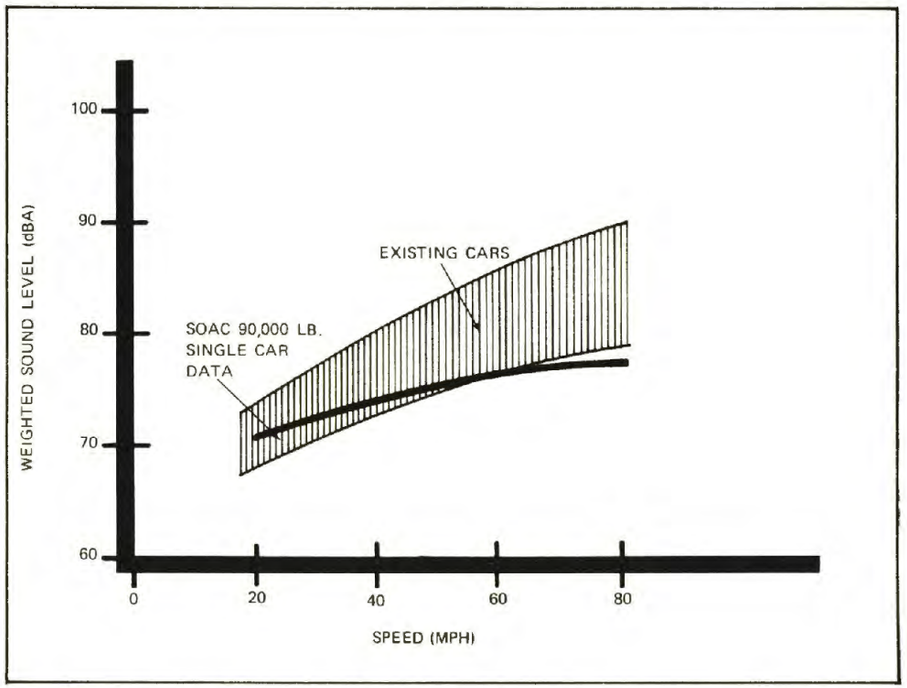
Although we have proposed an overall design theme, it would be noted that there is a great deal of room for flexibility within individual communities or cities.

It is intended that each city choose the precise location of its own station or stations, and that these will be financed within a system-wide budget, i.e., $5 million for each freeway station, $3 million for an aerial station and $1.5 million for the at-grade station. But cities or communities desiring larger or more elaborate facilities can add local funds to those amounts and thus determine both the size and design of their facility.

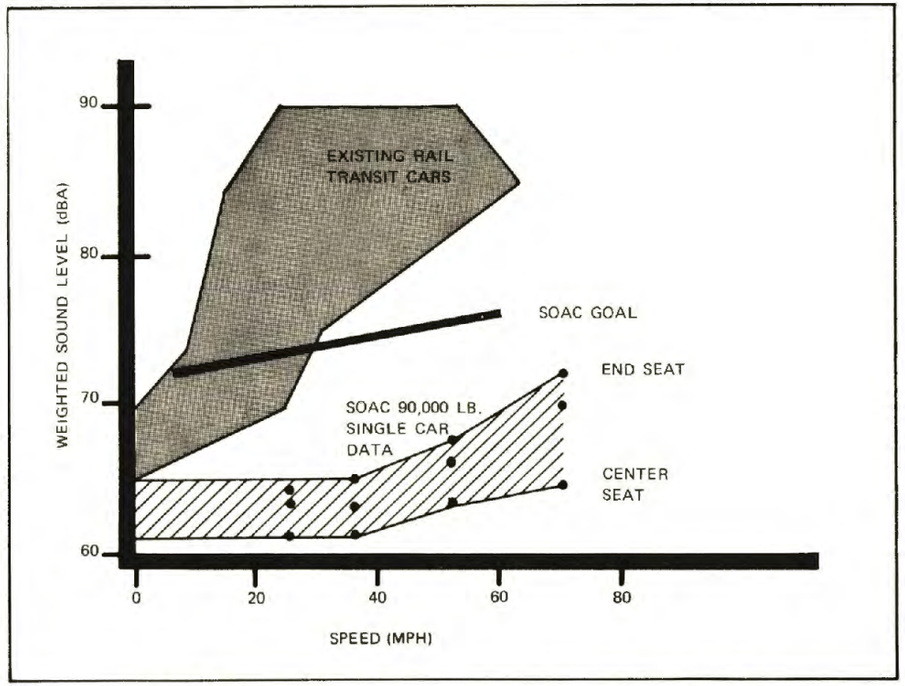
It is assumed from recent discussions with several cities, that many will choose to use the basic funding as seed money to develop local multi-modal transportation centers, incorporating local bus, dial-a-ride, taxi and parking facilities.

In addition, cities or activity centers with a characteristic architectural style of their own (for example, Century City, Universal City, the Forum, or Wilshire Boulevard) would perhaps prefer a configuration more in keeping with their modern environment.

Bay Area Rapid Transit Linear Park



Graph 2 - State -of-the-Art-Car Wayside Noise Levels



Graph 3 - State-of-the-Art-Car Interior Noise Levels

ACOUSTICAL CONSIDERATIONS

Considering previous studies by the Southern California Rapid Transit District, other transit properties and engineering and design consulting firms across the country, it is evident that sound levels are increasing in urban areas. It is recognized as a serious concern to planners and residents alike.

The alignment of the Sunset system, by virtue of its predominant concurrence with existing transit corridors, minimizes the impact of noise levels generated by the transit trains.

Design considerations for this system make use of the most recent advances in the control of noise for both the rail vehicles and the guideways.

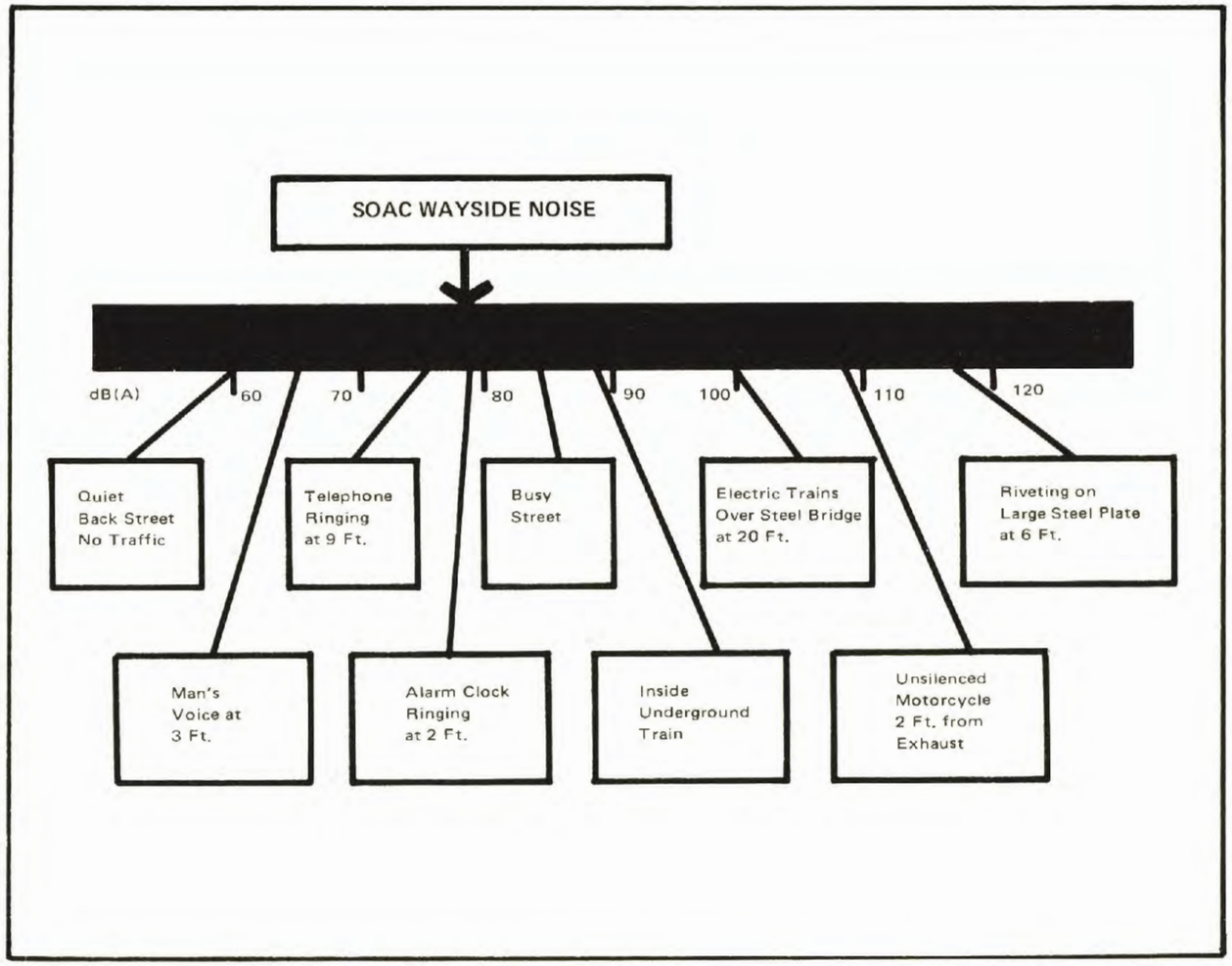
The equipment specifications will require that trains passing at 85 miles per hour will produce less noise than the average sound level produced by arterial street traffic.

This will be possible by specifying that the vehicles use resilient wheel linings to absorb sound, and by the installation of rubber pads between the rails and their fasteners to the ties. Heavy ballasting and high concrete barrier walls will also reduce and contain noise produced by the vehicles. The cost of these considerations has been included in the cost estimate for the Sunset system.

The two graphs on Page 36 show the sound dB(A) levels attributable to the State-Of-The-Art Car. The design of this vehicle or its successor, the Advanced Concept Train, offers a low noise level that will be welcomed by the community.

External noise is not the only factor to be considered. As may be seen in Graph 3, the interior noise level of the State-of-the-Art Car vehicle is considerably less than that experienced on most present cars. The quiet interior is achieved without additional cost or weight by considering noise reduction as a factor during the design and construction of the car.

Graph 4 illustrates various everyday noises encountered by the public which help to put in perspective the projected noise level of the rapid transit train. The wayside dB(A) level of the State-of-the-Art Car vehicle is illustrated in this situation.



Graph 4 - Typical Ambient Noise Levels

ELECTRIFICATION

Electrical energy requirements for operation of the transit system include:

- *Traction Energy* provided to the vehicle through the 650 volt D.C. third rail. It includes energy for vehicle propulsion, lighting, heating, air conditioning and various other minor energy demands within the vehicle.
- *Station Energy* used to operate passenger stations, associated parking lots, and the main administration buildings.
- *Maintenance Energy* required for facilities to repair and maintain vehicles and other equipment.

Adequate power for the operation of the train control system, communications and lighting is supplied from dual sources at each station to allow system operation in the event of local power outages. Power conversion units are located at or near stations where the greatest power demand occurs for train acceleration, and to minimize contact rail voltage drop. Stepless propulsion power control provides smooth acceleration and deceleration for passenger comfort.

Considerable work has been done in previous studies to estimate the electrical power requirements for a Los Angeles rapid transit system. These studies have indicated that existing power supplies for Los Angeles County can easily handle the load that would be added by the operation of a sizable system.

The Southern California Rapid Transit District's Phase Three engineering study by Kaiser/DMJM dated April 15, 1974, determined that "the power required to operate a full 243 mile system would probably amount to a few percent of the total generating capacity currently available to the service area." The Kaiser/DMJM engineers surveyed various power agencies that would supply power to a regional system and concluded that impacts on the various agencies would range from a low of 2.5% of Southern California Edison's load, to a high of 5.75% of the Pasadena Water and Power Department's capacity.

Since then, the electrical generating capacity in the Los Angeles region has increased. A preliminary evaluation by the Rapid Transit Power Advisory Committee[1] indicates that this proposed rapid transit system would use approximately one-to-two percent of the power currently being generated for the Los Angeles area, and that local power companies would have no problem in supplying that amount of energy. The estimated peak demand of the proposed system – four-to-five megawatts – similarly places no unusual burden on the generating systems. Thus, no new generating plan would be required for the operation of the Sunset Coast Line.

However, the conclusion that there is currently sufficient power to operate the transit system does not necessarily solve the energy consumption problems involved in the development of broad scale public transportation.

It is proposed that there be a continuing effort throughout the design and construction phases of the project leading toward development of electrical generation techniques that will reduce the region's dependence on oil. The goal should be to further enhance the energy conservation characteristics of a public transportation system over the known petroleum consumption of an automobile and bus oriented transportation structure.

For example, current County experimentation in the production of methane gas from solid waste disposal sites should be intensified. Further, the field of pyrolysis conversion should be examined closely by the County, the Rapid Transit District, and the various local power companies.

County sanitation engineers working with the Power Advisory Committee have estimated that the conversion of less than ten percent of the County's useable solid waste by-products into synthetic gas through the Westinghouse Process would produce enough electrical power to handle the total operation of the transit system, including any conceivable expansion over the next several decades. This method of energy conversion would not produce electrical power at a lower cost rate than achieved today (by burning oil for steam plant generation) but would reduce dependency on domestic and foreign oil supplies (which will continue to escalate in price) by substituting the produced gas for oil.

Engineers from the Ralph M. Parsons Company have recently estimated that a $48 million solid waste gasifier plant would produce enough gas to replace 770,000 barrels of oil per year in the generation of 50 megawatts of power. Once plant capital costs were amortized, it would continue to produce converted gas at a fraction of the cost of purchased oil.

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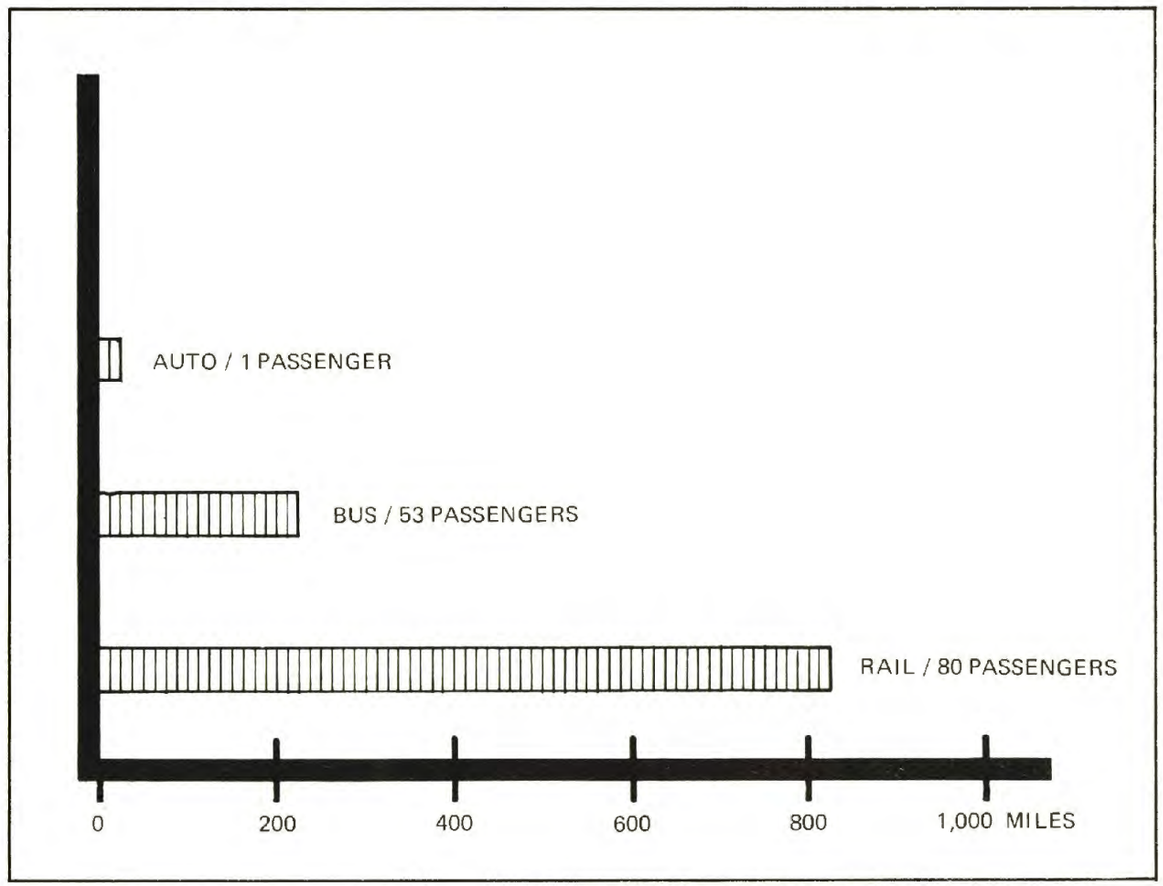
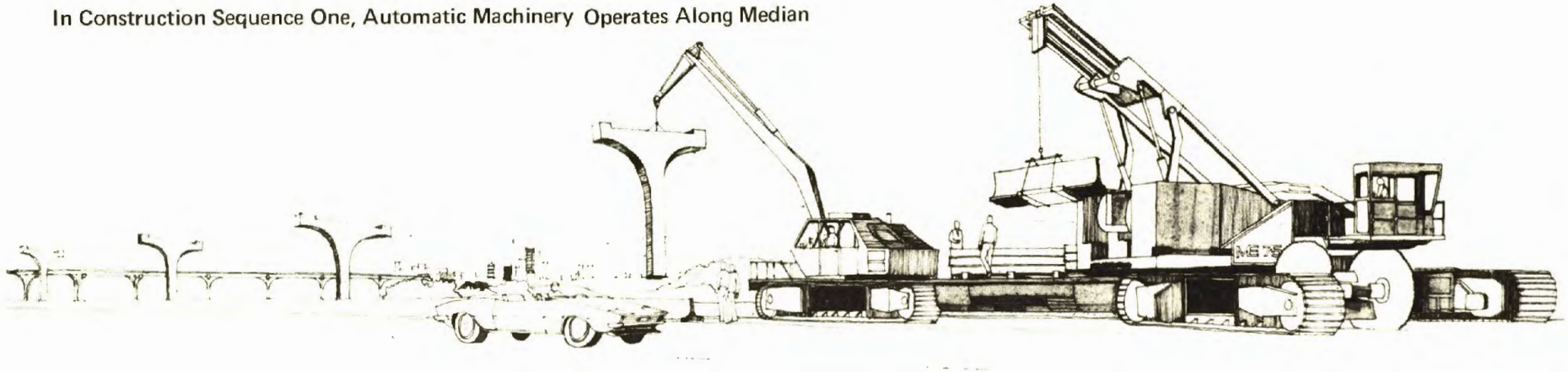
1. *The Rapid Transit Power Advisory Committee* is comprised of representatives from Southern California Edison, the Department of Water and Power, the Pasadena Department of Water and Power, the Glendale Public Services, and Burbank Public Services. That committee, in turn, advises the Rapid Transit Advisory Committee to the Southern California Rapid Transit District.



Graph 5 - Passenger Miles per Gallon of Fuel

In Construction Sequence One, Automatic Machinery Operates Along Median



CONSTRUCTION TECHNIQUES

Transit construction techniques are not part of a rapidly evolving technology and few innovations have been employed in the industry in the last forty years. This fact offers certain benefits, however, when considering a construction project of the scope proposed here. For example, the costs and methods for laying new track on or above railroad rights-of-way are well-known and should not present problems leading to overruns or construction slowdowns.

Likewise, public and private sector civil engineers here have acquired vast experience in the construction of bridges, viaducts, overpasses, and aerial structures. The basic civil engineering for the project requires no technological breakthroughs.

However, because of the inflationary spiral, the overall length of time required for construction becomes the single most important factor in the cost of the system. Therefore, some new construction techniques must be applied, particularly in the tunneling and freeway right-of-way construction. The management approach must be comprehensive and sophisticated in order to control simultaneously scores of individual construction contracts.

The tunneling work to be performed through the Santa Monica Mountains adjacent to the San Diego Freeway, through Kellogg Hill adjacent to the San Bernardino Freeway and under the Los Angeles River north of Union Station, should utilize boring machines for excavation of a twin bore tube section in each location. The SCRTD engineering staff has examined this method closely and it is felt that this method of construction can utilize the favorable soil conditions within the Los Angeles Basin.

Certain innovations should be considered for aerial construction along freeways in order to minimize the impact on traffic flow and to shorten the usually lengthy construction time.

The system contemplates construction of approximately 35-miles of aerial structures along railroad rights-of-way and flood control channels, which presents no particular problem since there are no access or traffic issues with which to deal. Those alignments will utilize standard techniques of casting in place the vertical support columns and lifting into place the precast horizontal sections.

On the aerial alignments over freeway medians or lanes, it is proposed that a multi-faceted mechanism be assembled for continuous aerial construction, using a combination of current state-of-the-art machinery. This approach is similar to a bore tunneling project, in that the on-site assembly of a specialized major piece of construction equipment will prove in the long run to be cost effective.

The sequence of construction over freeways could be as follows:

- In Sequence One—a machine would operate down the center of the freeway, removing the center barrier ahead of itself, boring placements for the vertical support columns, setting the supports in place, and also setting in place the retaining wall barriers along either side of the freeway median.

- In Sequence Two—during the off-peak hours of freeway utilization, a large trailer and crane combination would operate down the freeway lane adjacent to the median, setting in place the horizontal beams onto the vertical structures.
- In Sequence Three—machinery would operate along the overhead structure, setting in place ties and rails.

For construction of the at-grade alignment along the freeway interior lanes, a large machine similar to that used for the aerial construction would operate down the center of the freeway, removing the center median, sawing the concrete between the first and second freeway lanes (so that which would underlie the rapid transit facility would float separately from the freeway), and setting in place the retaining barriers.

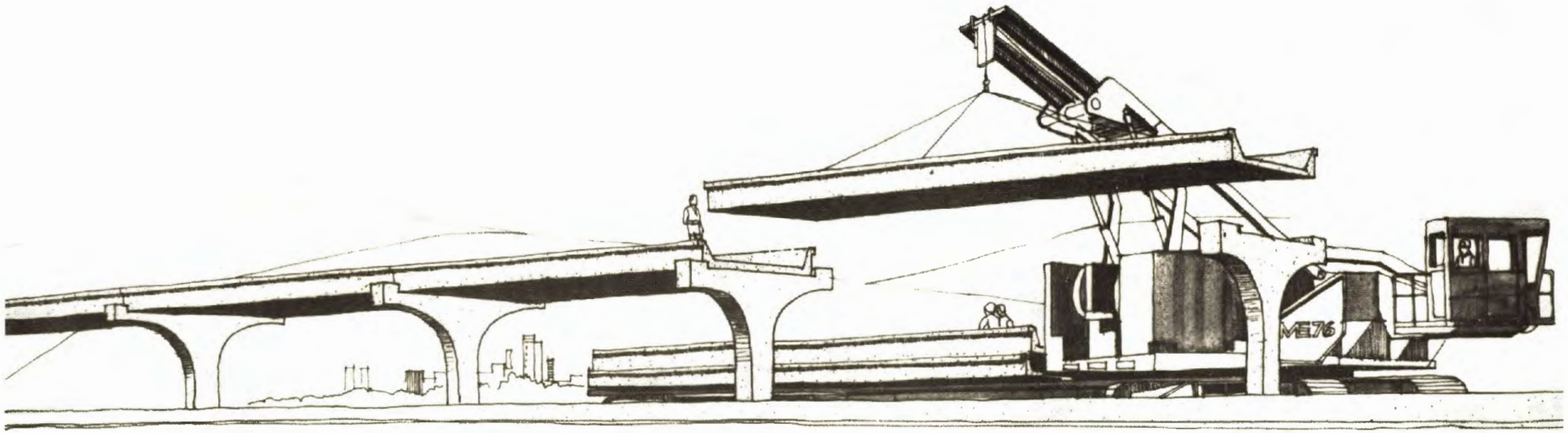
There are several approaches that can be used for the construction of tracks on freeway rights-of-way. One is aerial structures down median sections. Another is the conversion of existing lanes on freeways that have not yet reached a maximum traffic flow. Caltrans, at the request of this office, is currently engaged in a detailed analysis of additional construction techniques.

Among the preliminary findings reached by the Caltrans engineers is the feasibility of adding two new exterior lanes to embanked freeways (by adding compacted fill with retaining walls), thus freeing the interior or fast lanes, and median of the freeway for at-grade construction of a transit line.

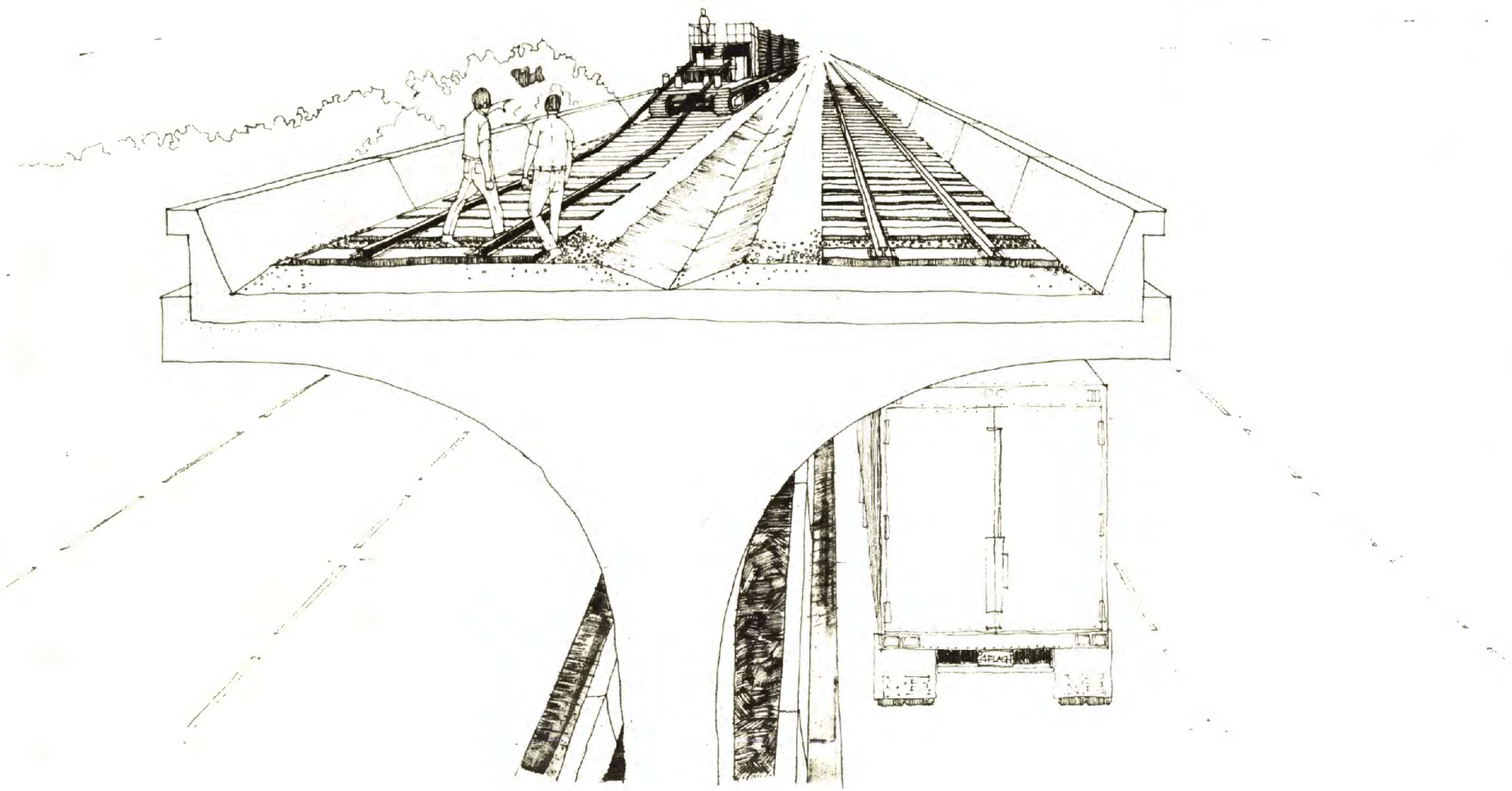
Preliminary estimates of cost, based on the recent widening of the Pomona Freeway, show a projected price of $3–10 million a mile for the added lanes, including 8 to 12 foot high sound retention walls for environmental considerations. This book has included the highest estimated cost for its projections, and assumed a $4.5 million-a-mile cost for the construction of the transit line itself. While the total for this method of construction is not appreciably lower than the cost for an aerial alignment, it provides several advantages:

1. An at-grade transit line avoids the engineering problems involved in bypassing or elevating over existing bridge and overpass structures.
2. Access to the median stations is simplified, thus lowering the unit costs for station construction.

In Sequence Two, Pre-Cast Decks are Lowered



After decks are placed, all work such as track laying takes place above the Freeway



ALIGNMENTS

AERIAL

A large proportion of the Sunset Coast Line is to be built using an aerial configuration. Approximately 34 miles (or 14 percent) of the proposed system is aerial along railroad rights-of-way, flood control channels or boulevard medians. Additionally, 90 miles of freeway routing has been costed for aerial alignment.

However, certain other rights-of-way, paralling freeways, could be substituted. Examples of this trade-off are:

(a) Exposition Line of the Southern Pacific, in lieu of the Santa Monica Freeway;

(b) Los Angeles River embankment, in lieu of the Long Beach Freeway between Randolph and the proposed Century Freeway Corridor;

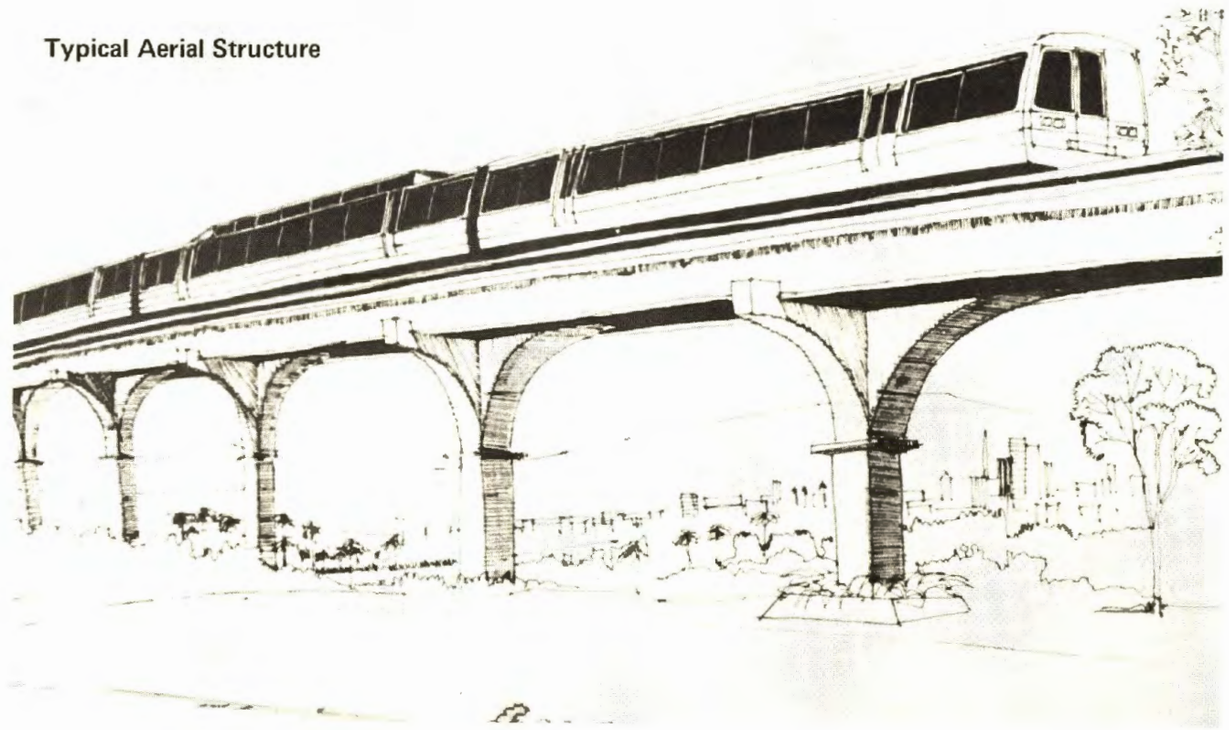
(c) the Los Angeles River embankment instead of the Golden State Freeway between the Glendale Freeway and the Pasadena Freeway;

(d) San Gabriel River embankment, in lieu of the 605 Freeway.

SUBWAY

Subway tunneling has been used in this project only slightly, and primarily because of the steepness of certain grades. However, we expect that the state-of-the-art of rail vehicular technology (capacity for 10 percent grade, with crush load, from full stop) at the time such equipment is ordered would accommodate the grades over Kellogg Hill and the Santa Monica Mountains, and this could reduce the tunneling program. Costs for the tunnel sections in each of these locations have been included in the estimates, nonetheless, since grade reductions might still be required.

Typical Aerial Structure

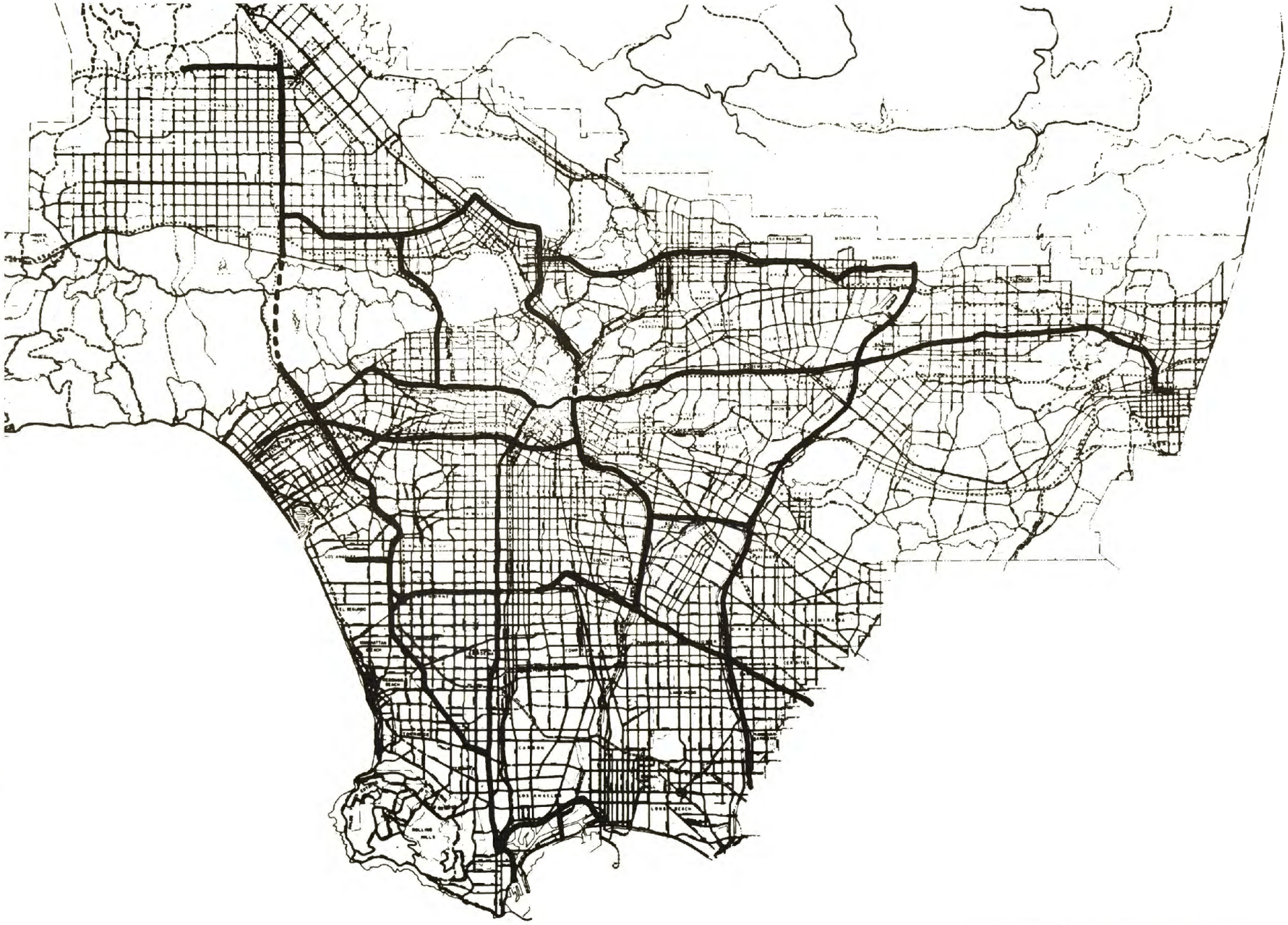


FREEWAYS

The predominant construction mode in this book utilizes the freeway network to quite a large extent. Approximately 90 miles are costed as aerial either over the medians or shoulders of the freeways. Another 94 miles (approximately) is costed as at-grade construction on the freeways. While several possibilities exist as a means by which to utilize the freeways, final decisions on exact alignments, design geometrics, and specific solutions to specific engineering problems have not been completed.

Above, we listed an example of an alternative to the use of construction on the freeways as the San Gabriel River. Estimates by the Los Angeles County Flood Control District indicate a highly favorable condition for construction on an embankment of the flood control channel, in lieu of building on the freeway. A saving of approximately $53.5 million from the "low cost" at-grade option on the freeway could be realized by using the flood control channel.

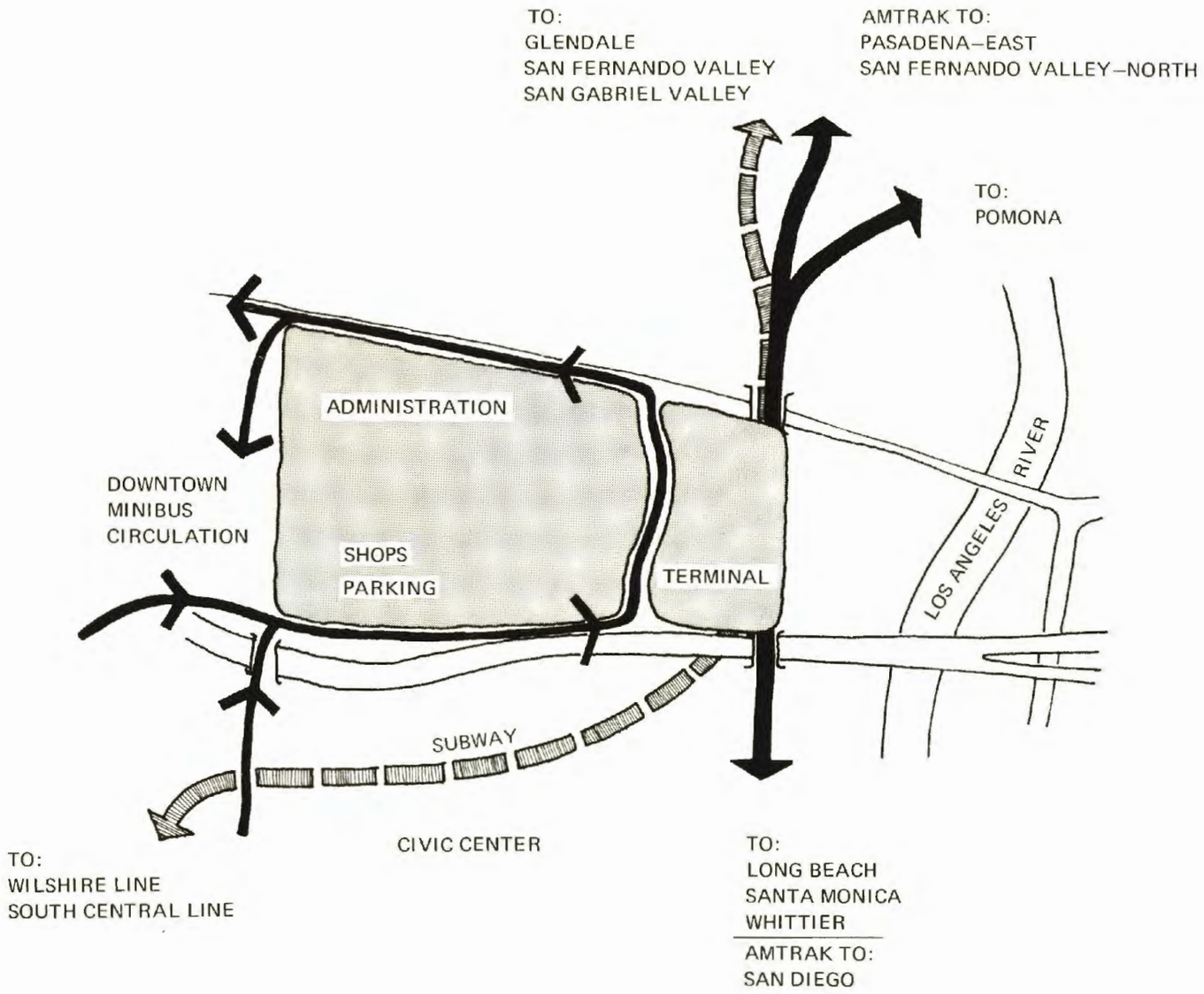
In each location where a freeway alignment has been estimated as a part of this project, alternative alignments exist which will be considered in final engineering for application instead of freeways.



Alternative Corridors (Non-Freeway)

stations

UNION STATION PLAZA
SCHEMATIC



UNION STATION

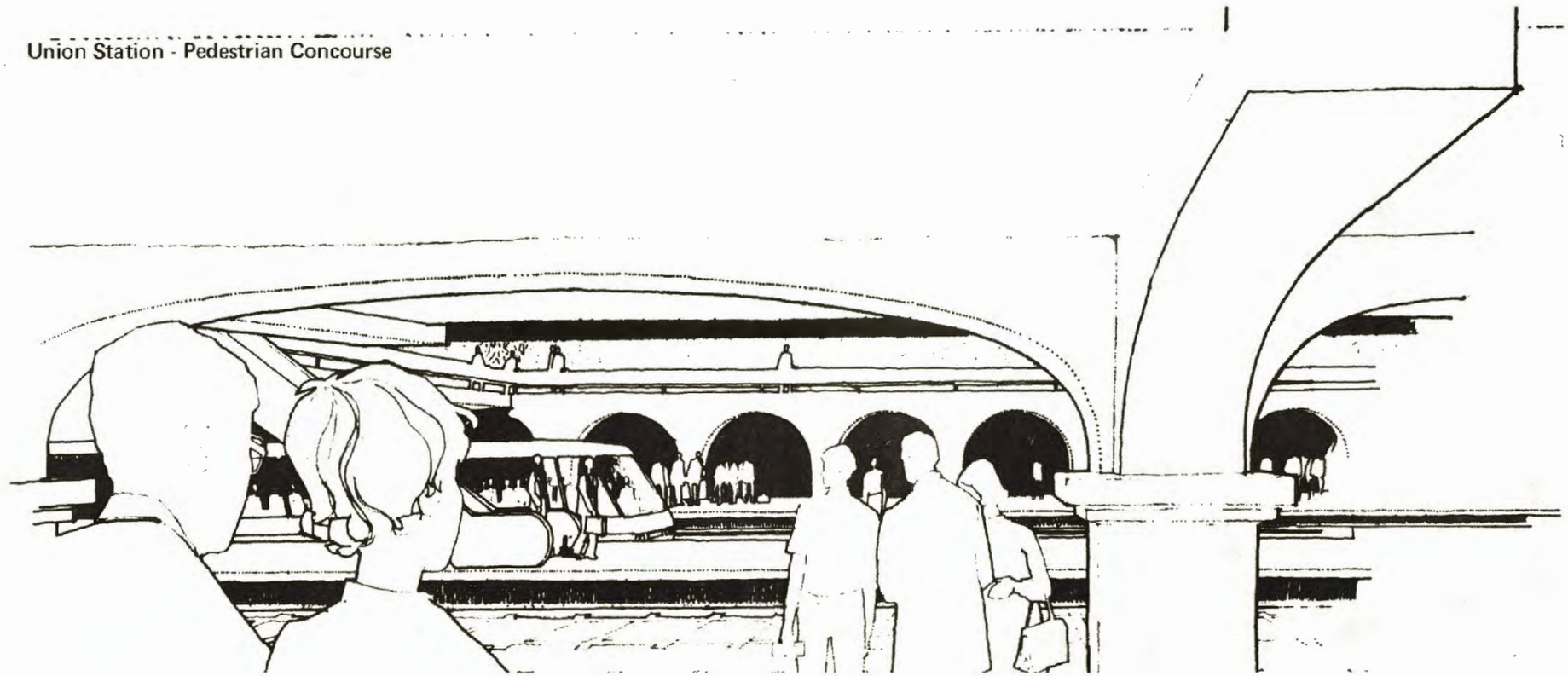
The key element in providing a County-wide rail transit system is the coordination of the services routed to, or through, the Union Station complex. Several lines provide direct service into the terminal, as well as connections to those circumferential routes which do not terminate downtown.

The new Union Station complex would be built several hundred yards to the east of the existing Union Station. This serves as the transportation hub for the Sunset Coast Line while the former Union Station would remain intact for non-transportation purposes. In addition, the rail terminal will provide on-line facilities for the at-grade Amtrak and commuter train services operating on a north-south axis through the terminal. Recent discussions with representatives from Amtrak, the Southern Pacific, the Santa Fe and Union Pacific Railroads have indicated a general willingness to relocate the existing "stub-end" facility to a through track terminal. This offers Amtrak a cost advantage over the existing stub-end terminal operations, as well as a more efficient operation.

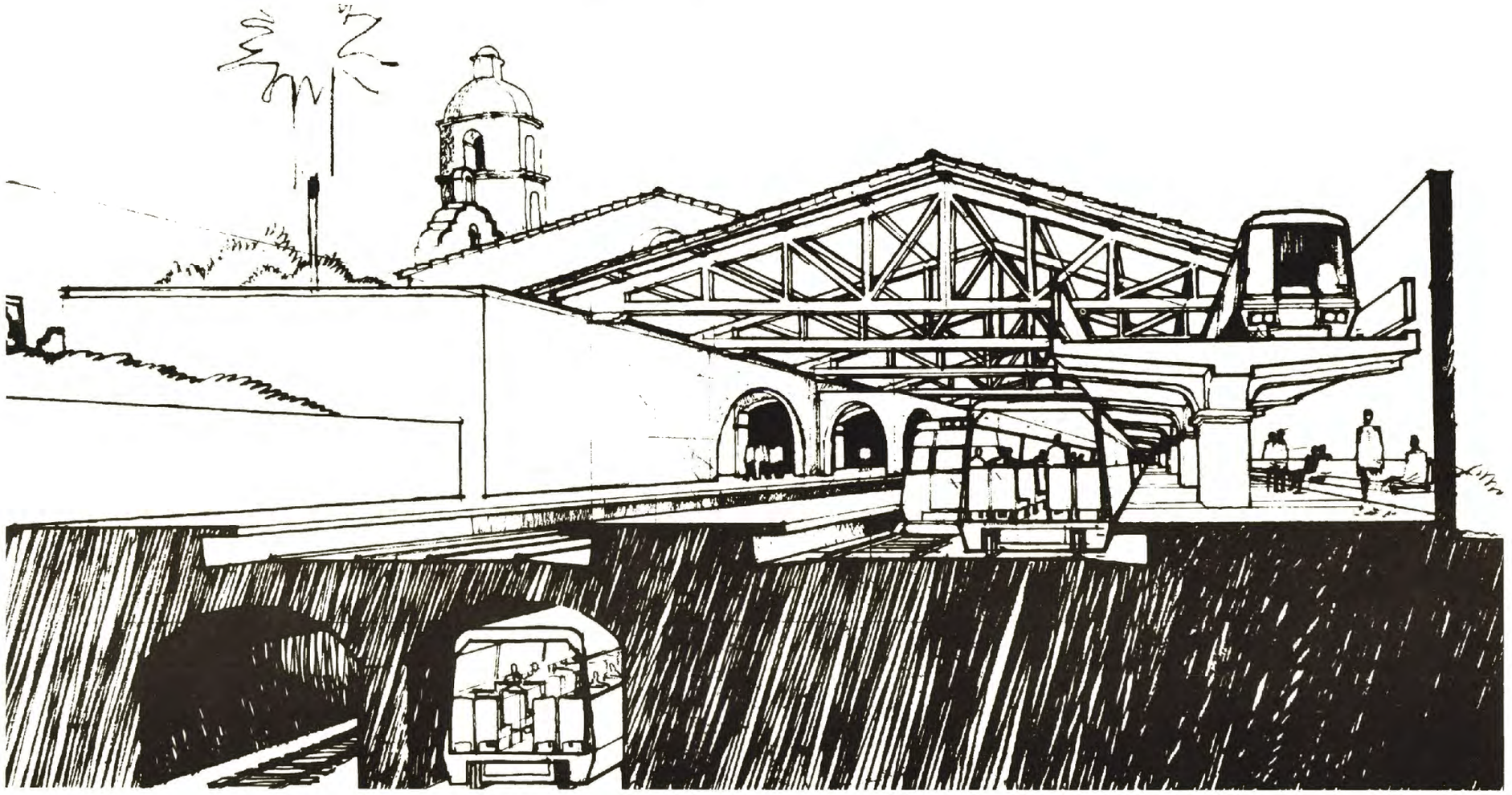
The present Union Station facility and other land within the proposed Union Station Plaza could be developed commercially to provide shopping facilities, hotels, office development and a tourist center for downtown Los Angeles.

While the Amtrak and commuter trains would operate at grade through the terminal, there will also be a subway connection for the rapid transit Central Line from Glendale through the civic center and financial district to South Central Los Angeles, as well as an aerial connection at the upper level concourse for lines from the east, south and west. All three types of train operations will be integrated through vertical passenger circulation to the concourses at the various levels. A distribution system for the central business district provides railside access for passenger convenience. The complex will also contain the operational, management and administration facilities for the Sunset system.

Union Station - Pedestrian Concourse



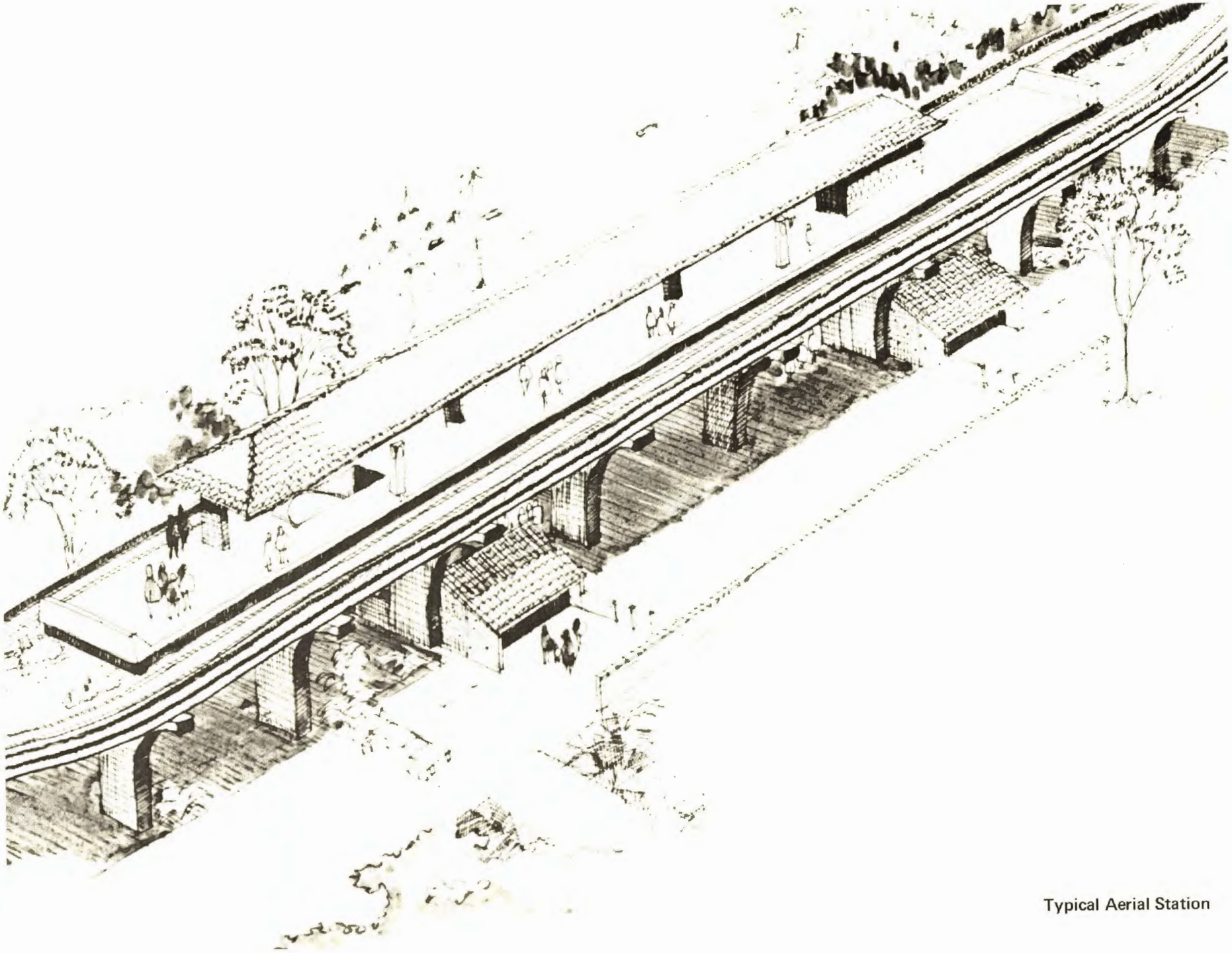
Union Station Cross Section - Aerial, At-Grade, and Subway Alignments



AERIAL

The aerial stations used on non-freeway segments are located on structures with a 17-foot minimum clearance requirement for undercrossing streets. Approximately 15 percent, or 35 miles, of the Main Line routes are on aerial structures, not including freeway routings. Twenty-one aerial stations are included in the cost estimates. A central platform is used for each of the 21 stations along the aerial alignment. The budget for the project provides $3 million each for such stations.

There would be three principal areas within the stations: the *Free Area*, the *Paid Area*, and the *Loading Platform*. Access to the free area of the stations would be provided by two escalators, plus one elevator to accommodate the elderly and the handicapped, and one or more stairways. Separation between the free area and the paid area would be a simply-designed mechanical turnstile device. The fare collection technology is discussed in an earlier section.

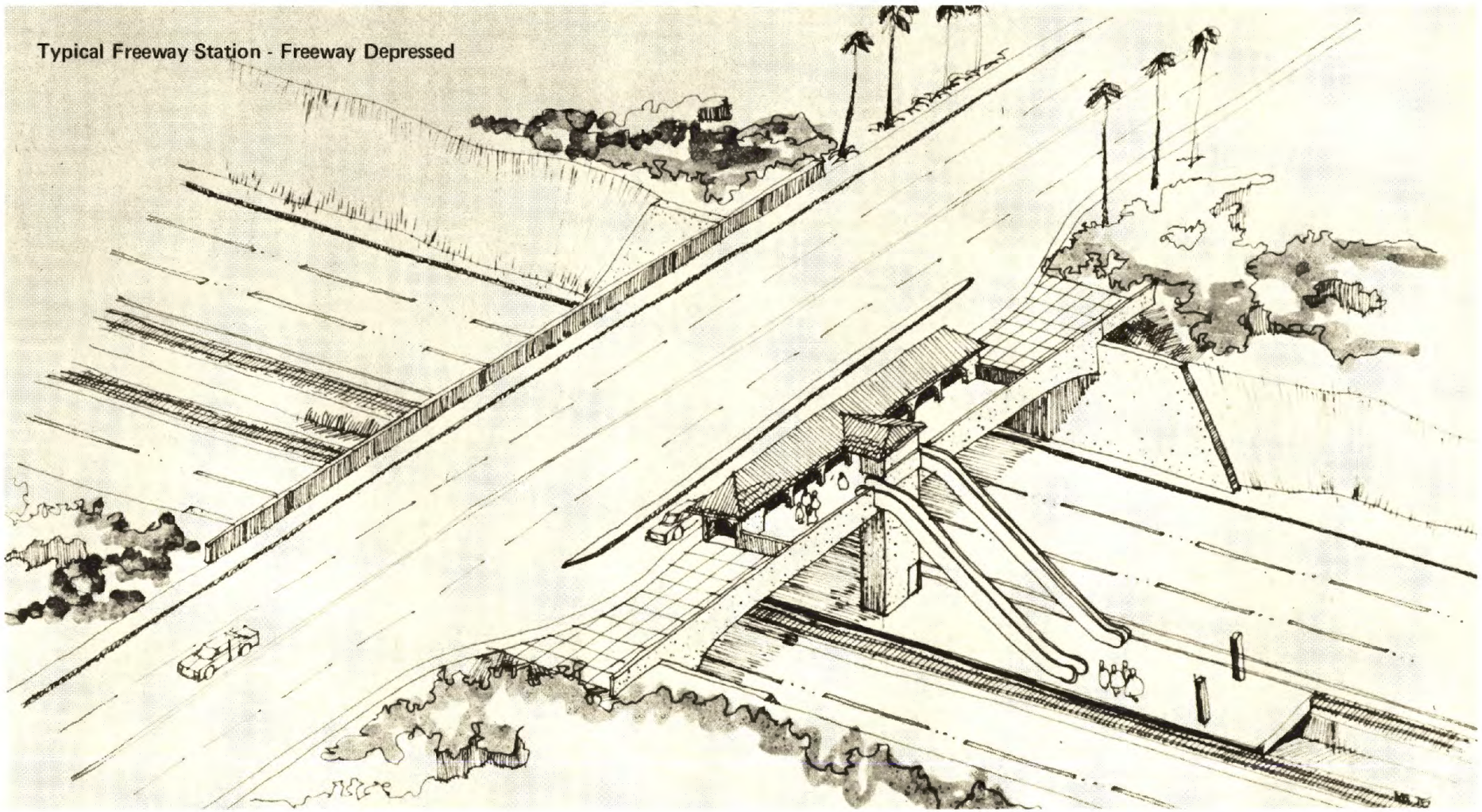


Typical Aerial Station

FREEWAY STATIONS

Since the majority of the system described in this book uses freeway alignments (although alternate pathways actually might be used in many instances), most of the stations for this system would utilize center-loading platforms built at car door level, either in the median of the freeway, or on a structure over the freeway. These would be virtually identical to the aerial stations on the non-freeway segments.

In those situations where the freeway is depressed, the Free and Paid areas of the station will be built over the median of the freeway from the crossing street. In those situations where the freeway is elevated relative to the crossing streets, a tunnel would be mined through the existing structure along the crossing street, up through the support material, to the median of the freeway. Within this excavation at the street level would be located the Free and Paid areas of the station. From this point, the stairs, escalator, and elevator would carry patrons up to the raised-level platform in the median of the freeway.



Typical Freeway Station - Freeway Depressed

Typical Freeway Station - Freeway Embankment

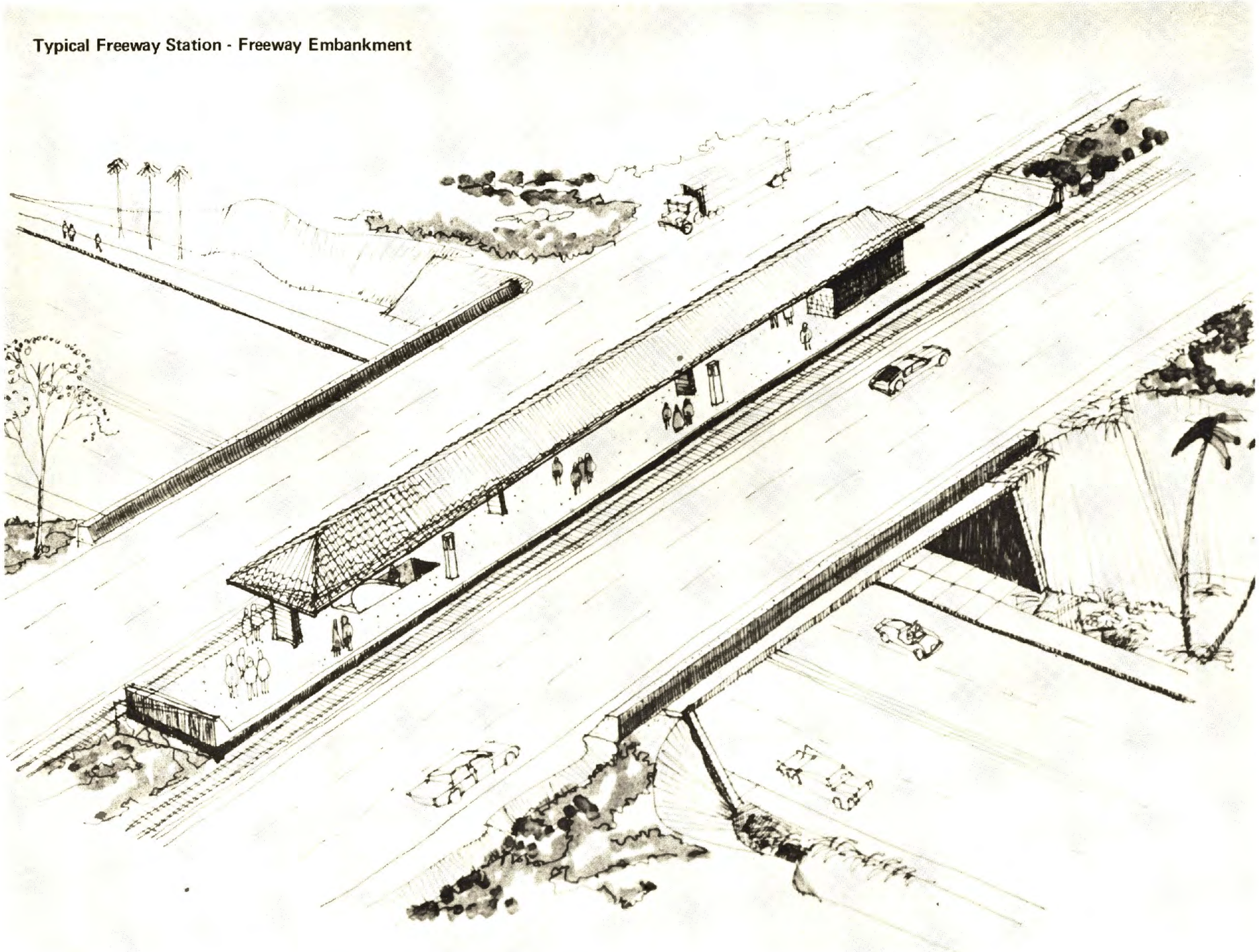
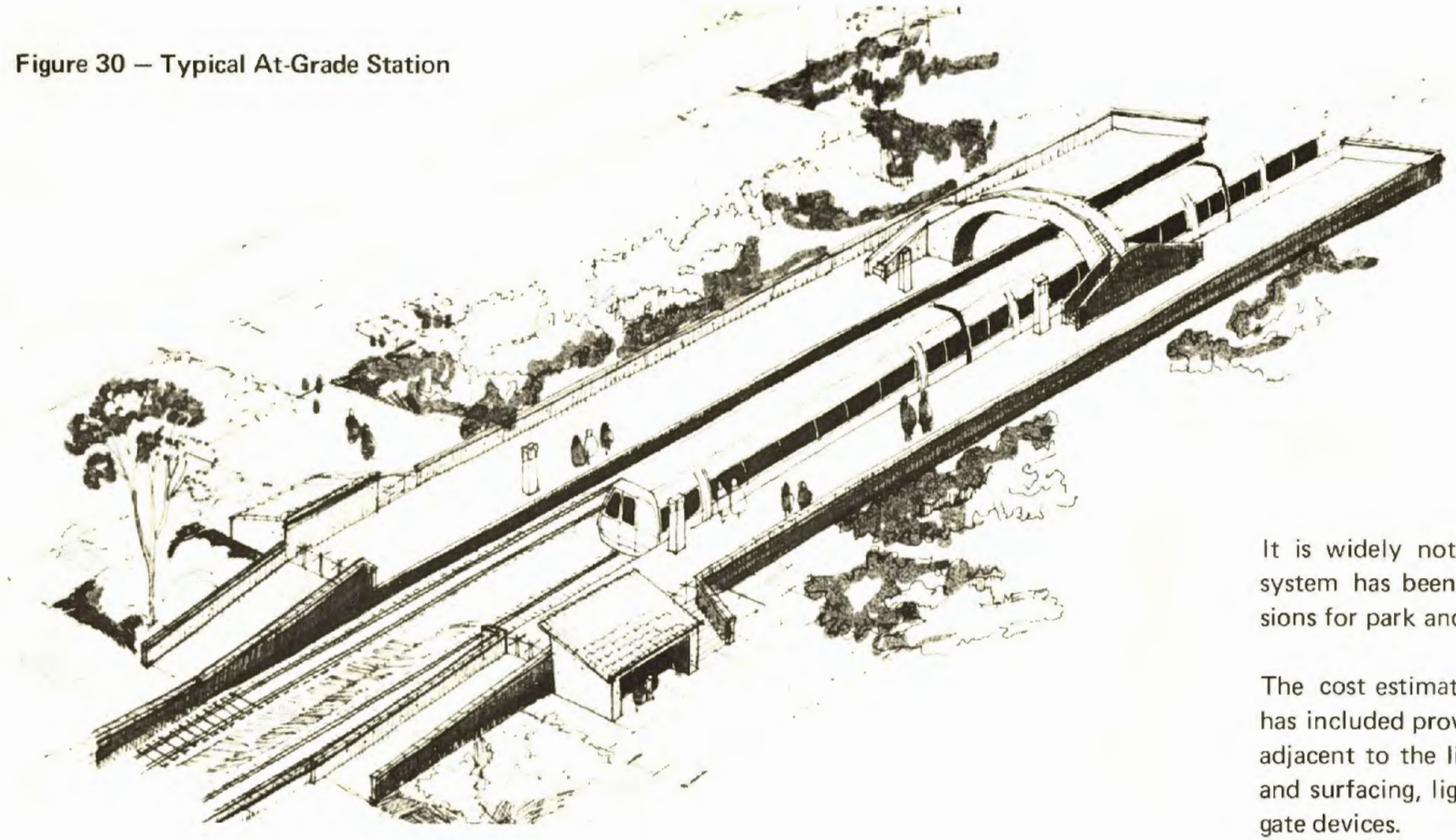


Figure 30 — Typical At-Grade Station



AT-GRADE

Since the Sunset Coast Line is a grade-separated, heavy rail transit system, most of the stations are aerial or on the freeways. Only at the ends of certain lines does the vertical alignment come down to grade level. Examples of this are the San Pedro and Pomona stations. In the case of the San Pedro station, the aerial guideway running along the Southern Pacific freight trackage adjacent to Front Street comes down to grade approximately 2,000 feet north of Ports O' Call Village. The facility is at-grade in this location to take advantage of the rail car storage area. By use of retaining walls and chain link fencing, the public is protected from the electrified third rail.

The facility as typified in Figure 30, would utilize a simple crossover ahead of the platform to change the trains from outbound to inbound service. The at-grade station would have interior architectural treatment similar to that of the aerial and freeway stations, and would utilize the same arrangement for fare collection equipment and accommodations for the elderly and handicapped.

PARK-AND-RIDE

A large part of the success of any rapid transit operation depends upon adequate park and ride facilities. This factor is more critical in Southern California than in any other part of the country. It is widely noted that ridership on the BART system has been penalized by inadequate provisions for park and ride facilities.

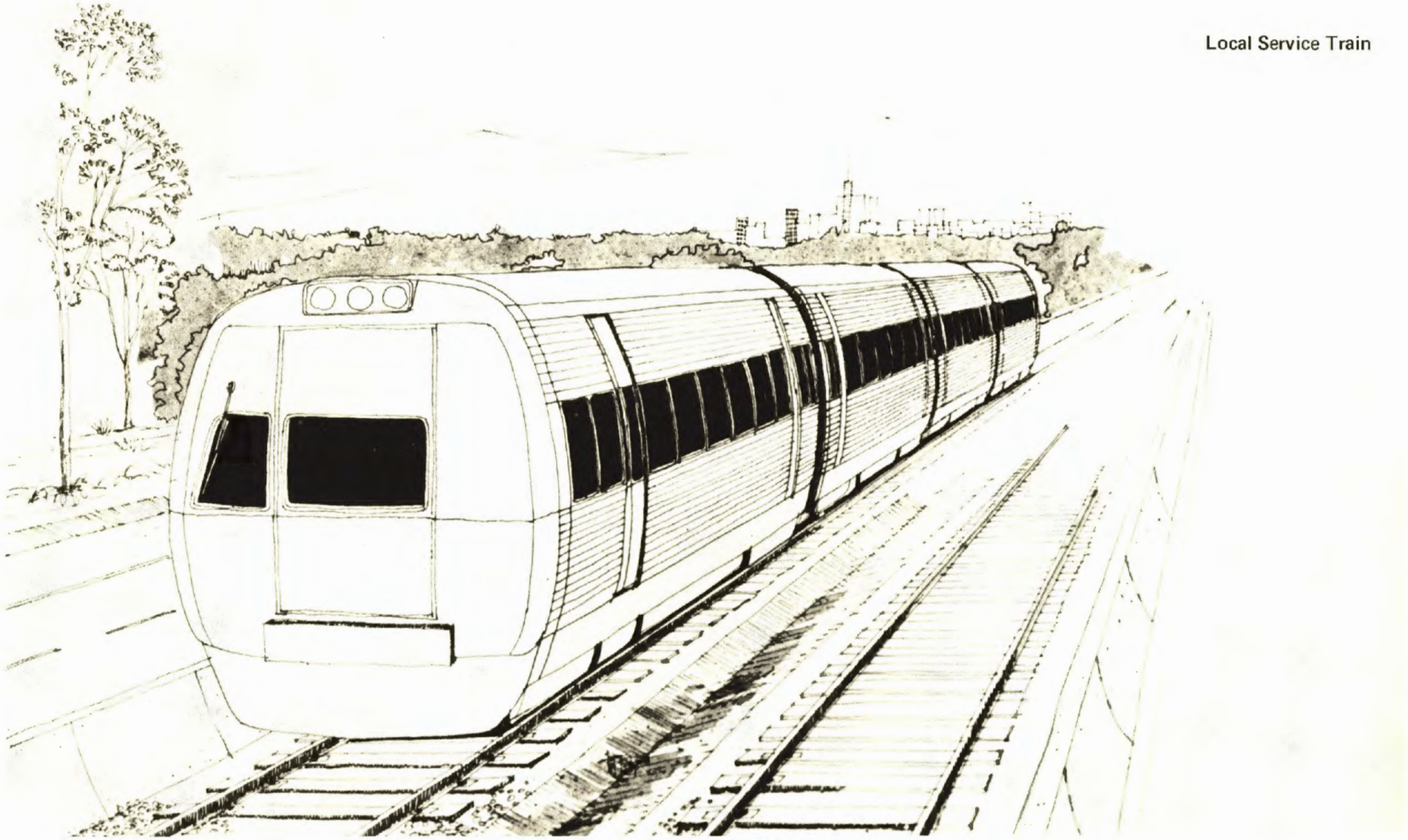
The cost estimate for this County-wide proposal has included provision for 100,000 parking spaces adjacent to the lines, providing funds for grading and surfacing, lighting, fencing, striping and entry gate devices.

However, in a project of this magnitude it has not been possible to set aside funds for the acquisition of land for the parking facilities, and it is assumed that the cities in which stations would be located would contribute land for such purposes. In preliminary discussions with officials from many cities, this concept has been deemed both feasible and reasonable, and it is expected that precise station locations in the various cities or communities would be drawn with accessible parking areas in mind.

Each city would be able to develop its own financing structure for such land if new acquisition is required, probably amortizing the cost through parking lot fees.

vehicles

Local Service Train



This report does not contain a detailed analysis of the design characteristics of all of the vehicle types that would be suitable for the Countywide Transit System. There are more than a dozen types of electric cars now operating in this country with a history of proven reliability that could be modified for use here.

At the same time, a number of newly designed cars are under development by various manufacturers following Department of Transportation specifications. It is our intent to take maximum advantage of the advancing state-of-the-art at the time that initial car orders are placed.

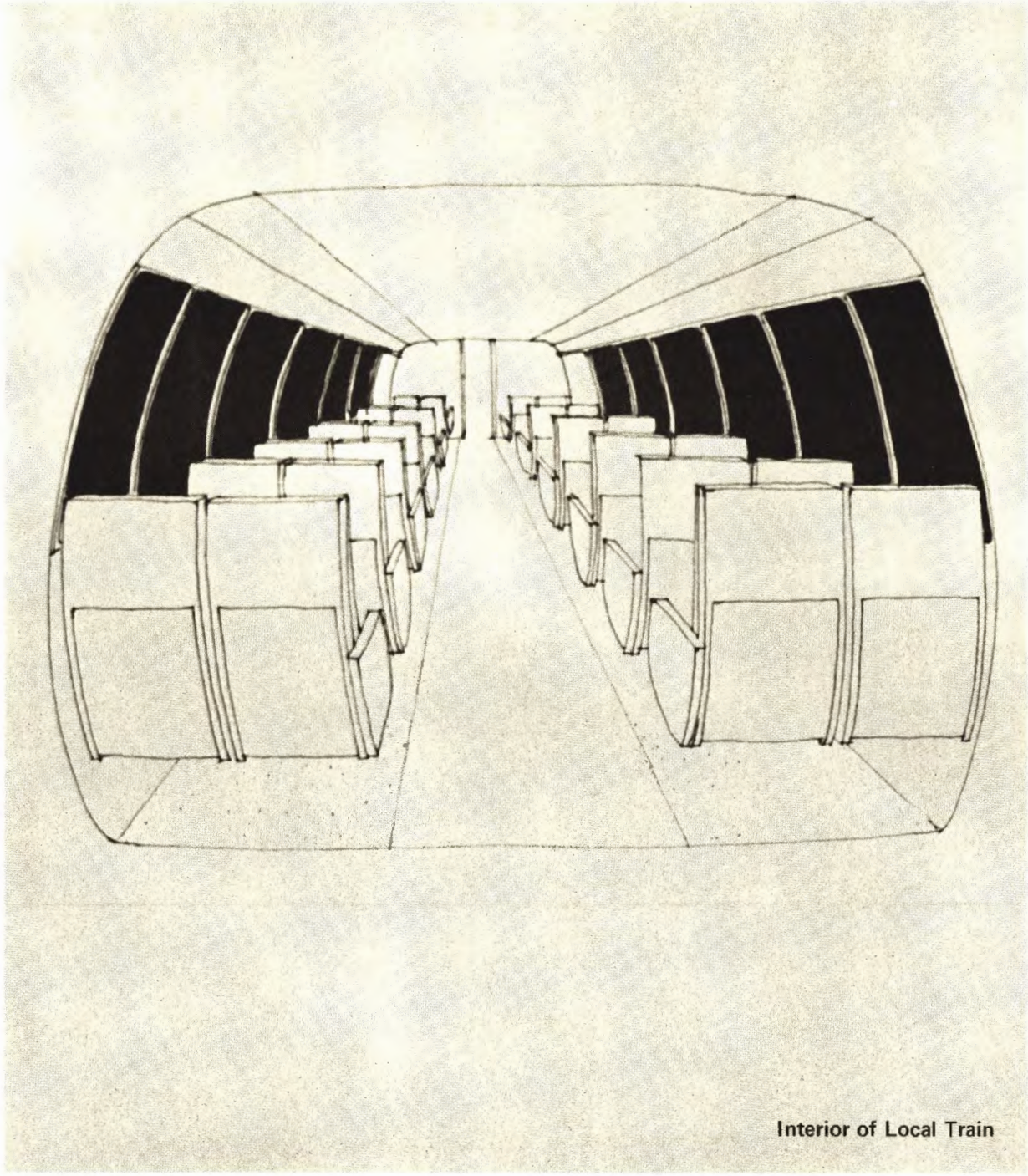
LOCAL SERVICE

A basic element of the rapid transit fleet will be cars to provide local rapid transit service. These vehicles will comprise approximately 75 percent of the car fleet. They will operate on a station-to-station service basis. The equipment will be 85 foot long cars which have a proper seating to provide the basic commuter need in any given corridor. This equipment will have the capability of operating systemwide along any given route with the exception of the International Airport Loop.

A small number of domed bilevel cars would be provided on the local service of the Sunset Line to add an attractive quality to the car fleet.

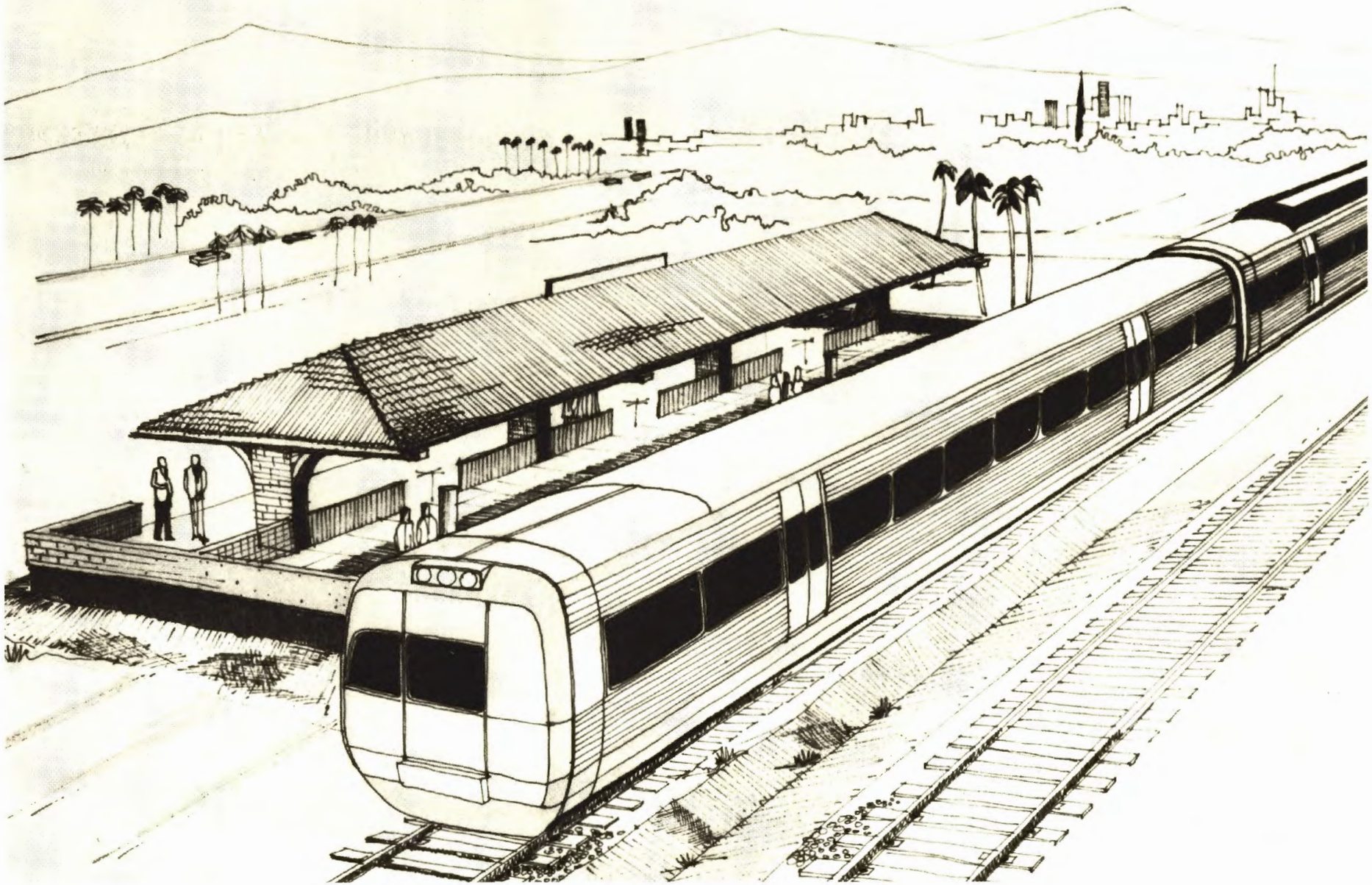
LOCAL CAR CHARACTERISTICS

Height	13 feet - 0 inches
Weight	91,600 pounds
Length	85 feet - 0 inches
Doors per side	3 per side
Seats	110
Maximum Load	200
Service Speed	85 miles per hour
Acceleration	2.5 miles per hour per second
Grade	4 percent $\pm$



Interior of Local Train

Local Service Train with Domed Car



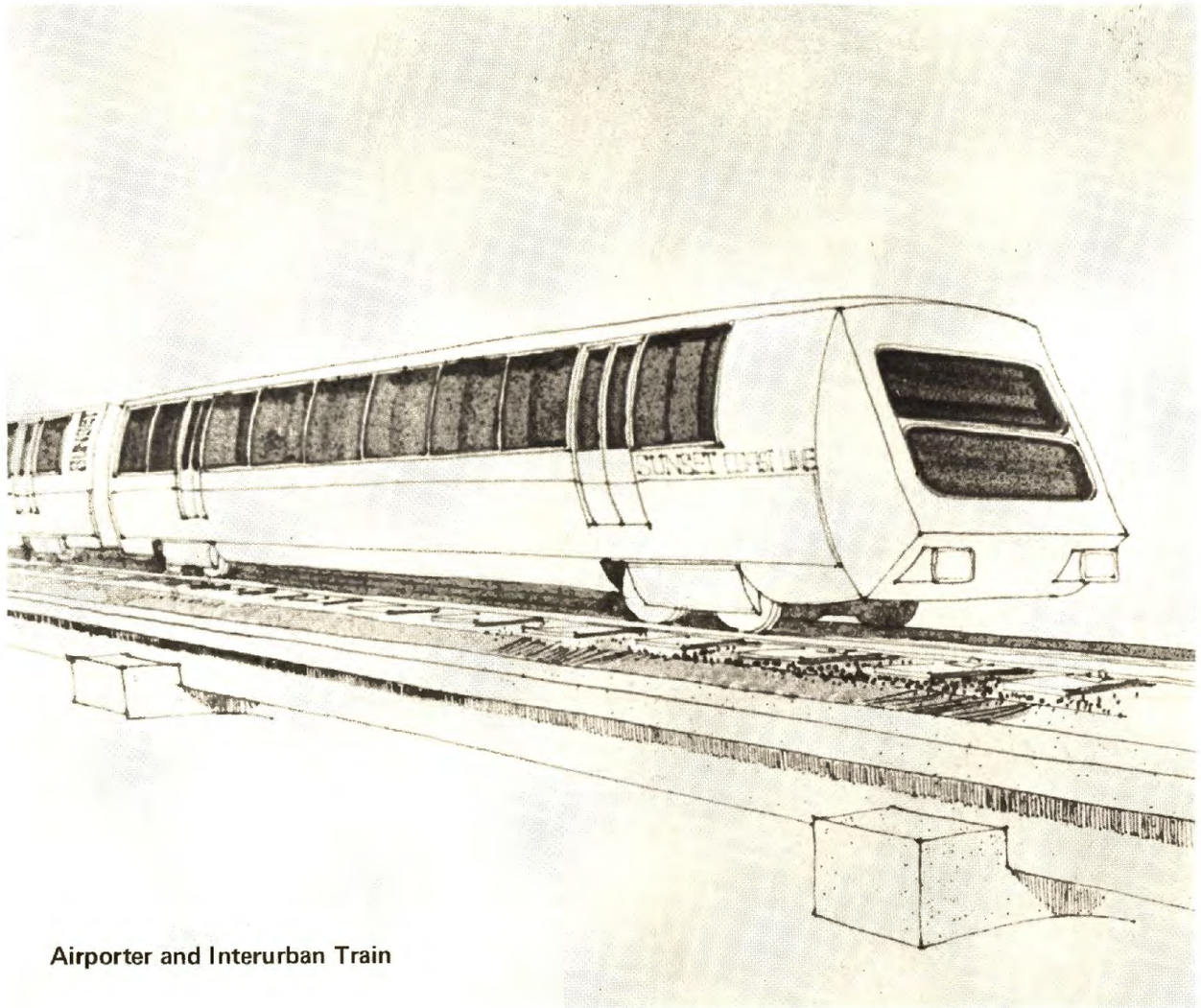
AIRPORTER

The Airporter vehicle would be a somewhat different car than that of the Local service. These cars would provide the streamlined styling and high performance characteristics of the Advanced Concept Train. The basic difference between the Airporter and the Local service train is the interior. The Airporter would utilize a lower seating density with swivel rocker seats similar to those utilized on the Metro Club cars in the New York-Washington service. Also available for the Airporter trains would be baggage handling and storage facilities on the train.

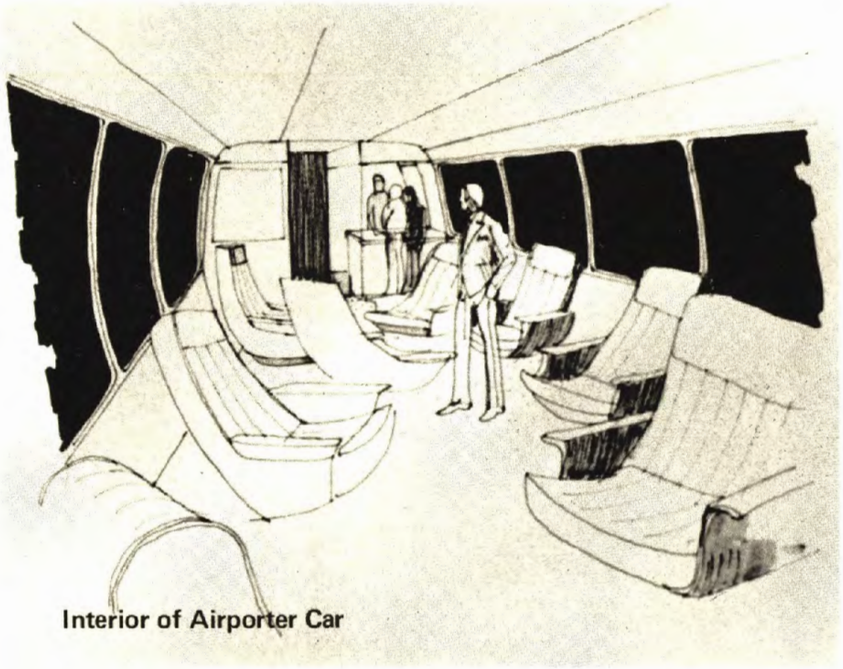
The Airporter service would operate systemwide throughout the County, with service beginning at each terminal point such as Pomona, Long Beach, San Fernando, and Orange County. The cars would arrive at the International Airport to circle the central terminal area (World Way Drive). This service would operate with a minimum number of stops and utilize the high-speed interline rail junctions to avoid the heavy rail traffic corridors during the peak periods. Service would operate in various corridors on a half-hourly basis to the Airport.

AIRPORTER CAR CHARACTERISTICS

Height	12 feet - 0 inches
Weight	64,000 pounds
Length	85 feet - 0 inches
Doors per side	2 per side
Seats	50
Maximum Load	(Not Stated)
Service Speed	85 miles per hour
Acceleration	4 miles per hour per second
Grade	7 Percent±



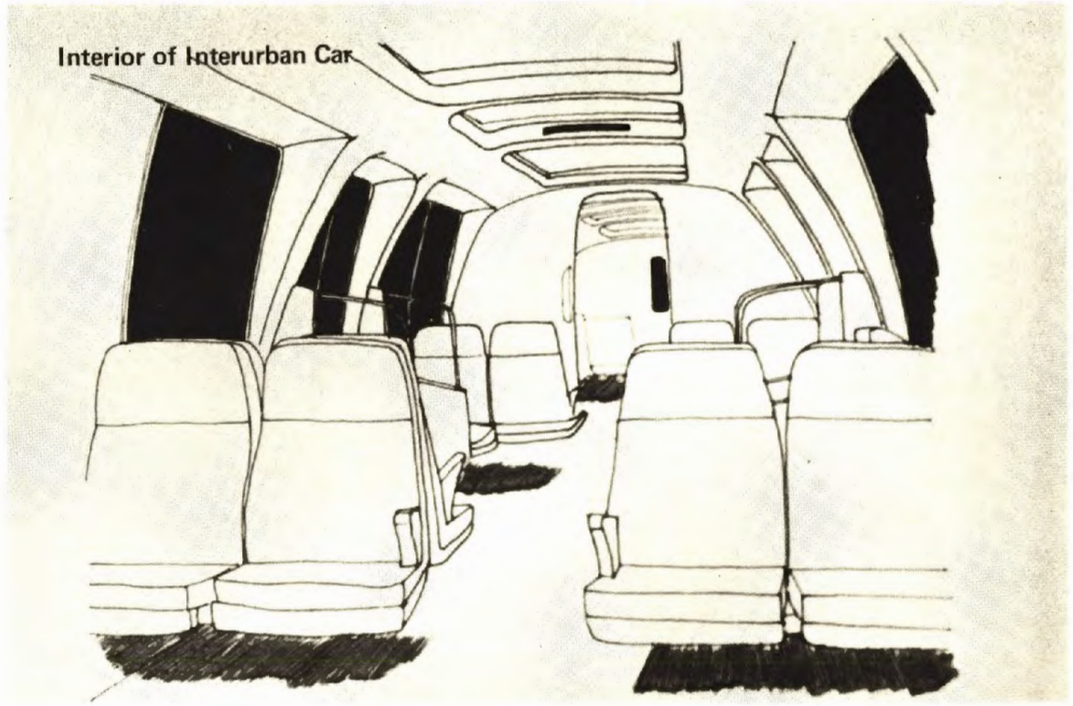
Airporter and Interurban Train



Interior of Airporter Car

INTERURBAN CAR CHARACTERISTICS

Height	12 feet - 0 inches
Weight	64,000 pounds
Length	85 feet - 0 inches
Doors per side	2 per side
Seats	75
Maximum Load	135
Service Speed	85 miles per hour
Acceleration	4 miles per hour per second
Grade	7 percent±



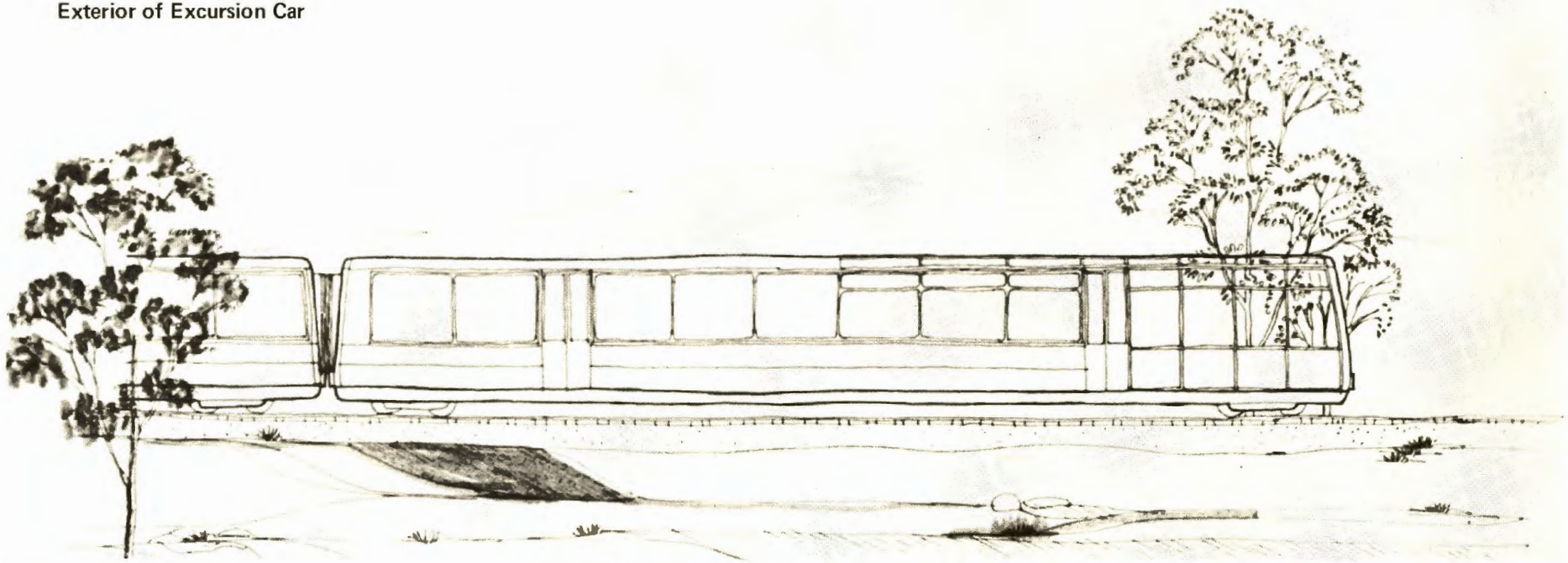
Interior of Interurban Car

RED CAR INTERURBAN SERVICE

Much like the Airporters, the Interurbans would operate over the Local service grids. Again, like the Airporter, the Red Cars would not operate on a station-to-station basis, but, rather, would stop only at key locations and utilize the interline rail junctions to provide cross-county service.

The seating density of the interurban cars would be an intermediate level between that of the Local service and the Airporters. The seating would be more conventional in its style but would still provide only 50 to 75 percent of the seating of the standard rapid transit car. It is expected that the Advanced Concept Train would be the design basis for this equipment as well.

Exterior of Excursion Car



EXCURSION SERVICE

A small percentage of the equipment for the system would be specially designed to accommodate special travel purposes. Attached to the interurban trains would be equipment with the interior capability of accommodating bicycles, surfboards, and the like. One end of the car would provide racks to store and lock down this equipment, while the opposite end of the car would provide bench-type seating for patrons. This equipment would be more modest in design, utilizing fiberglass molded seats or wooden bench seats for easy cleaning and maintenance rather than the padded and upholstered interiors of the other equipment.

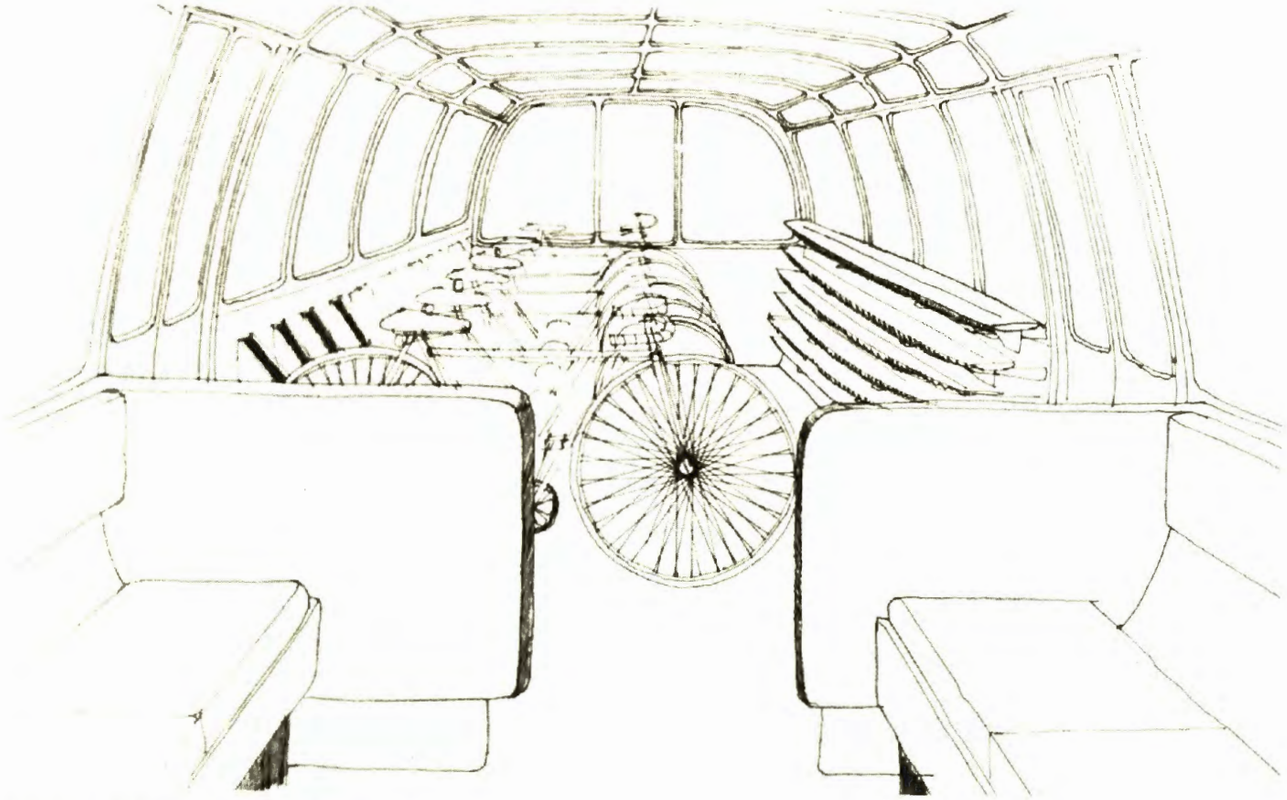
The excursion cars, along with the special designs for some domed local cars and special interiors for interurban cars, represent a particular philosophy inherent in this proposal.

Every effort has been made to design a system that is conservative in its cost approach while still providing the refinements that are required.

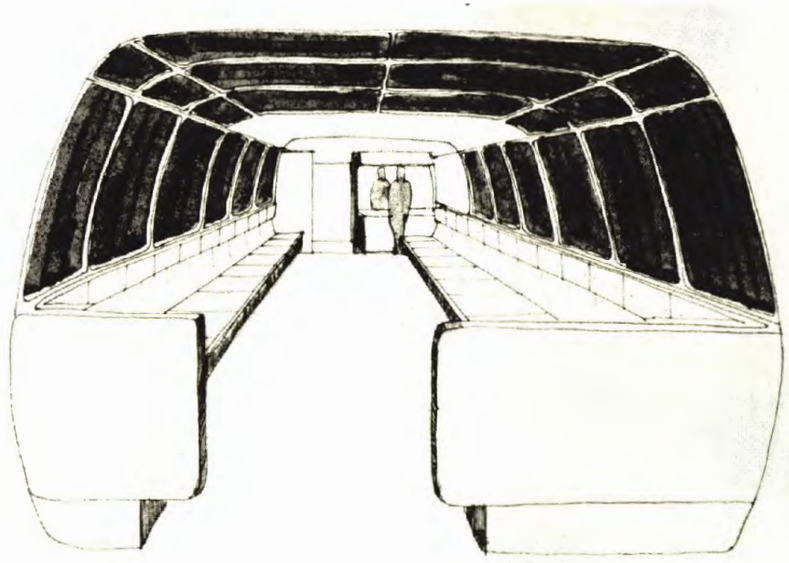
No transit line ever can be successful if automobile riders cannot be lured by the speed and the attractiveness of the rail system. It is our belief that amenities added to the rolling stock will be a cost effective criteria. For example, the excursion cars represent only a small fraction of the total cars used in the system, but their very uniqueness will add considerable popularity to the overall service. Tourists, weekend travelers, beach visitors, tennis players, and weekday shoppers will all find the excursion cars to be a happy way to travel.

EXCURSION CAR CHARACTERISTICS

Height	12 feet - 0 inches
Weight	60,000 pounds
Length	85 feet - 0 inches
Doors per side	2 per side
Seats	40
Maximum Load	60
Service Speed	85 miles per hour
Acceleration	(Non-Motorized)
Grade	n.a.



Interior of Excursion Car- Storage End



Interior of Excursion Car - Passenger End

FEEDER AND DISTRIBUTION CARS

As described subsequently in the section on route description, there are two general definitions for the service defined as feeders to, and distribution from, the heavy rail rapid transit system.

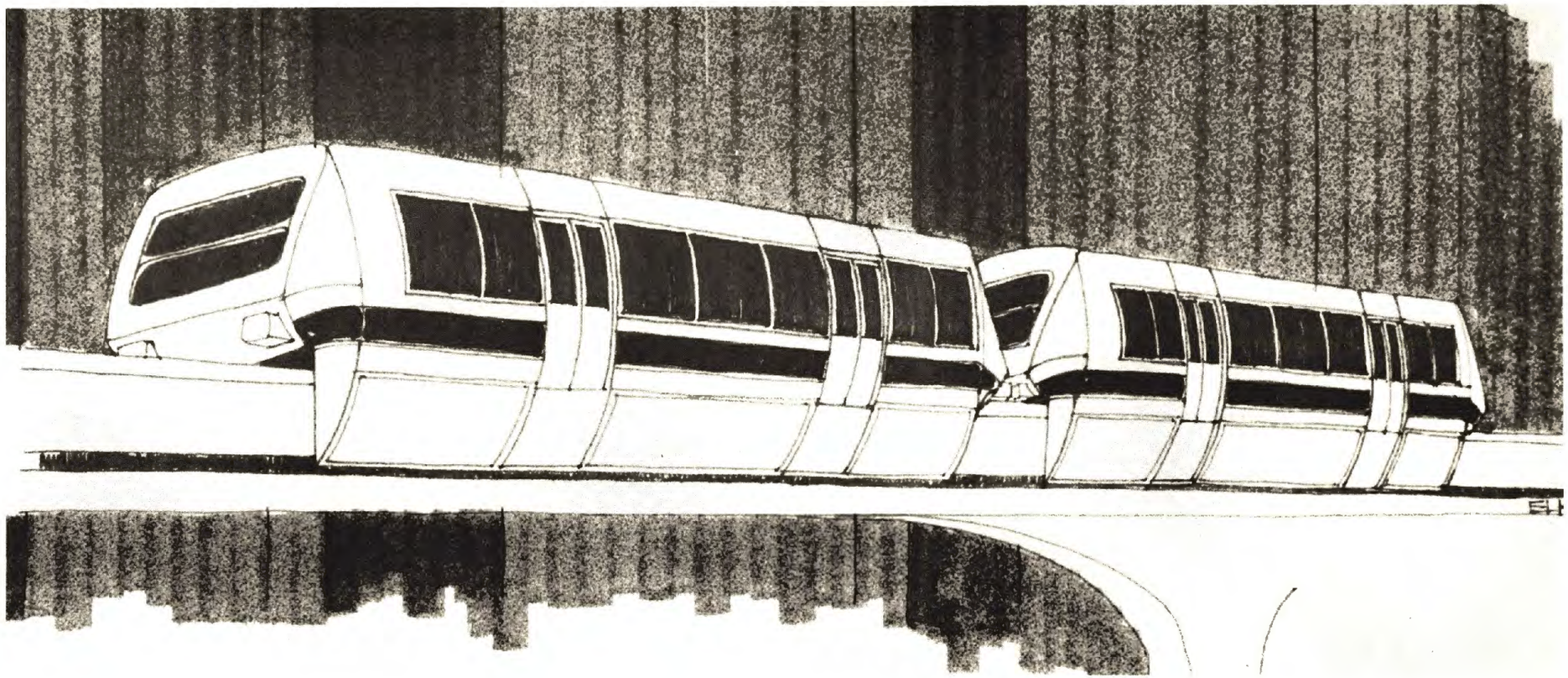
The several feeder lines which provide direct rail access from a local service area onto the rapid transit system utilize hybrid cars with capability of operating on a non-electrified right-of-way and continuing on the third rail electrified system. The technology generally applicable to this concept would be characterized by the gas turbine electric equipment produced by either General Electric or Garrett Airesearch for the Metropolitan Transit Authority in New York.

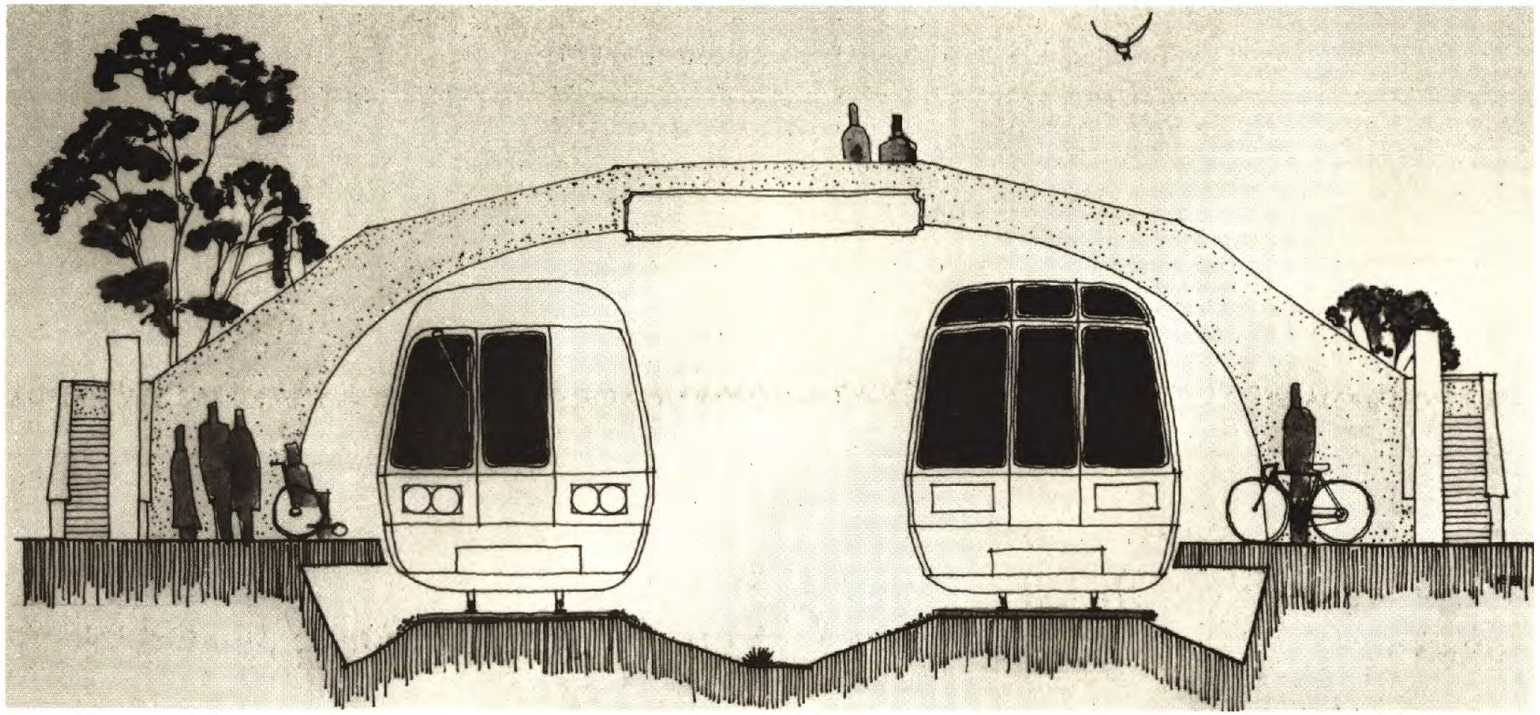
The balance of the local service is generally characterized as a closed loop Monorail or Group Rapid Transit system.These lines or networks are designed to provide a distribution of passengers from the Main Line through principal activity centers throughout the region. They are shown simply as shaded areas on the map describing Feeder and Distribution Systems in the subsequent chapter on the Corridors. By definition, Group Rapid Transit has a generic classification in transit technology which includes a broad range of vehicle size ranging from 10 to 50 passenger capacity. The Distribution System would employ a mix of vehicles of 16, and 30 passenger configuration, in order to accommodate different travel patterns at various locations and the fluctuation in passenger demand at different times of the day. As in the balance of the Rapid Transit System, the vehicles would be propelled by direct electric current.

However, the vehicles would be automatically controlled and would not require operators. It is proposed that the Monorail (GRT) networks follow a closed loop technology in the initial systems, in order to avoid excessive dependence on highly sophisticated computer control systems.

The hardware for the vehicles themselves and their light guideway support structures can be considered as off-the-shelf items.

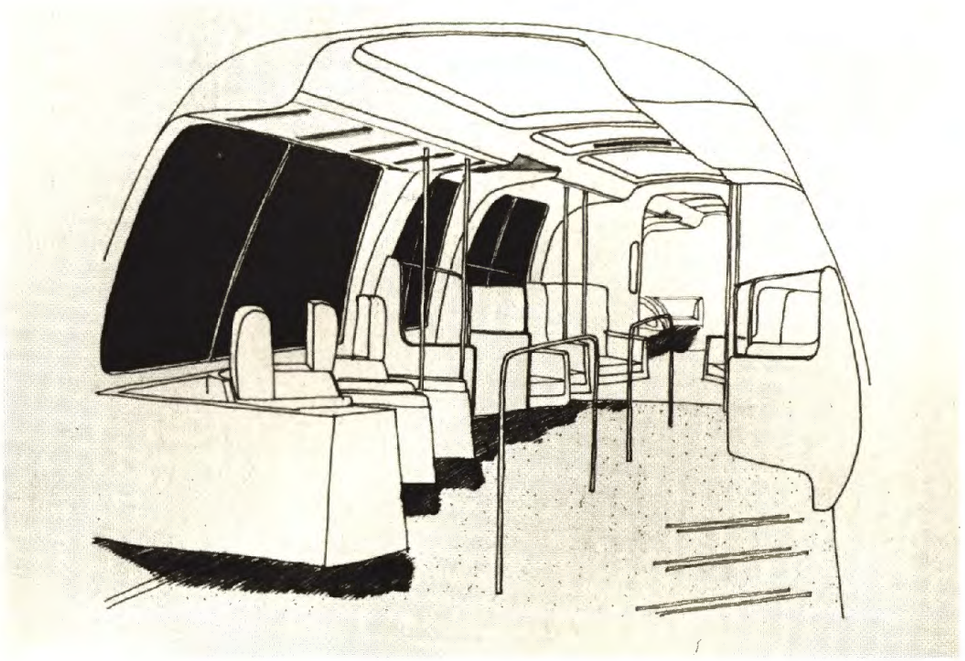
Prototypical Monorail Vehicle

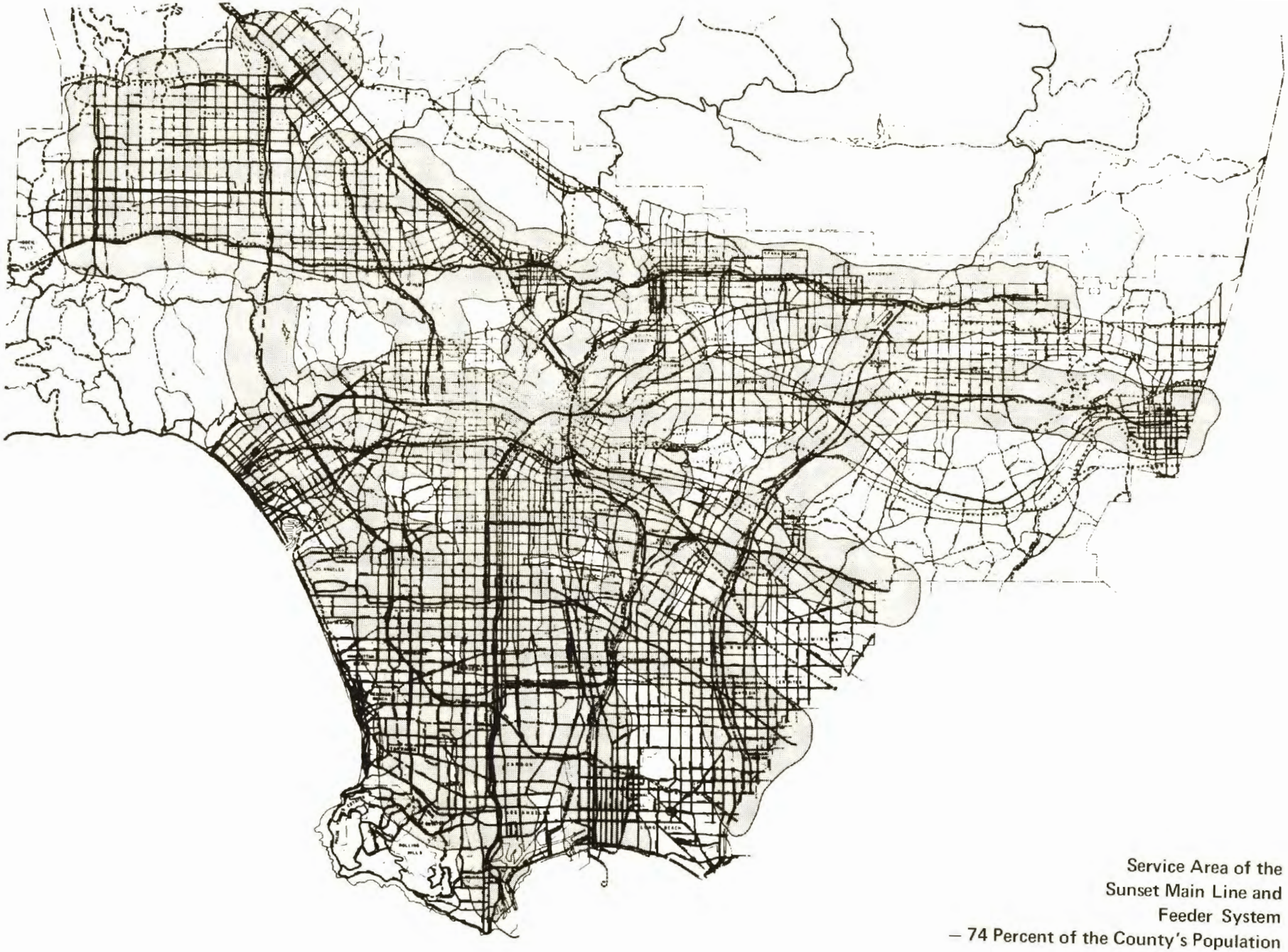




The design characteristics for Sunset Coast Line vehicles offer considerable flexibility in the development of special use cars. For example, excursion cars will provide space for bicycles, surf boards or other sports equipment or luggage.

In addition, all cars — Locals, Interurbans, Airporters, and Excursions — have special provisions made for the handicapped and elderly. The illustration on the right shows details of the handrails and wheelchair tie-down slots that will be included in all trains.





Service Area of the
Sunset Main Line and
Feeder System
— 74 Percent of the County's Population
Within 1½ Miles.

CITIES SERVED

An unprecedented number of communities will be provided direct service as a result of the development of the Sunset Coast Line. Previous proposals for the development of a rail transit system in the Los Angeles area historically have been extended only to the most densely populated travel corridors. Many outlying communities desiring rapid transit into their cities traditionally have been eliminated from consideration. This project will extend heavy rail transit into 43 cities in Los Angeles County below the San Gabriel Mountains. An additional 22 cities would be within 1—1-1/2 miles of a heavy rail transit line.

A number of cities have both Main Line service and feeder service extending within them. Three additional cities are served by feeder lines only.

Cities on Line

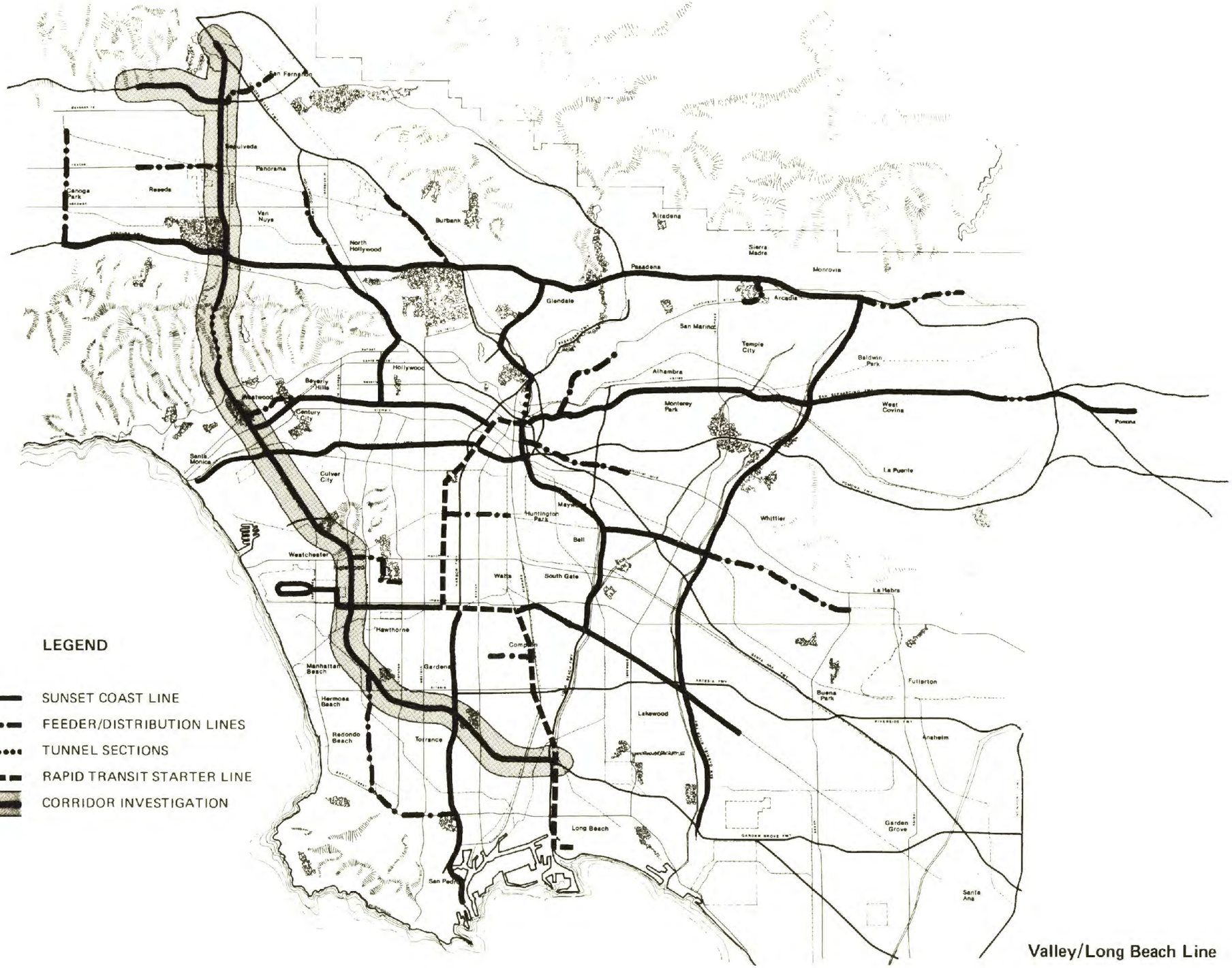
Alhambra	Culver City	Long Beach	Rosemead
Arcadia	Downey	Los Angeles	San Gabriel
Artesia	Duarte	Lynwood	Santa Fe Springs
Baldwin Park	El Monte	Monrovia	Santa Monica
Bell	Glendale	Monterey Park	Signal Hill
Bellflower	Hawthorne	Norwalk	South Gate
Beverly Hills	Industry	Paramount	Torrance
Burbank	Inglewood	Pasadena	Vernon
Carson	Irwindale	Pico Rivera	West Covina
Cerritos	Lakewood	Pomona	Whittier
Commerce	Lawndale	Redondo Beach	

Cities Within 1-1/2 Miles

Azusa	Gardena	Manhattan Beach	Sierra Madre
Bell Gardens	Hawaiian Gardens	Maywood	South El Monte
Bradbury	Huntington Park	Montebello	Temple City
Compton	La Puente	San Dimas	Walnut
Cudahy	La Verne	San Fernando	
El Segundo	Lomita	San Marino	

Cities With Feeder Lines

Arcadia	Glendale	Lomita	Torrance
Burbank	Glendora	Los Angeles	West Covina
Covina	Inglewood	San Fernando	Whittier

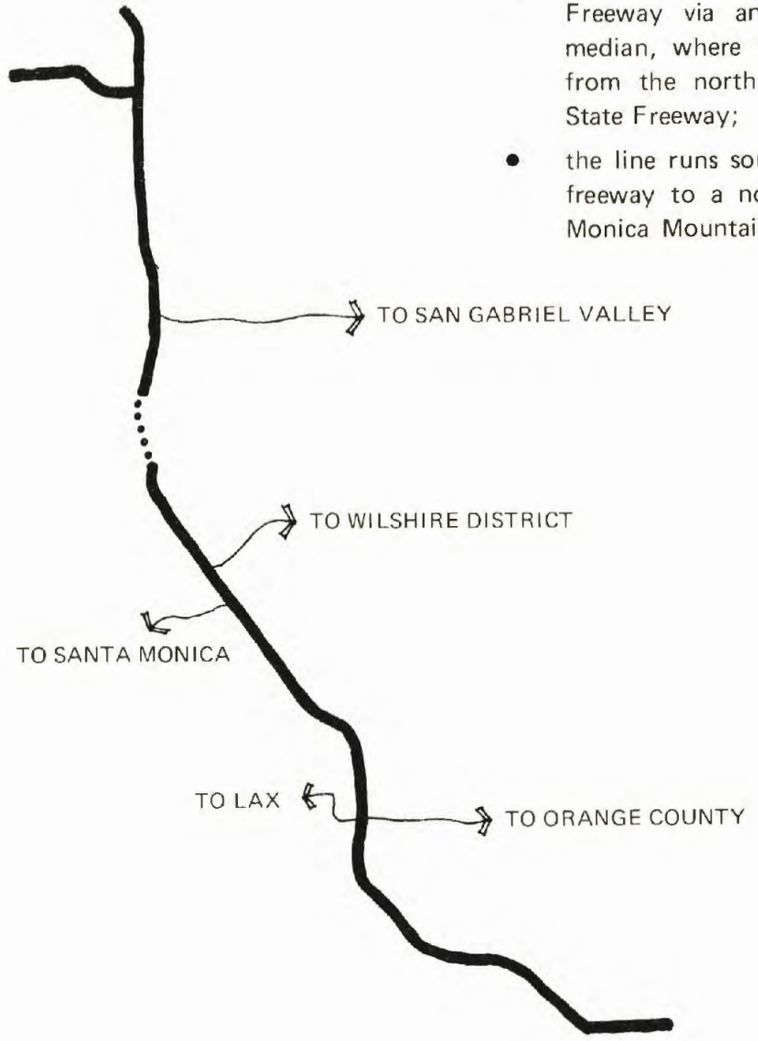


Valley/Long Beach Line

VALLEY/LONG BEACH LINE

ROUTE DESCRIPTION

- The line begins on the Simi Valley Freeway at Reseda Boulevard;
- the line runs to the east on the interior freeway lanes to the San Diego Freeway;
- the line turns south onto the San Diego Freeway via an aerial structure over the median, where it is joined by a structure from the north originating at the Golden State Freeway;
- the line runs south on a structure over the freeway to a northern portal in the Santa Monica Mountains near Valley Vista Drive;



- a tunnel 3.2 miles in length carries the line through the mountains, minimizing the grade requirement;
- at the southern portal (north of Sunset Boulevard) the Valley/Long Beach Line emerges and turns back into the median of the freeway (or onto a shoulder) onto an aerial structure;
- the line continues south on the freeway, making an interline rail junction with the Cross-County Line at the junction of Exposition and Sepulveda Boulevards;
- the line continues on a structure along the freeway through junctions with the Airport Line and the Central Line before terminating at the Rapid Transit Starter Line at the junction of the Long Beach and San Diego Freeways, where the line ends.
- This line is 44.49 miles in length.

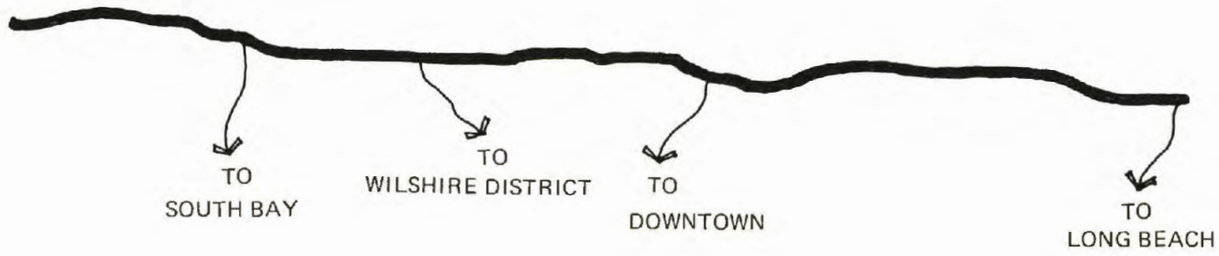
STATIONS

Locations and types of stations for this line are listed below:

Stations	Access			Station Type	Travel Time
	Bus	K&R[1]	Park		
Reseda	X		X	Freeway	0:00
Devonshire	X		X	Freeway	4:15
Nordhoff	X		X	Freeway	5:45
Sherman Way	X		X	Freeway	8:15
Ventura Blvd.	X	X		Freeway	11:30
Wilshire Blvd.	X	X		Freeway	18:30
Santa Monica Blvd.	X	X		Freeway	19:30
(Exposition Line)					20:00
Centinela	X	X		Freeway	25:00
(Airport Line)					28:45
Hawthorne	X	X		Freeway	32:15
Crenshaw	X	X	X	Freeway	34:00
Harbor Freeway	X		X	Freeway	36:30
Avalon	X		X	Freeway	38:00
Long Beach Frwy	X		X	Freeway	42:00

[1] K&R refers to kiss-and ride access to the rail stations.

Inter-Valley Line



INTER-VALLEY LINE

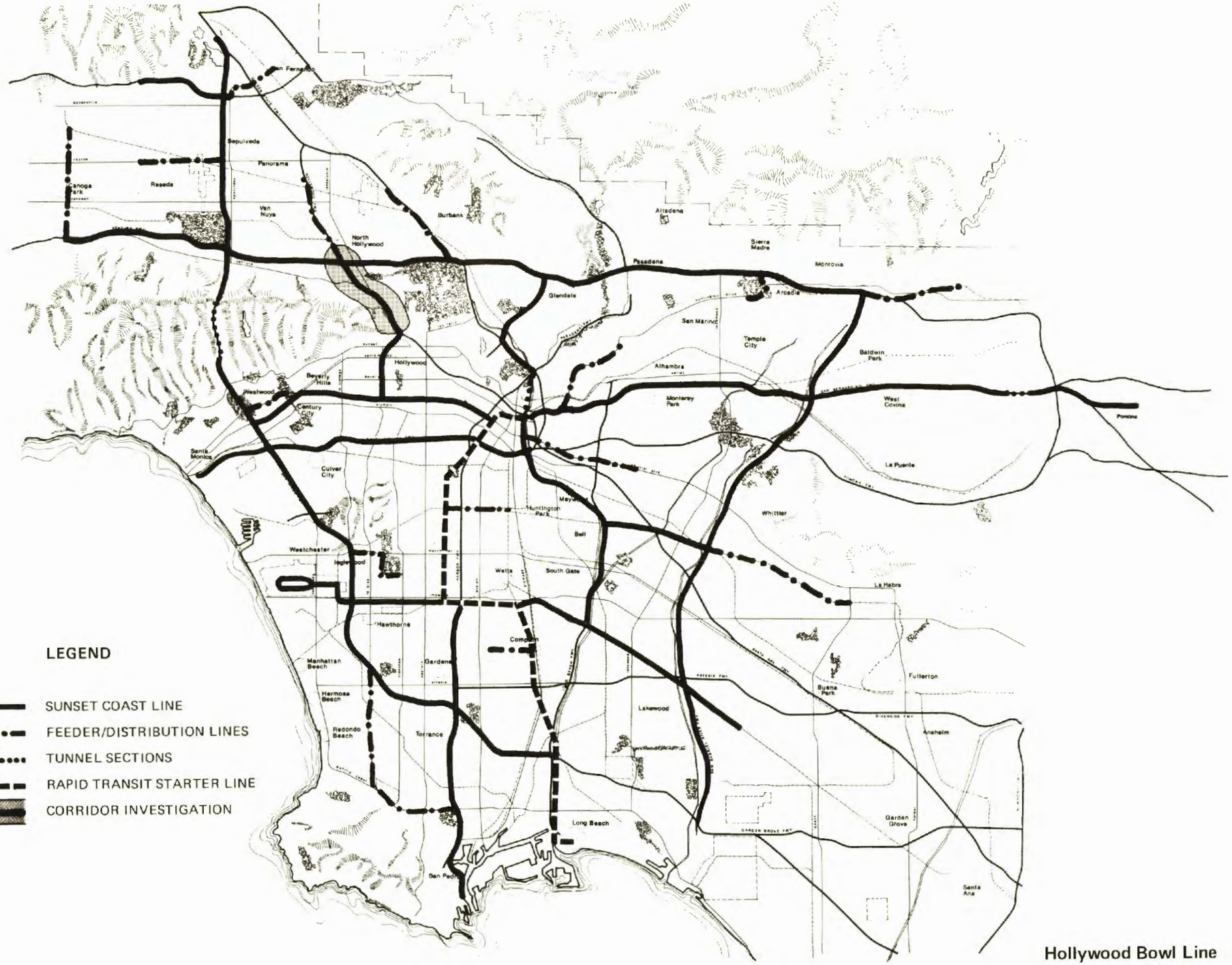
ROUTE DESCRIPTION

- This line begins on a structure over the median of the Ventura Freeway at Canoga Avenue in Woodland Hills;
- the line runs to the east through an interline rail junction with the Valley/Long Beach Line at the San Diego Freeway, where traffic can be diverted from the West Valley to the South Bay;
- the line continues along the Ventura Freeway to an interline rail junction with the Hollywood Bowl Line in the Hollywood Freeway, where traffic can be diverted from this east-west line to the Wilshire Corridor and downtown Los Angeles;
- the line continues east to a rail junction at the Glendale Freeway where traffic from either direction on the Inter-Valley Line can be diverted to downtown Los Angeles;
- to the east, the Inter-Valley Line remains on a structure until a point beyond Marengo Avenue;
- to the west of Marengo, the line could come down to grade on the interior lanes of the freeway;
- the line would continue at grade to a junction with the San Gabriel River Line in Duarte where the line ends.
- This line is 40.96 miles in length.

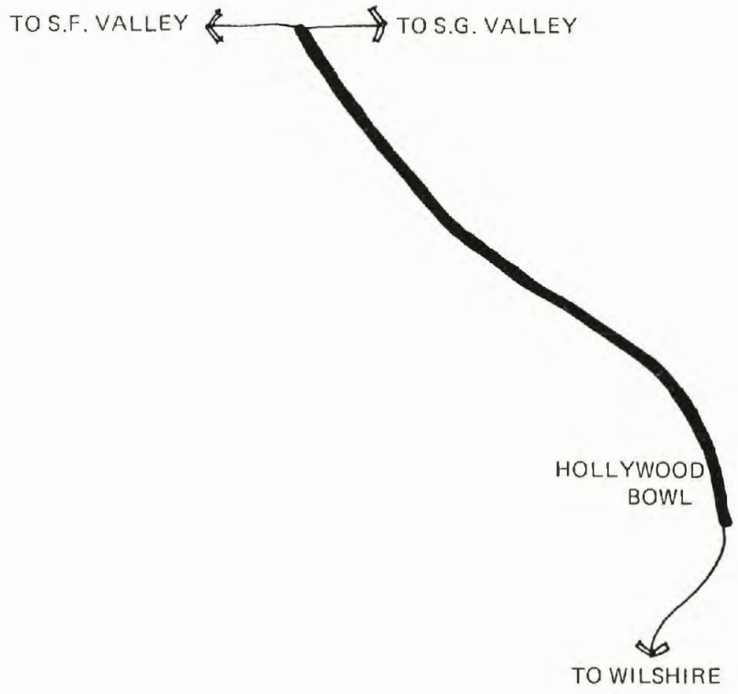
STATIONS

Locations and types of stations for this line are listed below:

Stations	Access			Station Type	Travel Time
	Bus	K&R	Park		
Canoga	X	X	X	Freeway	0:00
Winnetka	X	X	X	Freeway	1:30
Reseda	X	X	X	Freeway	3:15
Balboa	X	X	X	Freeway	5:30
San Diego Freeway	X	X	X	Freeway	7:30
Van Nuys	X	X		Freeway	8:45
Fulton	X	X		Freeway	10:00
Laurel Canyon	X	X		Freeway	11:30
Hollywood Freeway	X	X		Freeway	12:45
Hollywood Way	X	X		Freeway	14:25
Golden State Frwy	X	X	X	Freeway	18:00
Glendale Freeway	X	X	X	Freeway	21:15
Lake	X	X	X	Freeway	26:45
Sierra Madre	X	X	X	Freeway	29:00
Santa Anita	X	X	X	Freeway	32:30
Myrtle	X	X	X	Freeway	34:30
San Gabriel Ri. Frwy		X	X	Freeway	37:00



Hollywood Bowl Line



HOLLYWOOD BOWL LINE

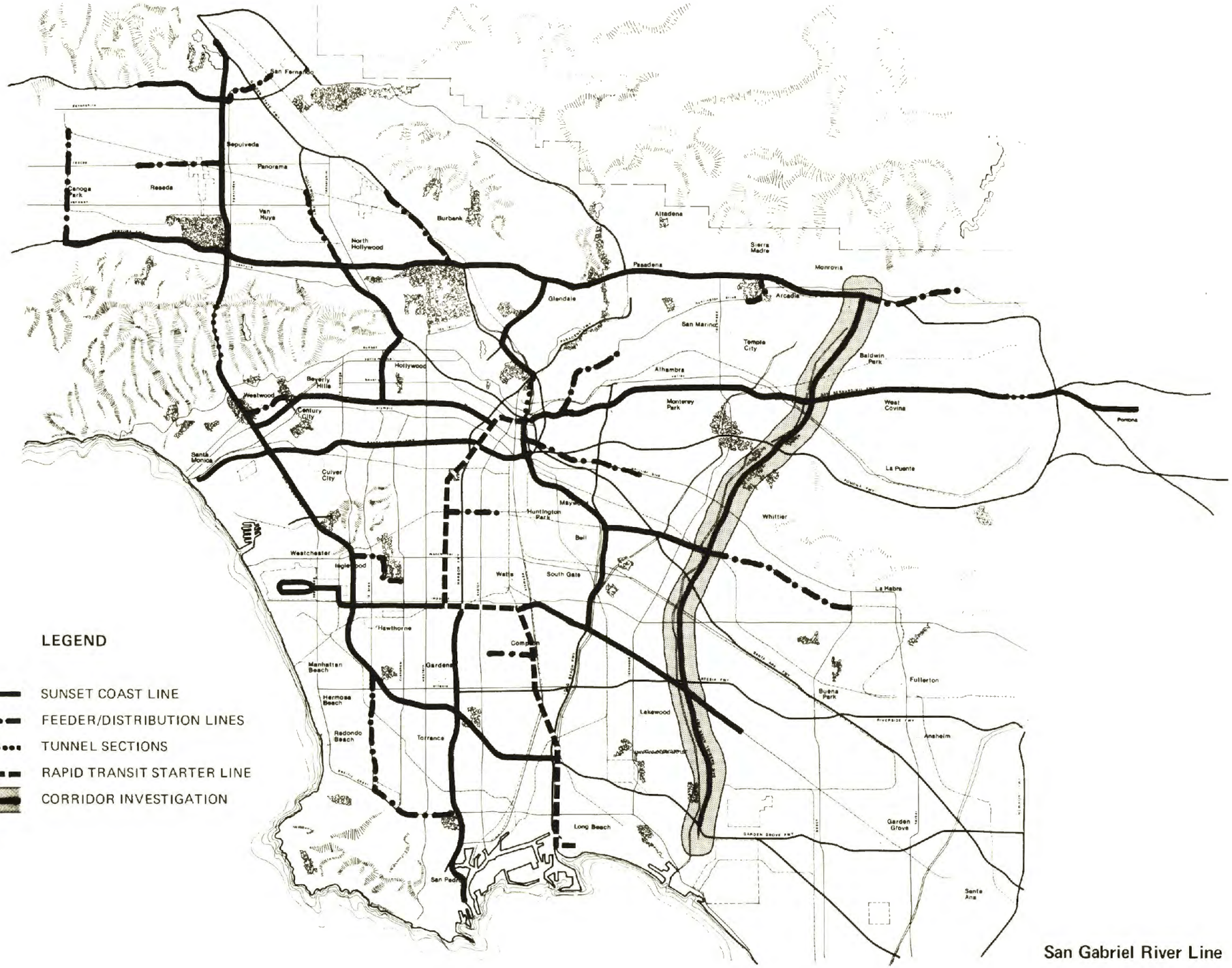
ROUTE DESCRIPTION

- This line begins at an interline rail junction with the Inter-Valley Line at the intersection of the Hollywood and Ventura Freeways;
- the line operates to the southeast on a structure either over the median or along the shoulder of the Hollywood Freeway to the Hollywood Bowl at Highland Avenue where the line ends.
- A future connection or extension of this line would be to the south along La Brea Avenue to the Wilshire District and ultimately to downtown Los Angeles (this will be discussed under the Wilshire/La Brea Corridors);
- The length of this Hollywood Bowl Line is 3.78 miles.

STATIONS

Locations and types of stations for this line are listed below:

Stations	Access			Station Type	Travel Time From North Hollywood
	Bus	K&R	Park		
Universal City	X	X		Freeway	1:00
Hollywood Bowl	X		X	Freeway	3:30

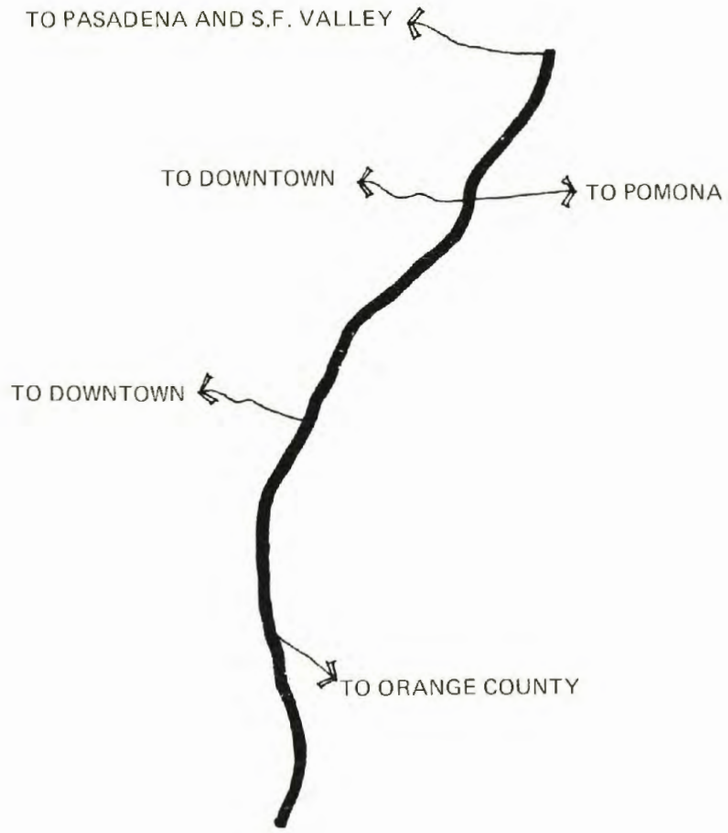


San Gabriel River Line

SAN GABRIEL RIVER LINE

ROUTE DESCRIPTION

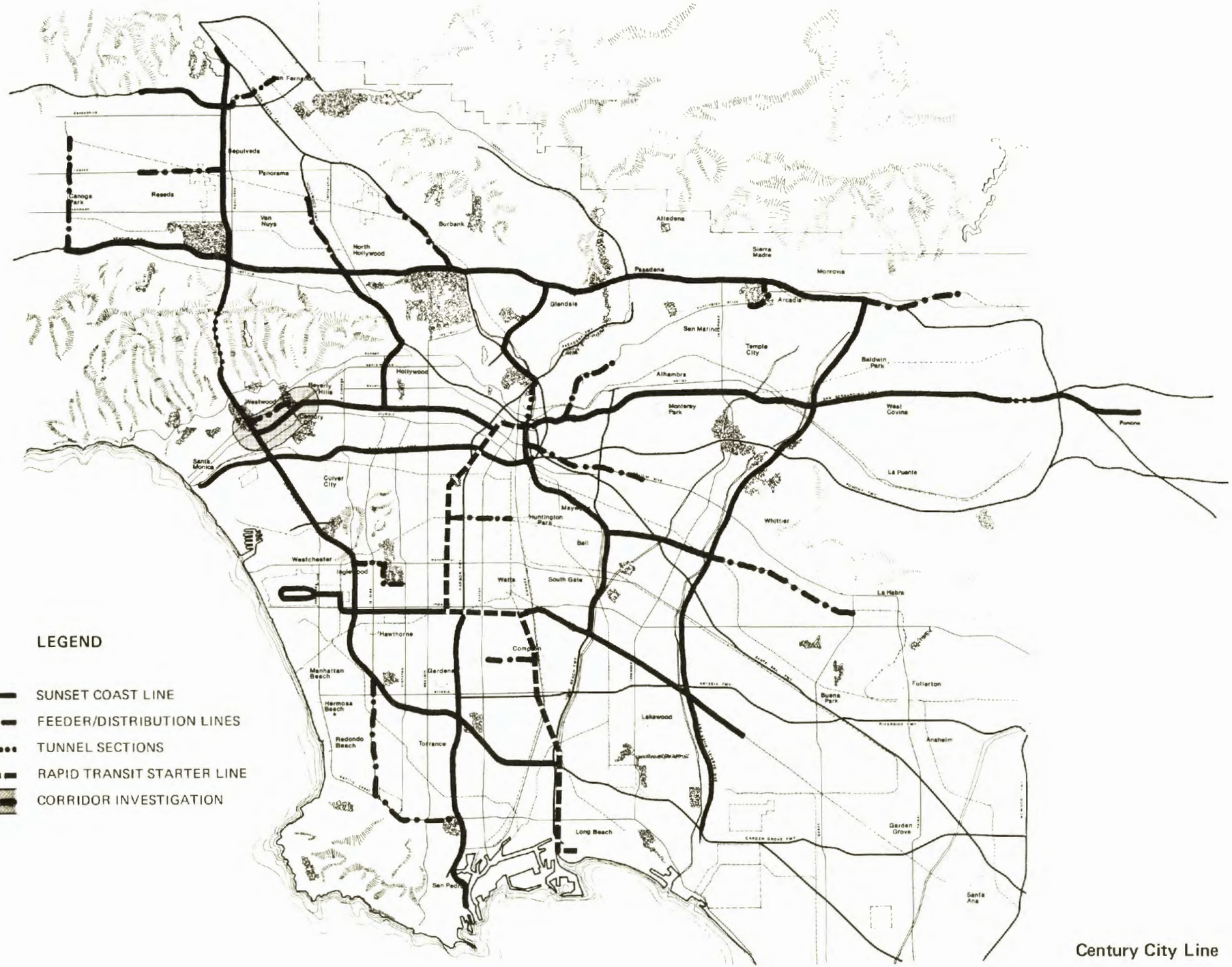
- This line begins at a junction with the Inter-Valley Line in Duarte;
- this line runs south from the Santa Fe Flood Control Basin along the interior lanes of the San Gabriel River Freeway;
- there is a partial interline junction with the Pomona Line on the San Bernardino Freeway;
- the line continues south along the interior of the freeway through a connection with the Cross-County Line in Santa Fe Springs;
- further to the south the San Gabriel River Line intersects a junction with the International Airport Line;
- the line continues to a temporary terminus at the freeway interchange of the San Diego and San Gabriel River Freeways where the line ends.
- This line is 24.7 miles in length.



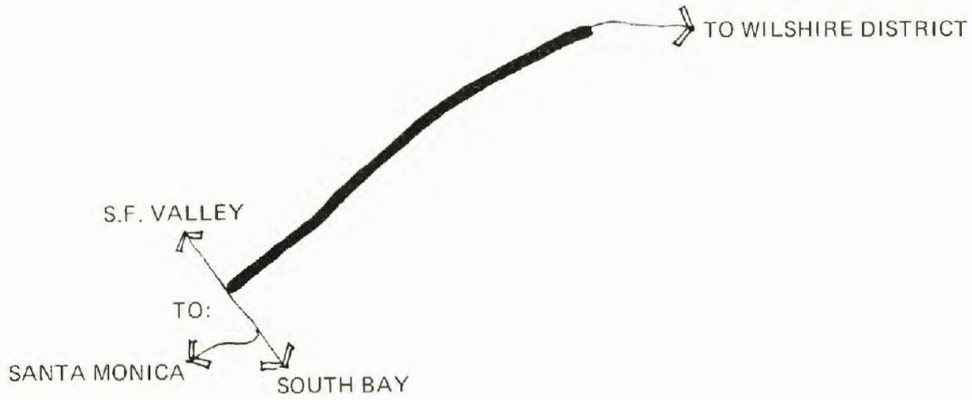
STATIONS

Locations and types of stations for this line are listed below:

Stations	Access			Station Type	Travel Time
	Bus	K&R	Park		
Foothill Freeway		X	X	Freeway	0:00
San Bernardino Frwy	X	X	X	Freeway	5:30
Pomona Freeway		X	X	Freeway	8:00
Whittier Blvd.	X	X	X	Freeway	11:15
Cross-County Line					13:75
Firestone Blvd.	X	X	X	Freeway	14:25
Int'l Airport Line					15:30
Carson	X	X	X	Freeway	19:00
Long Beach (I-405)	X	X	X	Freeway	22:00



Century City Line



CENTURY CITY LINE

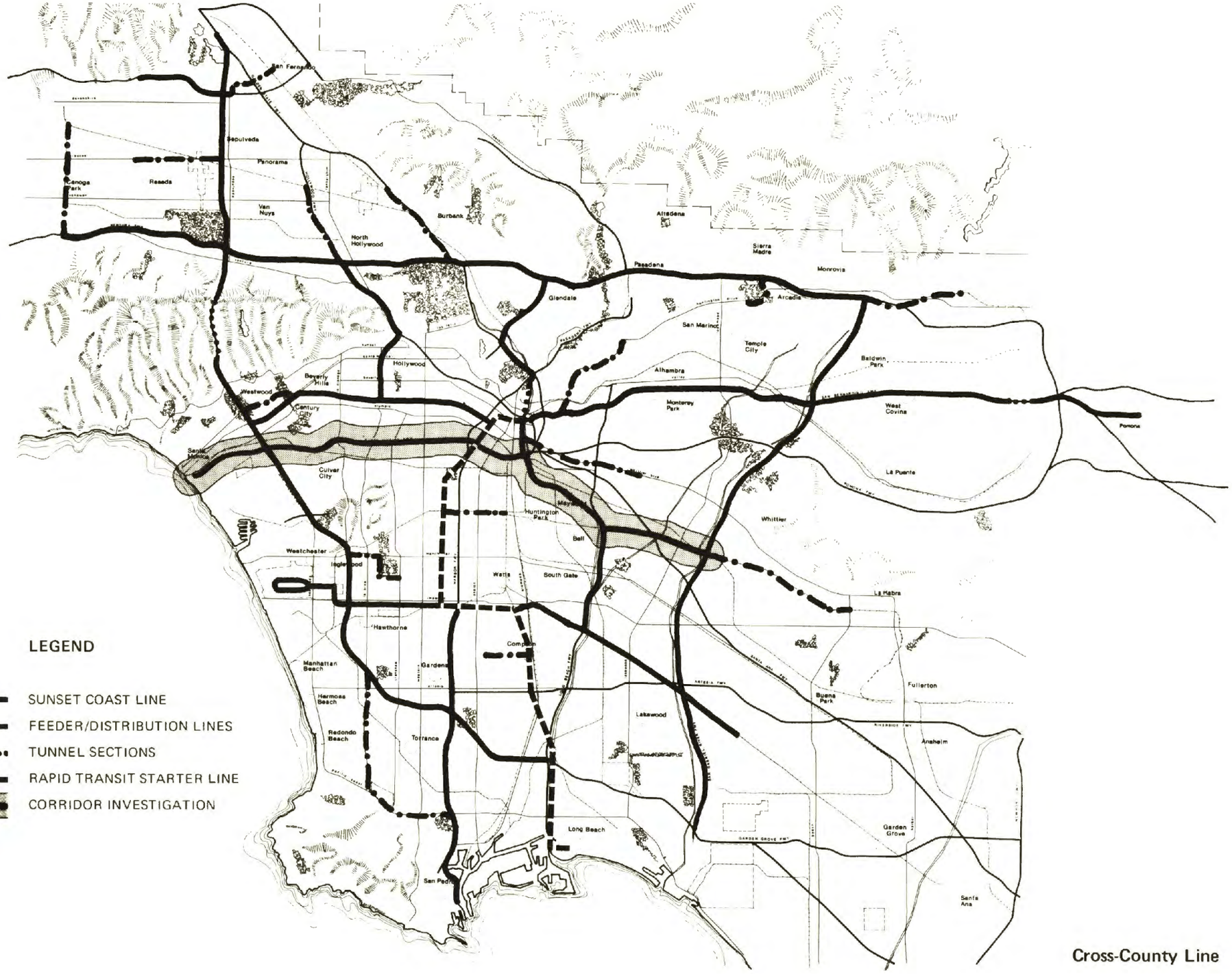
ROUTE DESCRIPTION

- This Line begins with an interline rail junction along the San Diego Freeway;
- the line runs to the northeast on an aerial structure supported over an easement along the Southern Pacific's right-of-way adjacent to Santa Monica Boulevard;
- a temporary terminus to this line is provided with a simple crossover switch at the west end of the Century City Station;
- to the east would be a possible future connection to the Wilshire Boulevard Corridor (this will be discussed subsequently under Wilshire/La Brea Corridors).
- This Century City Line is 2.27 miles in length.

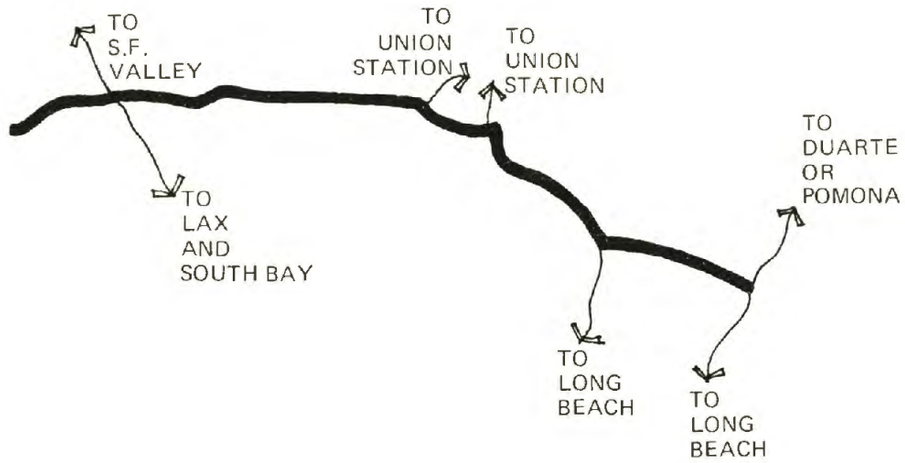
STATIONS

Locations and types of stations for this line are listed below:

Stations	Access			Station Type	Travel Time From Union Station	
	Bus	K&R	Park		(via Santa Monica Frwy)	(via Wilshire Line)
Century City	X	X	X	Aerial	17:00	12:00



Cross-County Line



CROSS-COUNTY LINE

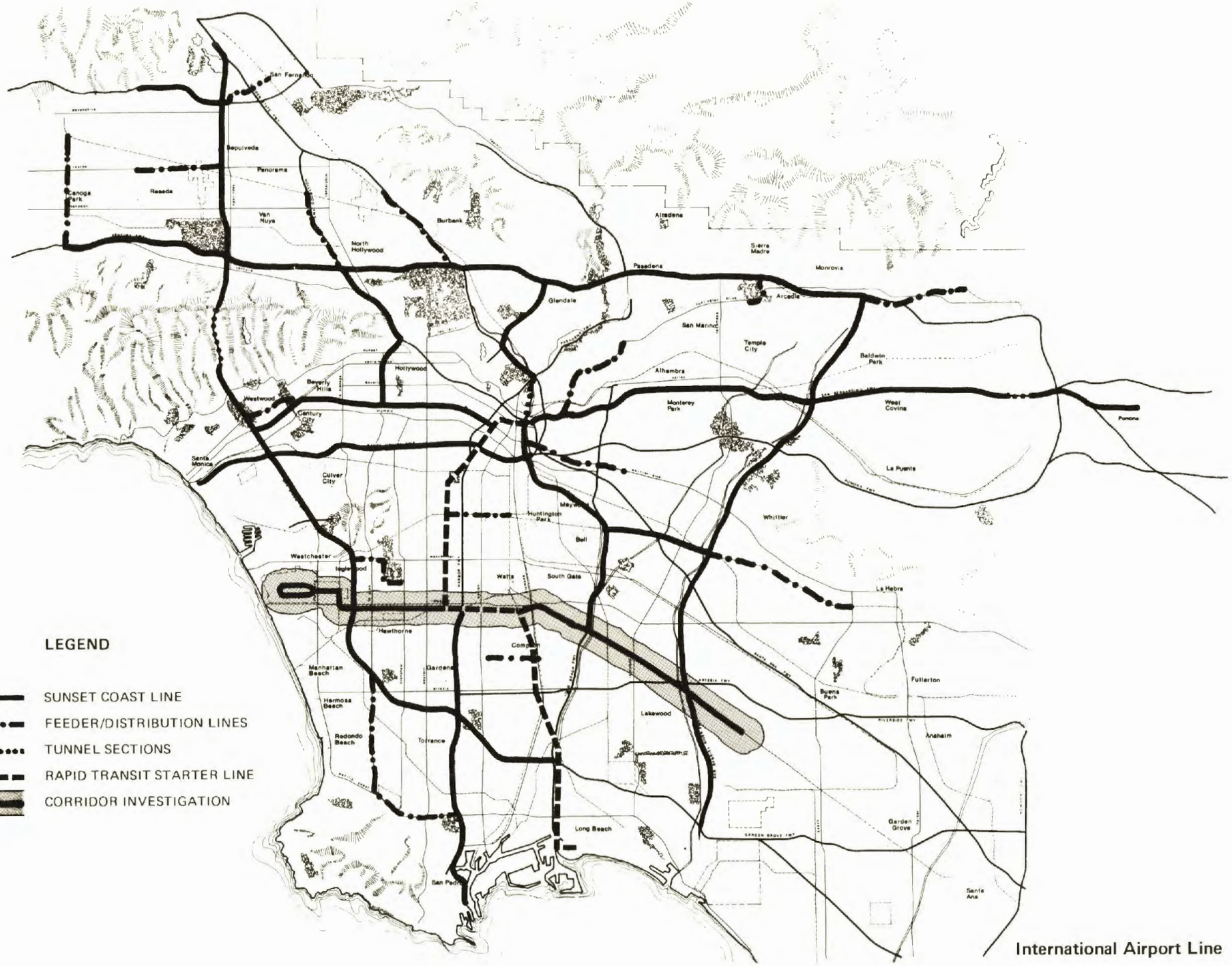
ROUTE DESCRIPTION

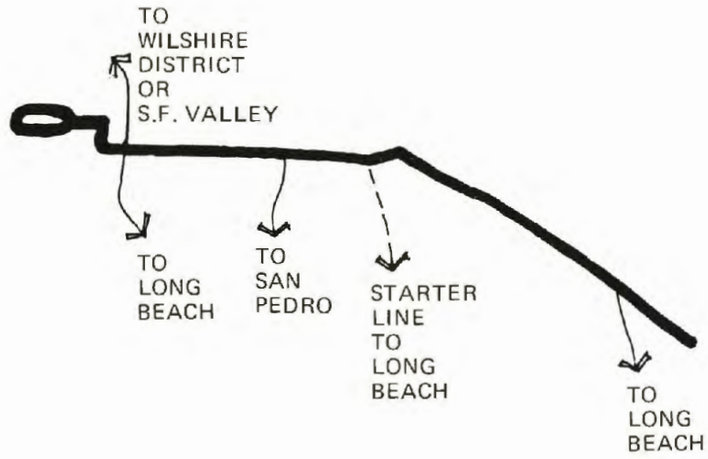
- This line begins with an at-grade station in the median of the Santa Monica Freeway at Lincoln Blvd;
- line runs at grade on the interior lanes of the Santa Monica Freeway to approximately the San Diego Freeway;
- the line swings out of the freeway onto a structure to an interline rail junction with the Valley/Long Beach Line in the vicinity of Sepulveda and Exposition Boulevards;
- the line returns on a structure to either the median or shoulder of the Santa Monica Freeway where it continues east;
- a bi-level station is provided at Figueroa Street, where this aerial alignment would overpass the subway configuration of the Rapid Transit Starter Line;
- the line continues east above the freeway to the Santa Fe Tracks along the west bank of the Los Angeles River;
- here the Cross-County Line forms a junction with direct access onto a structure adjacent to the Los Angeles River and north to Union Station;
- the line continues to the east from this junction, following the northern embankment of the Los Angeles River to its point of tangency with the Long Beach Freeway;
- here the aerial structure carries over the southbound lanes of the Long Beach Freeway to the median;
- the line continues along the median or a shoulder of the freeway to Randolph Street;
- the line carries over the northbound lanes of the Long Beach Freeway down onto a sloped embankment adjacent to the Southern Pacific trackage through the cities of Commerce and Pico Rivera to a connection with the San Gabriel River Line at the freeway, where the line ends. From this point, a feeder line extends to the Orange County border, through Whittier.
- This line is 25.71 miles in length.

STATIONS

Locations and types of stations for this line are listed below:

Stations	Access			Station Type	Travel Time From Santa Monica
	Bus	K&R	Park		
Ocean Blvd.	X	X		Freeway	0:00
20th Street	X	X	X	Freeway	1:15
San Diego Freeway	X	X	X	Freeway	3:30
National	X	X		Freeway	5:00
La Brea	X	X		Freeway	8:15
Western Avenue	X	X		Freeway	10:30
Figueroa	X	X		Freeway	12:30
Soto Street	X	X	X	Aerial	16:15
Randolph	X	X	X	Aerial	20:00
Telegraph	X	X	X	Aerial	22:45
Rosemead	X	X	X	Aerial	23:30
San Gabriel River		X	X	Aerial	25:00


LEGEND
SUNSET COAST LINE
FEEDER/DISTRIBUTION LINES
TUNNEL SECTIONS
RAPID TRANSIT STARTER LINE
CORRIDOR INVESTIGATION
San Fernando
Sepulveda
Panorama
Canoga Park
Reseda
Van Nuys
Burbank
North Hollywood
Altadena
Sierra Madre
Monrovia
Pasadena
Arcadia
Glendale
San Marino
Temple City
Baldwin Park
Alhambra
Hollywood
Beverly Hills
Westwood
Century City
Monterey Park
West Covina
Pomona
Santa Monica
Culver City
La Puente
Huntington Park
Whittier
Bell
Westchester
Inglewood
Watts
South Gate
La Habra
Hawthorne
Compton
Manhattan Beach
Gardena
Fullerton
Buena Park
Hermosa Beach
Lakewood
Redondo Beach
Torrance
Anaheim
Long Beach
Garden Grove
Santa Ana
International Airport Line



INTERNATIONAL AIRPORT LINE

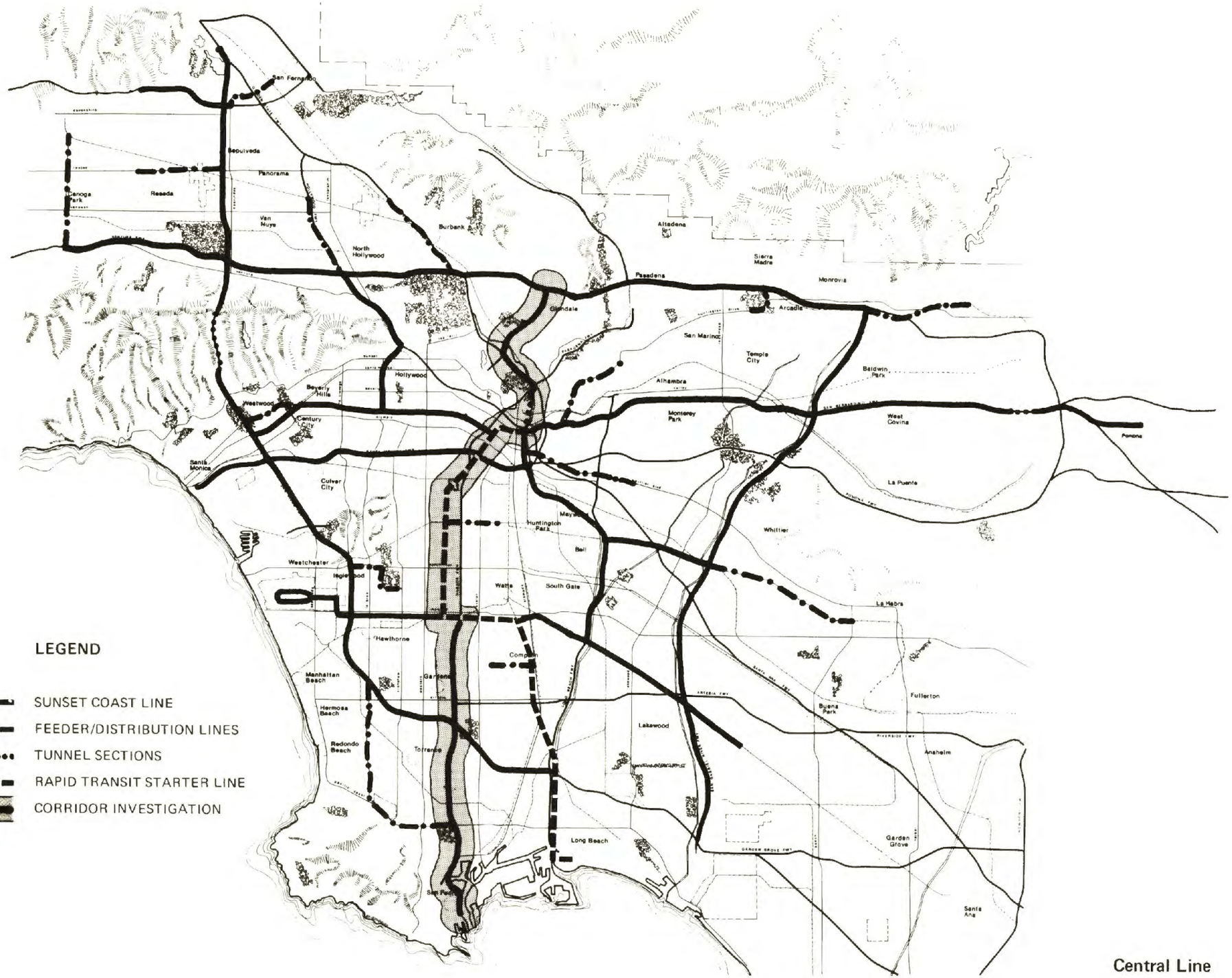
ROUTE DESCRIPTION

- This line begins at the Orange County Line along the Pacific Electric (Southern Pacific) Santa Ana Line;
- the Airport Line runs to the northwest on a structure over an easement of the Railroad right-of-way;
- the line continues to the northwest through a common station with the terminus of the Long Beach Line, where these two facilities intersect;
- to the west of the Long Beach Freeway the line follows the center median of the proposed Century Freeway;
- this right-of-way is used as far west as the intersection with the Willowbrook Branch of the Southern Pacific;
- between the Willowbrook Branch and Vermont Avenue the line continues in the median of the freeway but is constructed not as part of this County-Wide Sunset project, but as a part of the Rapid Transit Starter Line;
- the line continues west in the median of the freeway through an interline junction with the San Diego Freeway;
- the Airport Line continues to the end of the proposed freeway at Aviation Boulevard;
- here the line turns north on a structure over an easement along the Santa Fe Tracks to Century Boulevard;
- the structure turns west of the median of Century Boulevard to World Way Drive, to form a one-way loop through the terminals above World Way Drive, where the line ends.
- Second level entrance to the principal terminals is provided.
- This line is 25.69 miles in length, 8.01 of which is part of the starter line project.

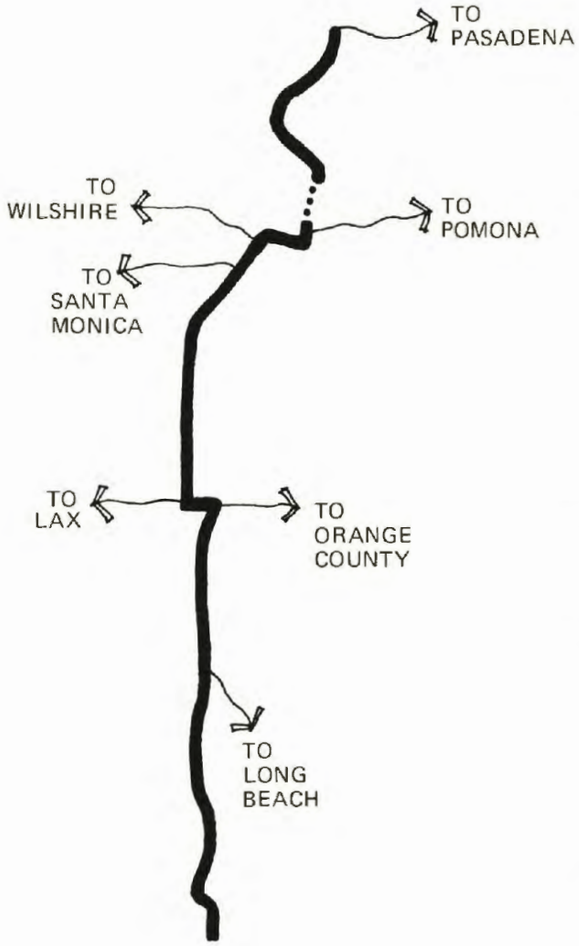
STATIONS

Locations and types of stations for this line are listed below:

Stations	Access			Station Type	Travel Time From Orange County	
	Bus	K&R	Park		To Union Station	To LAX
Orange County	X	X	X		0:00	0:00
Pioneer	X	X	X	Aerial	2:00	2:00
San Gabriel Ri. Frwy	X	X	X	Aerial	3:00	3:00
Bellflower	X	X	X	Aerial	5:00	5:00
Lakewood	X	X	X	Aerial	6:15	6:15
Paramount	X	X	X	Aerial	7:15	7:15
Long Beach Frwy	X	X	X	Aerial	7:45	7:45
Long Beach Blvd	X	X	X	Aerial	9:30	9:30
Avalon	X	X	X	Freeway	11:45	11:45
Vermont	X	X	X	Freeway	13:15	13:15
Western	X	X	X	Freeway	14:15	14:15
Crenshaw	X	X	X	Freeway	15:15	15:15
Hawthorne	X	X	X	Freeway	16:45	16:45
San Diego Frwy	X	X	X	Freeway	17:30	17:30
LAX	X	X	X	Multi–Termini	21:00	21:00
Imperial	X	X	X	Freeway	9:00	
Firestone	X	X	X	Freeway	10:15	
Florence	X	X	X	Freeway	11:30	
Randolph	X	X	X	Freeway	12:15	
Soto	X	X	X	Freeway	16:00	
Union Station	X	X	X	Multi-Level	19:45	



Central Line



CENTRAL LINE

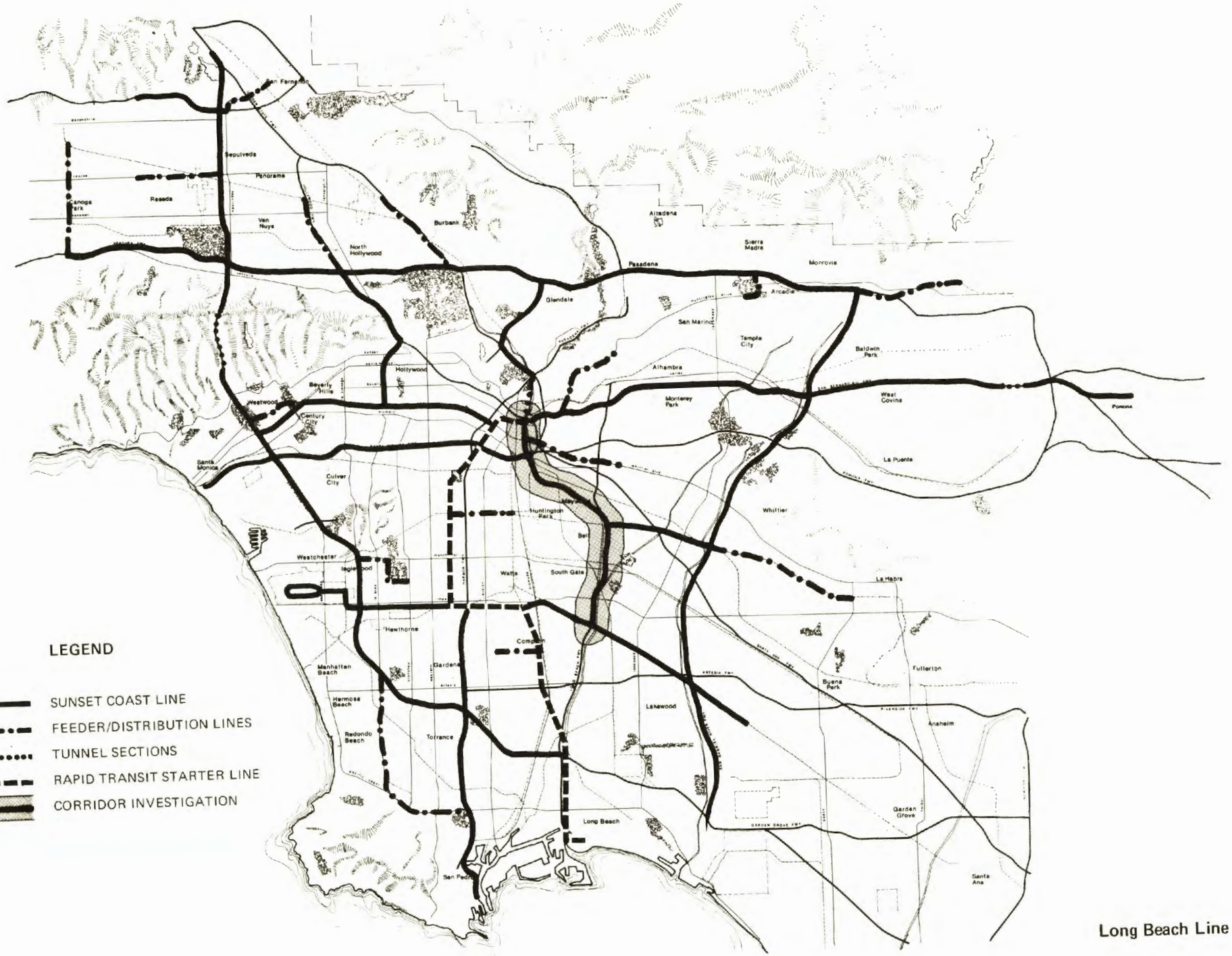
ROUTE DESCRIPTION

- This line begins with an interline rail junction with the Inter-Valley Line in Glendale, at the intersection of the Glendale and Ventura Freeways;
- the line runs to the south on the interior lanes of the Glendale Freeway to the Golden State Freeway;
- the line transitions from the Glendale Freeway on a structure down onto the median of the Golden State Freeway, and continues to the south again on a structure;
- the Central Line runs south on a structure supported above the median of the freeway to a point just north of the Pasadena Freeway;
- after the line transitions off the northbound freeway lanes onto a structure, it enters a portal at the south end of the Taylor Yard;
- the Central Line carries under the Pasadena Freeway and the Los Angeles River before entering Union Station as a subway;
- between Union Station and the proposed Century Freeway Corridor, the continuation of this alignment is as a part of the Rapid Transit Starter Line;
- that alignment begins as a subway from Union Station, running under the Civic Center, Bunker Hill, financial district, and USC/Coliseum, before aligning under Vermont Avenue and portaling out south of Gage Street in the median of Vermont;
- the alignment continues south on a structure above the median to the Century Freeway Corridor where it intersects the International Airport Line;
- the line jogs to the east one-half mile to the Harbor Freeway;
- while the Rapid Transit Starter Line and the International Airport Line continue east in the Century Freeway median, the Central Line turns south on a structure along a shoulder of the Harbor Freeway;
- this alignment continues through an interline junction with the San Diego Freeway;
- to the south the alignment comes down to grade onto the interior lanes of the freeway to approximately the John Gibson Highway;
- the Central Line transitions off the freeway onto a structure adjacent to Front Street through San Pedro to a rail car storage yard and at-grade station adjacent to Ports O'Call Village where the line ends.
- This line is 32.92 miles in length, 10.71 of which is the Rapid Transit Starter Line.

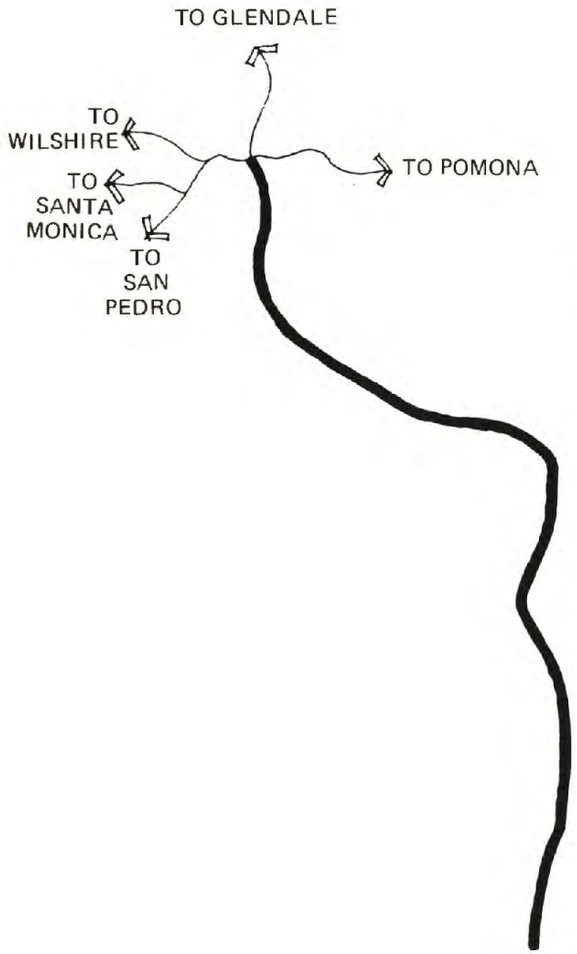
STATIONS

Locations and types of stations for this line are listed below:

Stations	Access			Station Type	Travel Time
	Bus	K&R	Park		
Ventura Freeway		X	X	Freeway	7:15
York Boulevard	X	X	X	Freeway	5:30
San Fernando Road	X	X	X	Freeway	4:30
Union Station	X		X	(Multi-Line)	0:00
Civic Center	X			Subway	2:00
Financial District	X			Subway	2:30
Seventh/Flower	X			Subway	3:00
Convention Center	X	X		Subway	3:30
Coliseum/USC	X	X		Subway	5:30
Florence	X			Subway	8:30
Manchester	X			Aerial	9:30
Century	X	X	X	Aerial	10:30
Imperial	X	X	X	Aerial	11:30
Alondra		X	X	Freeway	14:45
Carson		X	X	Freeway	18:30
Pacific Coast Hwy		X	X	Freeway	21:15
Ports O'Call	X	X	X	Grade	25:30



Long Beach Line



LONG BEACH LINE

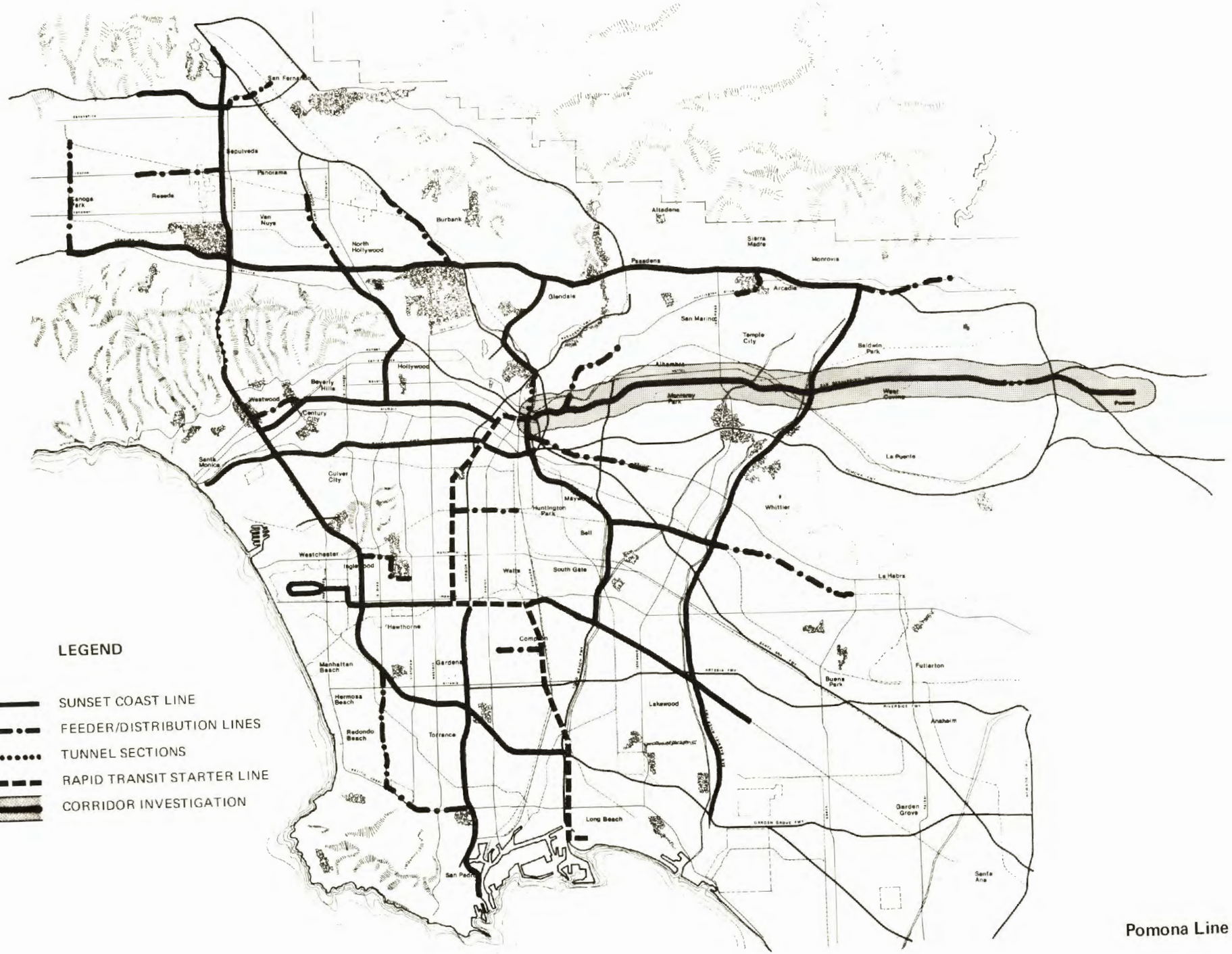
ROUTE DESCRIPTION

- This line begins at Union Station;
- here a direct connection is possible toward Glendale, Pomona, the Wilshire District, Santa Monica and South Central Los Angeles;
- the line runs south from Union Station on a structure supported above the Santa Fe Tracks along the west bank of the Los Angeles River;
- the line runs through a partial junction at the Santa Monica Freeway and turns onto a common right-of-way with the Cross-County Line along the Los Angeles River;
- the northern embankment of the river is followed to a point of tangency with the Long Beach Freeway (same as Cross-County Line);
- the Long Beach Line continues on a structure over the southbound lanes of the Long Beach Freeway onto the median of the freeway;
- the alignment continues to the south past the simple switching junction, where the Cross-County Line turns to the east;
- south of Randolph Avenue the Central Line continues on a structure over the freeway to an interline junction with the International Airport Line, where it ends.
- traffic to Orange County is facilitated either by this alignment or by a combination of service along the Santa Ana Branch and the Starter Line to downtown.
- This line is 11.30 miles in length, 4.73 of which is common with the Cross-County Line.

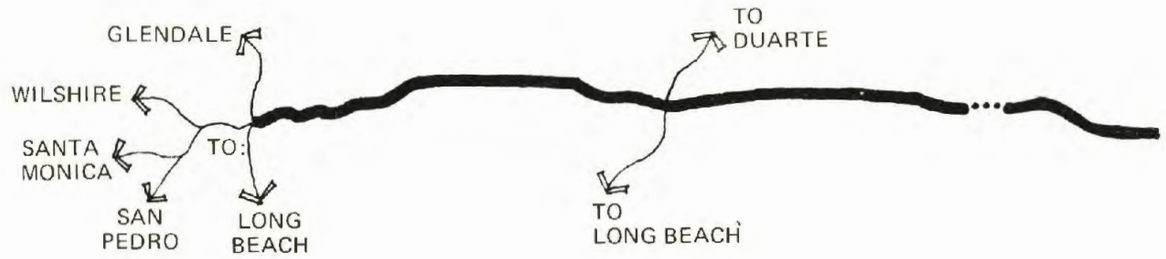
STATIONS

Locations and types of stations for this line are listed below:

Stations	Access			Station Type	Travel Time From Union Station
	Bus	K&R	Park		
Union Station	X		X	Multi-Level	0:00
Soto Street	X			Aerial	3:15
Cross County Line (Randolph)					6:45
Florence Avenue	X	X	X	Freeway	7:30
Firestone Blvd.	X	X	X	Freeway	8:34
Imperial Highway	X	X	X	Freeway	10:00
Airport Line					11:30


LEGEND
SUNSET COAST LINE
FEEDER/DISTRIBUTION LINES
TUNNEL SECTIONS
RAPID TRANSIT STARTER LINE
CORRIDOR INVESTIGATION
San Fernando
Sepulveda
Panorama
Reseda
Van Nuys
Burbank
North Hollywood
Altadena
Sierra Madre
Monrovia
Pasadena
Glendale
Arcadia
San Marino
Temple City
Baldwin Park
Alhambra
Hollywood
Beverly Hills
Westwood
Century City
Monterey Park
West Covina
La Puente
Santa Monica
Culver City
Huntington Park
Whittier
Bell
Westchester
Inglewood
Watts
South Gate
La Habra
Hawthorne
Compton
Manhattan Beach
Gardena
Fullerton
Buena Park
Hermosa Beach
Lakewood
Anaheim
Redondo Beach
Torrance
Garden Grove
Long Beach
San Pedro
Santa Ana

Pomona Line



POMONA LINE

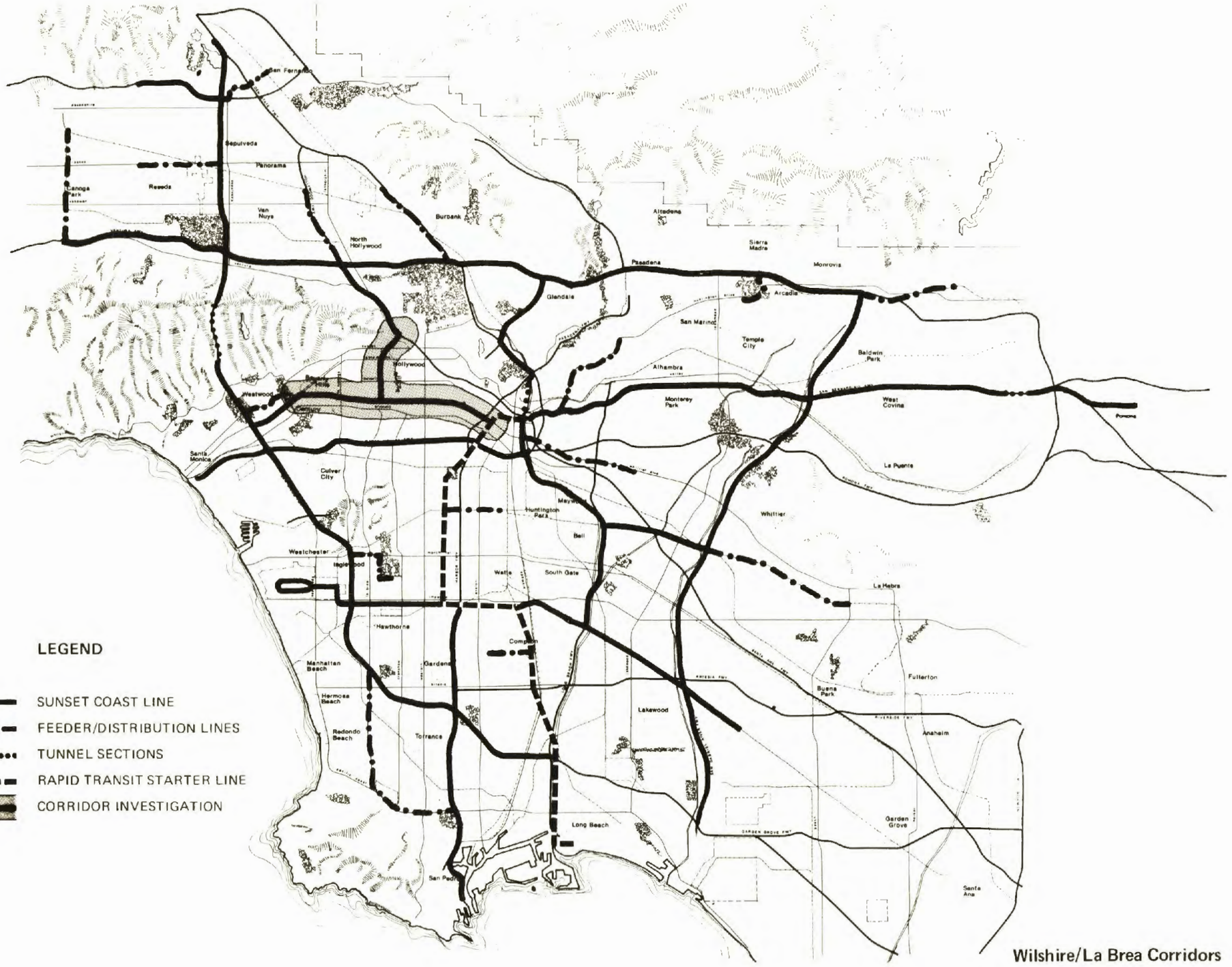
ROUTE DESCRIPTION

- This line begins on the upper level of the Union Station plaza;
- a vertical connection is made to the subway alignments as well as the intercity commuter trains at the grade level of Union Station;
- the line runs north from Union Station and immediately turns on a tight radius curve to the east over the Los Angeles River;
- the tracks enter the El Monte Busway near the intersection of Macy and Mission Streets;
- the alignment continues to the east at grade on the busway itself;
- through a simple switching spur, a stub-end terminal is provided at the existing El Monte Shops from the freeway alignments;
- the main line continues, however, at grade on the interior lanes of the San Bernardino Freeway through an interline rail junction with the San Gabriel River Line;
- the at-grade construction continues to the east to approximately Holt Avenue;
- to reduce the grades over Kellogg Hill, a tunnel section of 2-1/4 miles in length is bored as a twin-tube section through the hill;
- the Pomona Line continues east from the eastern portal through the interchange of the San Bernardino, Orange, Foothill and Corona Freeways, following the Corona Freeway to the southeast;
- the line turns east on a structure from the Corona Freeway adjacent to the Southern Pacific Tracks into downtown Pomona;
- a common station facility is provided between the Sunset Line and the Amtrak Station at Garey Avenue where the line ends.
- This line is 28.13 miles in length.

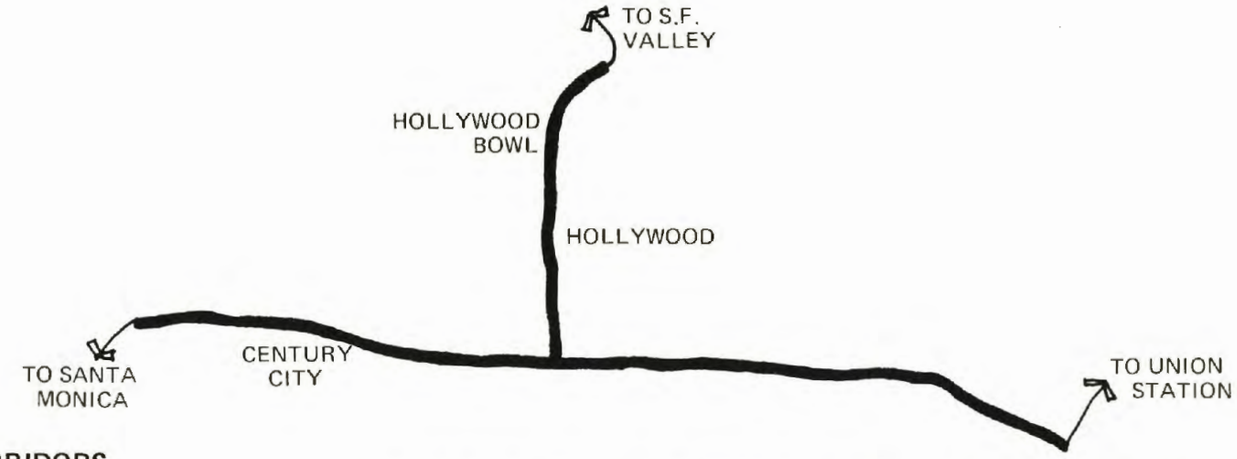
STATIONS

Locations and types of stations for this line are listed below:

Stations	Access			Station Type	Travel Time From Union Station
	Bus	K&R	Park		
Union Station	X		X	Multi-Level	0:00
County Hospital	X		X	Freeway	1:15
Cal State L. A.	X		X	Freeway	3:30
Garfield	X	X	X	Freeway	6:15
San Gabriel	X	X	X	Freeway	8:00
El Monte	X	X	X	Grade	10:30
San Gabriel Ri. Frwy		X	X	Freeway	13:00
Sunset Avenue		X	X	Freeway	16:45
Citrus Avenue		X	X	Freeway	19:30
Garey Avenue		X	X	Grade	27:30



Wilshire/La Brea Corridors



WILSHIRE/LA BREA CORRIDORS

Provision is being made through the County-Wide project for solution of the travel needs in the Wilshire and La Brea Corridors. Originally these two corridors were part of the City-proposed rapid transit Starter Line project.

The resolution of the controversy surrounding the Starter Line project was to build the first route with UMTA and local gas tax funds from Union Station under downtown Los Angeles, along Vermont Street to the proposed Century Freeway Corridor, east in the median of this freeway to the Willowbrook Branch of the Southern Pacific and south along the Willowbrook Line to the Los Angeles River. At this point the Starter Line would run adjacent to the Los Angeles River to Third Street in Long Beach, where it would turn east to the proposed transportation center in downtown Long Beach.

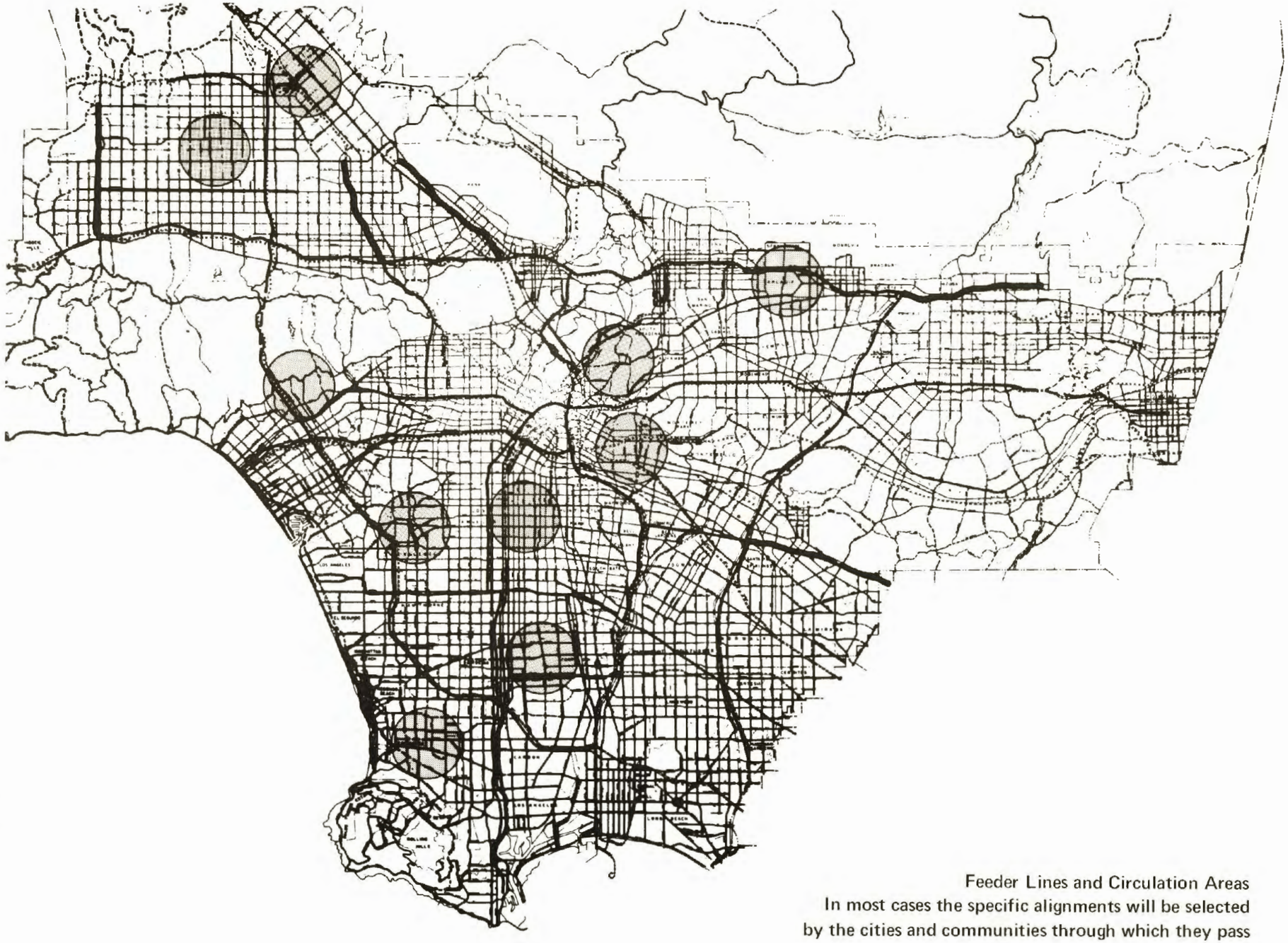
Accompanying the decision to build this route as the initial Starter Line with the Federal transit funds is the fact that the Wilshire Corridor now is to be built as part of the County-Wide plan.

The County-Wide project does not provide sufficient funds for tunnels, except where mandatory by steep grade problems and the northern inaccessibility of Union Station. The reason for this decision is to keep the unit cost per mile to a level which will allow for the deepest deployment of the system to the greatest number of people within the County.

Therefore, in keeping with this decision, an allocation of twelve million dollars ($12 million) per mile, plus the cost of stations, $3 million per station, has been assigned to both the Wilshire and La Brea Corridors. These funds apply to the pathway beginning at the end of the Century City Line at the Beverly Hills border, and running easterly along Wilshire Boulevard to its connection with the Starter Line at 7th and Flower Streets, a distance of 9.09 miles. Also, funds have been accorded at the rate of twelve million dollars ($12 million) per mile, plus the cost of stations, for a connection from the Hollywood Bowl Line southerly along La Brea Avenue to the Wilshire district. The funds allocated to the project will allow for construction of an aerial guideway much like that being deployed elsewhere in the system.

Several possibilities exist for deployment of such a system within these corridors. Although Wilshire Boulevard is probably inappropriate for such a facility, converting 6th Street to one-way traffic and building an aerial structure over part of that route would be a distinct possibility. Similar opportunities exist along the La Brea approach as well.

Another possibility is for the City of Los Angeles to create special taxing districts, which would utilize the County funds as "seed" money at the rate of approximately 50% to generate the additional funds needed to build a subway in both of these corridors. Still another approach is that of deploying a monorail group rapid transit system along each of the rights-of-way as described. The lower cost of these systems (approximately 50% of that of the large car systems) would allow the City of Los Angeles to add additional mileage where transit services are needed. An example of this might be to extend the Wilshire Line up to Sunset Boulevard, east along Sunset to Vermont, and south along Vermont, passing the hospitals and L. A. City College, to a connection with the Starter Line at the USC Campus.



Feeder Lines and Circulation Areas
In most cases the specific alignments will be selected
by the cities and communities through which they pass

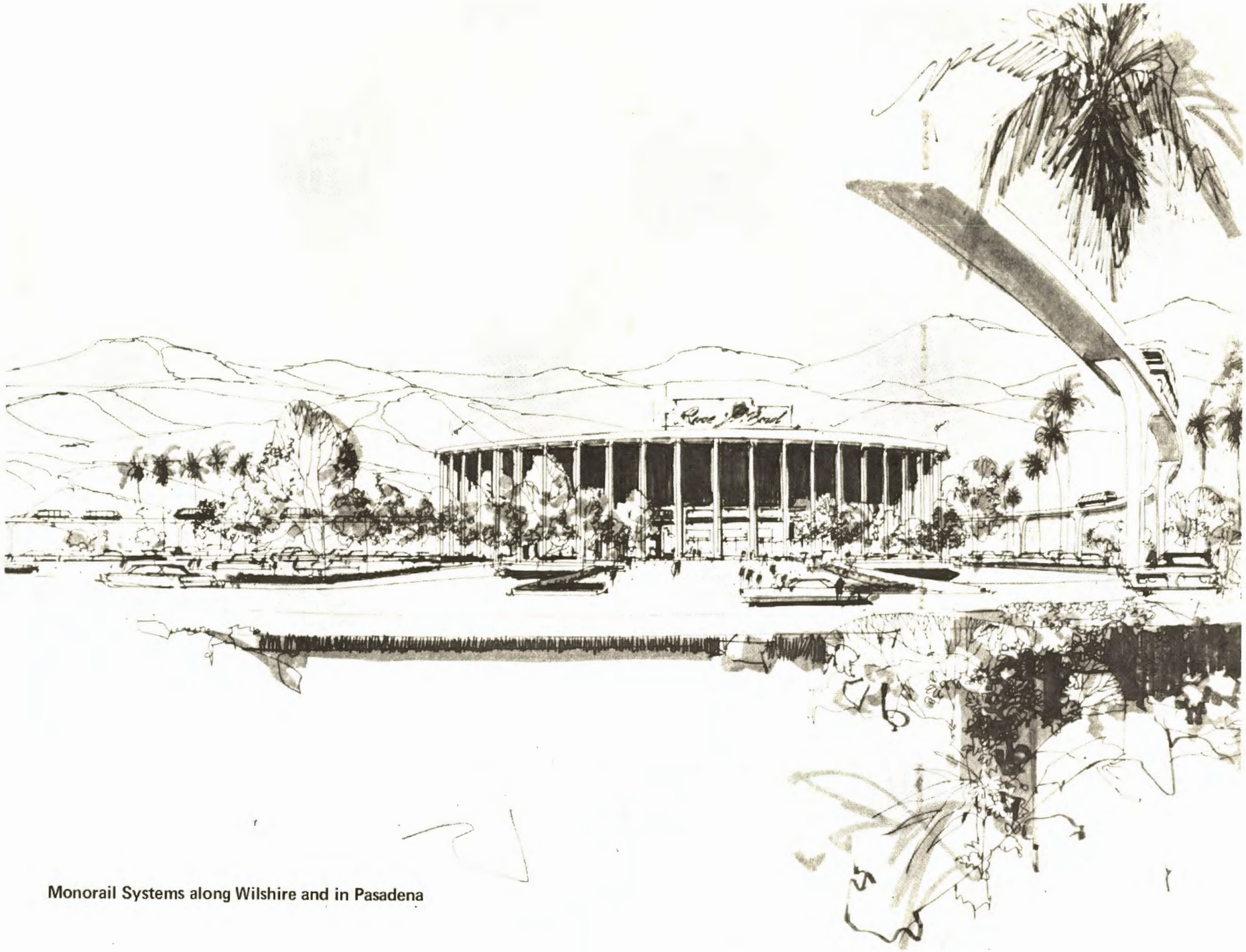
FEEDER AND DISTRIBUTION SYSTEMS

The Light Rail feeder system to the Sunset Main Line would utilize standard gauge rail construction in which dual-powered cars could operate on turbine power. Upon entering the Main Line, they would switch from turbine power to third-rail contact for propulsion. Due to the unique power capabilities of this equipment, the cars could continue system-wide after entering from the feeder lines. Obvious locations for the development of feeders to the Main Line would include an extension in the San Gabriel Valley of the Inter-Valley Line to the east of Duarte into the communities of Azusa and Glendora. Another example would be an extension of the Cross-County line from Pico Rivera through Whittier to the Orange County Line, and a third example would be provision of service to the Ventura Freeway from Chatsworth along the Burbank branch of the Southern Pacific, adjacent to Canoga Avenue. Others include service into North Hollywood and through Burbank.

Monorail (Group Rapid Transit) systems are characteristically designed with branching routes and serve groups of people traveling with similar origins and destination. These systems generally have bypass tracks that allow through vehicles to pass while other vehicles are stopped at a station. This switching capability allows the Monorail systems to provide service on a variety of routes, much like buses, but without the delays from traffic congestion.

Monorail systems can be developed to augment the Heavy Rail Main Line and provide a broad range of services in major activity centers as well. These services include a variety of schedules for peak period use and on-demand service at times of low activity. An important consideration is the potential of the Monorail system to evolve in both capacity and versatility. A relatively simple closed loop system, or segment system, could be installed and later expanded. With proper planning, off-line stations could be added and headway reduced, without major alterations to the basic guideway network.

Examples of the concept of distribution systems from the Main Line which would utilize the Monorail/GRT technology would include the following: The South Bay area of Hawthorne and Torrance, the El Sereno district, San Fernando, Northridge, East Los Angeles, West Covina, and the downtown of Los Angeles.



Monorail Systems along Wilshire and in Pasadena

WHITTIER

capital cost

unit cost development

In direct response to the planning efforts by the Southern California Rapid Transit District in 1968 and in 1973, and the subsequent efforts surrounding the Rapid Transit Starter Line Proposal, there has been a great deal of planning and engineering work which has yielded a finely grained set of unit costs for planning purposes. Planning and engineering analyses by the major consulting firms in the Country and by the local agencies in the Los Angeles region, including the Southern California Association of Governments, Southern California Rapid Transit District, Orange County Transit District, City of Los Angeles, the Chamber of Commerce and the County of Los Angeles, have produced an up-to-date range of unit costs for the categories described below. It has been our policy to use the highest cost estimated in each of the categories.

RIGHT OF WAY

This cost category normally contains the estimated cost for acquisition of public and private properties along the transit alignments. But since the vast majority of the alignments for this system are along publicly held rights of way, such as freeways and flood control channels, the acquisition costs have been held to an absolute minimum. The only private property which would be used for transit alignment would be a limited amount of railroad right of way property. It is our intention to pay easement fees to the railroads to allow for the construction of aerial guideways on their right of way. Since the County has begun preliminary negotiations with the railroads for those easements, it would not be appropriate at this time to detail precisely the amount of money we would be prepared to pay for these rights. However, a dollar figure which we believe will be acceptable to the railroads has been included in the cost estimations for those sections utilizing their property.

WAY AND STRUCTURE

This category includes the cost of tunnels, ventilation structures and equipment, aerial structures, other special structures, earthwork, retaining walls, landscaping, drainage facilities, fencing and all related construction items.

TRACKWORK

This includes the provision of ballast, ties, tie plates, and all other ancillary facilities requisite to the construction of the tracks on the roadbed or structure.

UTILITY RELOCATION

Costs included in this category are for the relocation of electrical, water, telephone and all other public and private utilities which are above and underground and would interfere with either excavation for tunnel sections or above ground work.

ELECTRIFICATION

This cost category includes all the requisite facilities and equipment necessary to carry the electrical power from the power source to the vehicle. The power distribution system is by a contact third rail providing 650 volts nominal direct current.

CONTROL AND COMMUNICATIONS

Included in this category are all those costs of electrical and electronic facilities and equipment required to provide direct communication from the control center to the rail vehicles and for providing the system control features. This system would provide electronically operated wayside block signals with the automatic train stop as an override provision. Also included is provision for computerized car locater system, centralized signal override control, and car communications. Unlike the Bay Area Rapid Transit System, the proposed facility for Los Angeles would not provide the automatic train operation (ATO) type of operation. This more sophisticated electronic control feature might be employed by the Sunset Coast Line at some future date, when a higher reliability factor can be guaranteed.

STATIONS

This category provides a standard level of investment for each rapid transit station by virtue of its right-of-way characteristics. The cost estimate for stations assumes an interesting, well designed architectural treatment for each type of station. Ample provision has been made for the major civil work required for freeway stations. Every station, either at grade or on an aerial structure, provides amenities for the handicapped and elderly, including escalators and elevators.

VEHICLES

The cost of vehicles for this system includes the base cost of building (with controls), taxes, delivery and installation in the system and a contingency and escalator clause apart from that of the system construction as a whole.

YARDS AND SHOPS

Included in this cost item are the rail storage facilities, the major rebuilding shops, the minor car repair facilities and all associated buildings and equipment, as well as the rail-borne maintenance vehicles for servicing, repairing and maintaining the right-of-way and revenue vehicles.

PARK-AND-RIDE

This category provides a level of investment to accommodate the improvement of existing parcels of land dedicated by the various communities as Park-and-Ride for the station stops along the line. The improvement includes the grading and surfacing of the land and the installation of lights, fencing and entry gate mechanisms. There is no provision in this cost category for the acquisition of the land.

PRE-OPERATION EXPENSES

Included in this category is the expense of training all operating and maintenance personnel, including the development of operational and maintenance manuals and policies. Included also is the development of necessary computer software and hardware, and the establishment of an operating management system, including the normal ancillary personnel requirements, such as labor relations, personnel and retirement functions.

Pre-operation expenses also provide for the testing of computer hardware, signalization coordination, and vehicle operation and the development of operational specifications.

PROJECT MANAGEMENT, ENGINEERING AND DESIGN

These costs include the project administration, detailed planning, preliminary and final engineering design, preparation of construction plans and specifications, control surveying, soil investigation, construction management and inspection, general procurement and other related professional services. Generally a figure of 15% of facilities costs accounts for the engineering and management total (for park and ride improvements a figure of five percent for engineering and management has been calculated).

In the case of monorails, discussions with vendors indicate that the systems which will serve as feeders to the Sunset Coast Line will require a small engineering and management fee, based upon the simplicity of designing in systems of this type. A level of 12 1/2 percent is used for engineering and management in these feeder systems.

CONTINGENCY

Inasmuch as all cost figures in this report have been taken from the highest range of current cost estimates, based on the present state of the art in construction technology and associated equipment prices and conditions, it is considered that a sum of 15 percent of the basic construction cost will provide for unknown and unanticipated conditions. This contingency factor has been applied to all line construction, including shops and yards, and the monorail feeder system.

ESCALATION

Based upon the experience of the recent trends in price escalation, a factor of ten percent per year is used as a multiplier to increase the cost associated with construction and materials acquisition for the building of the Sunset Line.

The percentages for project management and engineering, contingency and escalation, and the elements to which they are applied, are illustrated in the following equation. The equation provides a mechanism for interpreting the method in which the cost summary has been developed.

COST SUMMARIZATION EQUATION

$$LC \times E \times C \times I\,(5.0) = \Sigma\, LC$$

$$S + Y \times E \times C \times I(2.5) = \Sigma\, S + Y$$

$$V \times C \times I(2.5) = \Sigma V$$

$$PR + RW \times E \times C \times I(2.0) = \Sigma\, PR + RW$$

$$RT = \Sigma\, LC + \Sigma(S + Y) + \Sigma\, V + \Sigma(PR + RW) + PO + CBD$$

$$GRT = LC \times E(12.5\%) \times C \times I(4.0)$$

$$GT = \Sigma\,(RT + GRT)$$

Where:

LC = Line Costs
S = Shops
Y = Yards
V = Rail Cars (8% inflation escalation)
PR = Park-and-Ride
RW = Right-of-Way
(5% engineering/ management, or contingency)
PO = Pre-Operation
CBD = Central Business District allocation.
RT = Heavy Rail Rapid Transit System
GRT = Group Rapid Transit Feeder System
GT = Grand Total
E = Engineering and Management (15%)
C = Contingency (15%)
I = Inflation Escalation (averaged over 2 1/2 years from $\Sigma\, S + Y$, and $\Sigma\, V$ averaged over 5 years from Σ LC and PR + RW)

TRANSIT SYSTEM UNIT COSTS USED FOR THIS REPORT

	Metro ($ Millions)
I. WAY/STRUCTURE	
A. Bored Tunnel	
Tunneling	$ 24.6
Trackwork	.98
Electrification	1.7
Controls/Communications	1.2
Cost per route/mile	$ 28.4
B. Cut-and-Cover	
Tunneling	$24.4
Trackwork	.98
Electrification	1.7
Controls/Communications	1.2
Utility relocation	5.0
Cost per route/mile	$33.2
C. Aerial Structure (single)	
Structure	$ 7.5
Trackwork	.98
Utility relocation	2.0
Electrification	1.7
Controls/Communications	1.2
Cost per route/mile	$13.3
D. Aerial Structures (dual)	
Structures	$11.5
Trackwork	.98
Electrification	2.3
Utility relocation	4.0
Controls/Communications	2.6
Cost per route/mile	$21.3
E. Grade (no freight)	
Grading $	N.A.
Trackwork	
Electrification	
Controls/Communications	
Cost per route/mile	N.A.
F. Grade (Freight R-O-W) no relocation	
Grading	N.A.
Trackwork	
Electrification	
Controls/Communications	
Cost per route/mile	N.A.
G. Grade (Freight R-O-W) no relocation	
Grading	N.A.
Trackwork	
Electrification	
Controls/Communications	
Cost per route/mile	N.A.
H. Street Median	
Structure	N.A.
Trackwork	
Utility relocation	
Electrification	
Controls/Communications	
Cost per route/mile	N.A.
I. Street Operation	
Structure	N.A.
Trackwork	
Utility relocation	
Electrification	
Controls/Communications	
Cost per route/mile	N.A.
J. Sloped Cut	
Grading	$ .7
Landscaping	.3
Trackwork	.98
Utility relocation	5.0
Electrification	1.7
Controls/Communications	1.2
Cost per route/mile	$ 9.8
K. Retained Cut	
Excavation/Structures	$ 8.0
Trackwork	.98
Utility relocation	2.0
Electrification	1.7
Control/Communications	1.2
Cost per route/mile	$13.8
L. Retained Embankment	
Grading/Fill	$ 6.9
Trackwork	.98
Electrification	1.7
Utility relocation	2.0
Controls/Communications	1.2
Cost per route/mile	$12.7
M. Sloped Embankment	
Grading/Fill	$ .8
Landscaping	.03
Trackwork	.98
Electrification	1.7
Utility relocation	2.0
Controls/Communications	1.2
Cost per route/mile	$ 6.9
N. Freeway Lanes	
Trackwork	$ .5
Fencing	.2
Concrete Severance	.03
Electrification	1.7
Controls/Communications	1.2
Cost per route/mile	$ 3.9
II. STATIONS	
Subway – Mined – Major	$ 9.0
Subway – Mined – Minor	6.0
Aerial (on structure)	
Major	3.0
Minor	1.5
Grade – Center Platform	1.5
– Side Platform	–
Freeway Alignment	5.0
III. SITE SPECIFIC	
Main Shop	$17.0
Storage Yards @	5.0
Crossovers	.3
Grade Crossing Protection	N.A.
Overpasses @	Site Specific
Park-and-Ride (improvements only)	.005
IV. VEHICLES	
Third Rail	$ .5 (BART)
Overhead Caternary	.5 (Erie Lackawanna)
Third Rail/Caternary	.8 (New Haven)
Gas Turbine/Electric	1.0 (Est.) (Long Island)

transit construction costs

The various elements of the County-wide rapid transit system have been costed upon the basis of interagency estimates of cost for the various starter line proposals. These cost figures have been contributed by and generally agreed to by the City of Los Angeles, the County of Los Angeles, the RTD, Southern California Association of Governments, Caltrans, and the various private engineering firms that have been called in by the above groups for consultation on specific costs and techniques.

Table 2 summarizes the key elements of the Heavy Rail system and its Light Rail and Monorail feeder/distribution systems. Shown also is a summary of the construction cost, as distinguished by each of the Heavy Rail alignments, the Light Rail and Monorail feeder lines and the fiscal provisions made for the Wilshire/La Brea Corridors including the downtown Los Angeles Distribution System.

The method of calculation was illustrated previously in the cost summary equation, as discussed under Unit Cost Development. Substituting monetary values into that equation, the actual line construction cost, as well as costs for vehicles, shops and yards, park-and-ride, right-of-way, feeder systems, pre-operations and the Central Business District distribution system, is calculated and summarized in Table 3 .

OPTION: MAXIMUM FREEWAY
HEAVY RAIL TRANSIT CHARACTERISTICS

Miles of Line*:	229.99	Stations*:	89
Aerial:	34.48	Aerial:	21
Aerial/Frwy:	89.43	Freeway:	64
Subway:	7.18	Grade:	4
Grade/Frwy:	93.98	Subway:	0
Embankment:	4.92		

Overpasses:	8
Vehicles:	1060
Max. Speed:	85 mph
Avg. Speed:	58.1 mph

FEEDER LINE TRANSIT CHARACTERISTICS

Miles of Line:	51.69	Stations:	102
Aerial:	51.69	Aerial	102
		**Transfer:	15

Vehicles:	620
Max. Speed:	55
Avg. Speed:	30

TOTAL SYSTEM MILES –	281.68
TOTAL SYSTEM STATIONS*** –	191

*Includes Wilshire/La Brea
**Monorail transfer to heavy rail transit line
***Includes double facility at transfer points.

Table 2

Table 3

COST SUMMARY
(Line Costs — In Millions)

Engineering and Management @ 15% (of $2658.44) = $3057.20
Contingency @ 15% = $3515.78
Escalation @ 10%/yr. (5 yr) = $5660.40

A. LINE COSTS — TOTAL = $5660.40

Shops $35.0 — Yards $50.0
TOTAL $85.0
Engineering and Management @ 15% = $97.75
Contingency @ 15% = $112.41
Escalation @ 10%/yr. (2.5 yr) = $140.51

B. SHOPS/YARDS — TOTAL = $ 140.51

Rail Cars 1000 @ $ .420 = $420.0
60 @ $ .845 = $ 50.7
TOTAL $470.7
Contingency @ 15% = $541.3
Escalation @ .08%/yr. (2.5 yr) = $649.56

C. RAIL CARS — TOTAL = $ 649.56

Park-and-Ride $50.0 (Improvements Only) — Right-of-Way $45.76
TOTAL = $95.76
Engineering and Management @ 5% = $100.54
Escalation @ 10%/yr. (2 yr) = $120.64

D. RIGHT-OF-WAY/PARK-RIDE — TOTAL = $ 120.64

E. RAPID TRANSIT SYSTEM (A+B+C+D) — TOTAL = $6592.40

F. PRE-OPERATIONS — TOTAL = $ 25.0

G. CBD DISTRIBUTION — TOTAL = $ 50.0

H. SUB-TOTAL (E+F+G) — $6571.11

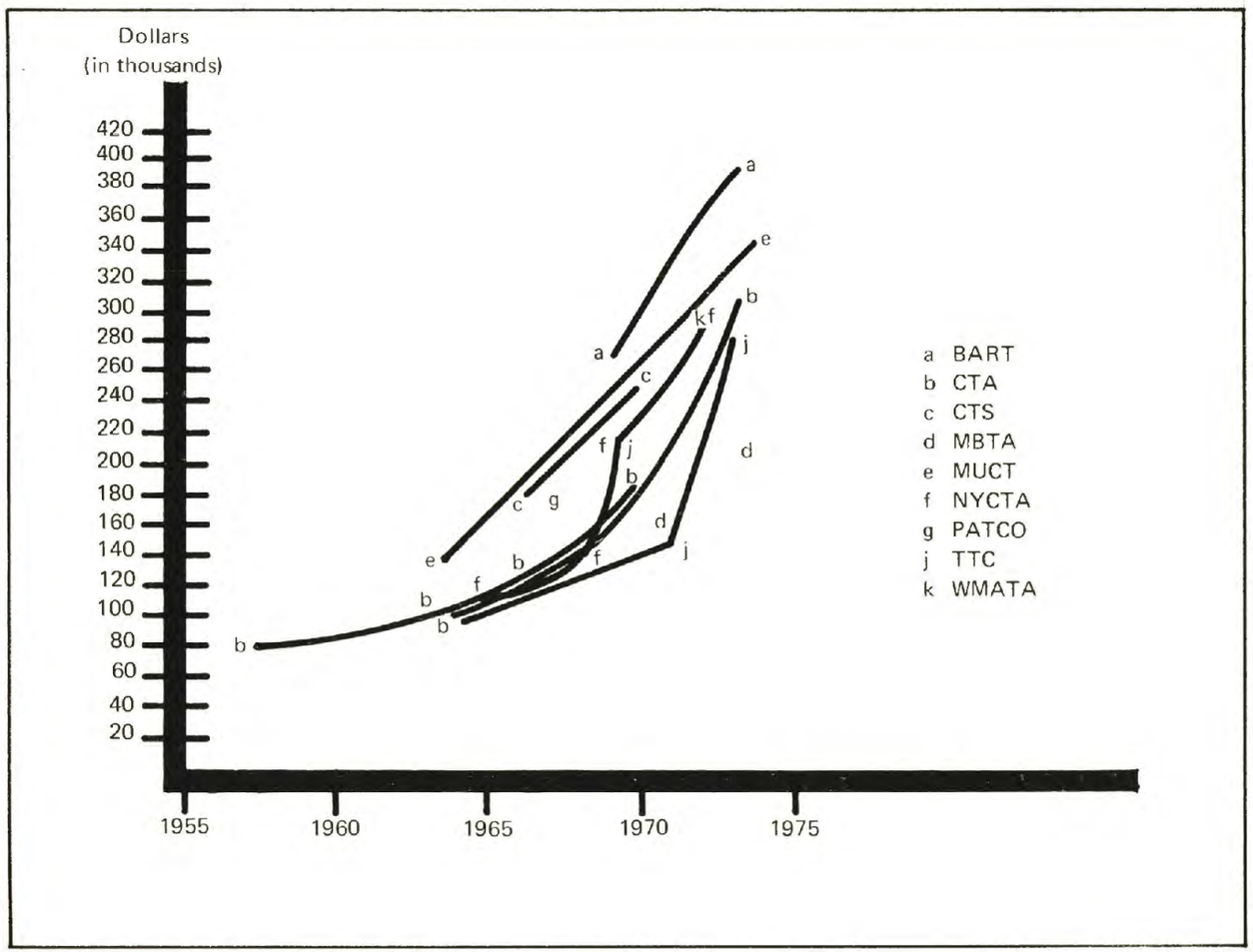
GRT Feeder System = $273.46
Engineering and Management @ 12.5% = $314.47
Contingency @ 15% = $361.64
Escalation @ 10%/yr. (4 yr) = $506.29

I. GRT FEEDER SYSTEM — TOTAL = $ 506.29

J. GRAND TOTAL (Rapid Transit + Feeder System) (H + I) — $7152.40

SUMMARY BY ROUTE

		(1975) ($ Millions)
1.	Valley/Long Beach Line	$ 622.14
2.	Inter-Valley Line	462.44
3.	Hollywood Bowl Line	53.00
4.	San Gabriel River Line	121.44
5.	Century City Line	33.35
6.	Cross County Line	295.62
7.	International Airport Line	212.24
8.	Central Line	236.93
9.	Long Beach Line	191.62
10.	Pomona Line	226.57
	Sub-Total	$2455.35
W-1	Wilshire Corridor	$ 148.60
W-2	La Brea Corridor	54.49
W-3	Central Business District	50.0
	Sub-Total	$ 253.09
LRT-1	Chatsworth	$ 17.79
GRT-2	Northridge	8.40
GRT-3	San Fernando	12.40
LRT-4	North Hollywood	13.93
LRT-5	Burbank	7.45
GRT-6	Compton	8.93
GRT-7	Torrance	50.75
GRT-8	El Sereno	24.86
GRT-9	East Los Angeles	18.41
LRT-10	Whittier	35.80
LRT-11	West Covina-Glendora	28.86
GRT-12	Hollywood Park	14.92
GRT-13	Westwood	10.52
GRT-14	Santa Anita	9.92
GRT-15	South Central	10.52
	Sub-Total	$ 273.46
	GRAND TOTAL	$2981.90



Graph 6 — Rapid Transit Car Cost Escalation

rail vehicle cost estimation

RAIL VEHICLE COST ESTIMATIONS

The estimate of costs for rail cars for the Sunset Coast Line is based upon a interpolation of previous car costs and upon a forecast of the indices for price escalation. Graph 6 illustrates the relationship of cost escalation over time based upon all car orders since 1956. These are shown by operating property in such a way as to illustrate how successive orders for the same properties have increased over time.

Based upon a review of car cost research, an estimate of $420,000 per car (1975) is allowed for the Airporter, Interurban, and Local Service cars. An estimate of $845,000 is used for a small order of domed cars which would provide bilevel seating as previously discussed in the section under Vehicles. A further definition of cost for transit vehicles is provided in the preceding section either under Transit Construction Costs or Unit Cost Development.

capital cost for monorail (group rapid transit) feeder system

The generic classification of transit systems known as monorails, or group rapid transit systems, covers a particularly broad range of technology, physical construction requirements, and the like. Due to this broad spectrum of possibilities, the cost estimates for this element of the Sunset line has been based upon one particular Monorail (GRT) system, in order to provide a comprehensive and rational set of numbers.

The development of this particular cost estimate has been made in conjunction with the manufacturer of the particular system described. This however in no way implies that a Monorail (GRT) system has been decided upon for the Sunset Coast Line and it is anticipated that after passage of the tax measure further analyses of many such systems will be made before any selection. One of the virtues of the feeder or distribution technology is that such systems at various locations do not necessarily need to be compatible with each other — thus creating a climate in which two or more types of systems may be developed from the most promising proposals.

The following is a cost breakdown for the construction of a typical mile of the feeder system selected for initial evaluation.

UNIT COSTS

	Cost/2-way mile ($ Millions)
Guideway	$ 3.70
Prestressed concrete girders, precast columns, top beams, switches, other components	
Vehicles	.48
Drive unit, body, security, etc.	
Stations	.60
Vehicle Control System	.20
Vehicle components, control facility, fixed signal cable	
Security and Fare Collection	.20
	S 5.18/mile*

*Summarized in Total System Costs

SANTA MONCIA

operations

patronage

We have said the Sunset Line provides immediate accessibility, within one and one-half miles of the line, to 74 percent of the population of the County.

The total population serviced within a three mile corridor (as shown on Page 64) is 5,190,000, according to the Population Research Section of the Los Angeles County Department of Regional Planning. This means that 74% of the County's population lives within one and one-half miles of a transit line. In addition, 2,900,000 — or 90% — of the total jobs in the County are within one and one-half miles of a transit line in the Sunset system.

Service is also provided to 84 high schools, 18 community colleges, 13 colleges and universities, 18 major amusement facilities and regional parks, 41 major hospitals and medical facilities, 18 principal auditoriums and stadiums, 44 major shopping centers and 3 major airports.

It is estimated that an operational fleet of 1000 vehicles on this system could carry a theoretical total of 5.04 million passengers per day. This computation is based on the following:

METHOD OF ESTIMATING RIDERSHIP

A detailed analysis of the previous ridership studies for the 1968 and 1974 ballot proposals, as well as the 1967 Origin and Destination Study (LARTS), has been made. This analysis has provided valuable data and permitted the following assumptions:

1. The average trip length for work trips in Los Angeles County is 10.2 miles.
2. The average trip time will be 15-20 minutes.
3. The maximum load per car during rush hour is 200 passengers.
4. The traffic distribution flow, average County-wide, is a 70% — 40% directional mix. That is, cars will average 70% operating capacity in one direction with a 40% operational capacity in the opposite direction during the same period.
5. Each transit vehicle will have the average operating capacity of two trips in each direction on any given line during any three hour peak period, based upon the average trip length.

Given these assumptions, preliminary calculations indicate a maximum passenger capacity during each of the peak hour periods of 1.68 million person trips. The operational assumptions provide for more than a 40/50% nonpeak hour usage of the System.

Thus, given these assumptions, the capacity of a 1,000 transit vehicle operational fleet, will be 5.04 million passengers per day. Under actual operating conditions this figure will be reduced by a number of factors.

Because of the size of the System (281 miles), none of the current computer models has the capacity to analyze this system configuration. A new computer analysis will be required for preparation of system operation studies.

The final patronage figures will require a detailed study of the transit mode shifts occasioned by a county-wide rapid transit network, as well as an operational analysis projecting car miles.

operating cost

It has been assumed that the first 25 mile segment of Main Line track will have become operational by 1982. For that opening year, we have estimated operating costs to the extreme, at $40 million. Our financial program (as shown in the Financial Model), at 1/4 of 1% sales tax, has reserved $90 million for 1982 operations. The $50 million balance can be converted immediately to construction capital for that year, further reducing the bond draw in 1982.

In each successive year, approximately 45 miles of additional track would be placed in service. However, the cost ratios will begin to reduce sharply, and will average out to approximately $1 million per mile of Main Line track.

The conservative Financial Model shows that by 1987 (when the 230 miles of Main Line and 15 miles of Light Rail feeder extensions should be in full use), $263 million will be available for operational costs.

All of these above funds are from sales tax sources only, and do not include passenger revenue available from the flat 25 cent fare.

The minimum income from passenger fares, based on a weekday-average-usage of 80% of the 1000 car capacity, and 20% capacity on weekends, is estimated conservatively at $2,025,000 per week. This will provide over $100 million annually in additional operational funds for support of the Monorail feeder systems, which are expected to cost approximately $30 million per year.

The balance of the passenger revenue can be used for additional vehicles and construction of route

extensions as required.

The basic Main Line $1 million per mile operational costs break down as follows:

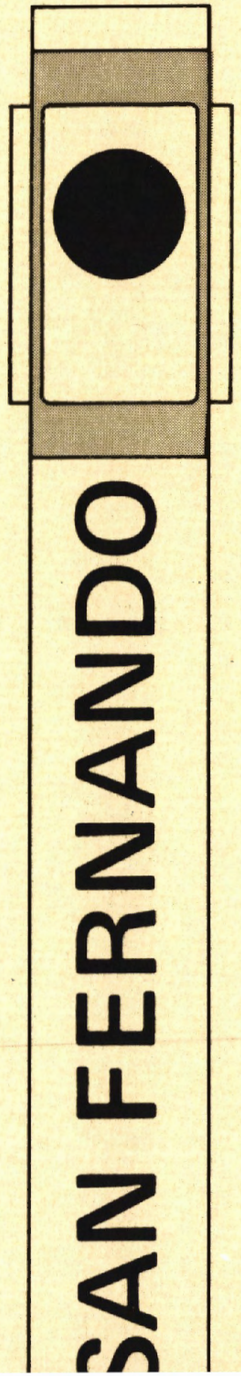
Transportation	29%
Maintenance of Structures and rights-of-way	25%
Vehicle Maintenance	18%
Administrative and general costs	14%
Electrical	10%
Insurance	4%

The above figures include station maintenance, which will average about $75,000 per station.

Although Local and Red Car Interurban fares are fixed at a flat 25 cents, the Airporter trains are considered as a premium service, with attendants provided, and fares should range from a $1 minimum to a $2.50 maximum, depending on the length of the trip.

When compared with other non-rail types of airport service, the Airporter trains offer a value in excess of $2.50. However, these trains are in direct competition with the Local trains that also provide LAX transfer service at only the 25 cent fare. Thus, Airporter patronage could decrease if the surcharge became excessive.

Even at these reduced rates (and considering the pay-scale of attendents, plus the factor of low-density seating), the Airporter trains will become the most profitable individual operation on the Sunset system.



financial program

financing and the economics of rapid transit

THE AUTHORITY

The Public Utilities Code of the State of California, Sections 30820, et seq., and 30830, et seq., grant to SCRTD the power to place before the voters two separate one-half cent sales taxes. With an affirmative vote from the people, the sales tax may be collected. The first one-half cent (PUC 30820) may be used for capital costs in the construction of a rapid transit system. It also entitles the District to incur bonds for such construction. The second one-half cent (PUC 30830) may be used for both capital construction and the operating costs of the rapid transit system. None of the money may be used for the purchase of buses or general operating expenses of SCRTD.

THE REVENUES

The revenues received from the total one cent sales tax during its first year will be $283 million. This sum increases annually over the course of the entire period of construction and operation of the system, as shown in figure A.

For purposes of calculating the annual increases in revenues from the sales tax, the Los Angeles County Auditor/Controller's Office has determined that 6.4 percent represents a conservative average annual percentage increase. This percentage is the average increase in State taxable transactions for the period 1950 to 1974.

A similar compounded average for the County of Los Angeles taxable transactions during the base period would produce a 6.8 percent average annual percentage increase. The most conservative of the two figures has been used for our projection of revenues.

In economic terms, a 6.4 percent increase represents the equivalent of a 3.2 percent real growth rate in the local economy and a similar inflation rate. It is believed that these figures are highly conservative, both in terms of the inflation factor and in terms of real growth.

The application of this percentage growth rate over the course of the years 1977 through 2016 is shown in Figure A-1.

ESTIMATED REVENUE FROM SALES TAX

Year	Taxable Transactions in L.A. Co. & Cities* in millions	Revenue in millions	Year	Taxable Transactions in L. A. Co. & Cities*	Revenue in millions
1974	$ 23,549	$ —	1995	86,648	433,240
1975	25,056	—	1996	92,193	460,965
1976	26,660	—	1997	98,093	490,465
1977	28,366	283,660	1998	104,371	521,855
1978	30,181	301,810	1999	111,051	555,255
1979	32,113	321,130	2000	118,158	590,790
1980	34,168	341,680	2001	125,720	628,600
1981	36,355	363,550	2002	133,766	668,830
1982**	38,682	290,115	2003	142,327	711,635
1983	41,158	308,685	2004	151,436	757,180
1984	43,792	328,440	2005	161,128	805,640
1985	46,595	349,463	2006	171,440	857,200
1986	49,577	371,828	2007	182,412	912,060
1987**	52,750	263,750	2008	194,086	970,430
1988	56,126	280,630	2009	206,508	1,032,540
1989	59,718	298,590	2010	219,725	1,098,625
1990	63,540	317,700	2011	233,787	1,168,935
1991	67,607	338,035	2012	248,749	1,243,745
1992	71,934	359,670	2013	264,669	1,323,345
1993	76,538	382,690	2014	281,608	1,408,040
1994	81,436	407,180	2015	299,631	1,498,155
			2016	318,807	1,594,035

*Growth rate in Taxable Transactions was compounded at a rate of 6.4% annually.

**Reflects diversion of 1/4 of 1% in years 1982-1986 and 1/2 of 1% in years 1987 forward for operation of system.

Figure A

ESTIMATED REVENUE FOR BONDS

Figure A-1

Year	Estimated Amount of Sales Tax Collections in millions	Estimated Interest Earnings at 7.5% Yield on Funds in Excess of Debt Service Reqmts. in millions	Estimated Annual Revenue in millions
1977	$ 283,660	$ –	$ 283,660
1978	301,810	33,410	335,220
1979	321,130	47,101	368,231
1980	341,680	61,709	403,389
1981	363,550	75,844	439,394
1982*	290,115	83,130	373,245
1983	308,685	90,707	399,392
1984	328,440	99,373	427,813
1985	349,463	106,936	456,399
1986	371,828	110,097	481,925
1987**	263,750	105,827	369,577
1988	280,630	100,101	380,731
1989	298,590	92,892	391,482
1990	317,700	84,177	401,877
1991	338,035	73,933	411,968
1992	359,670	58,393	418,063
1993	382,690	44,314	427,004
1994	407,180	31,916	439,096
1995	433,240	21,443	454,683
1996	460,965	13,164	474,129
1997	490,465	7,375	497,840
1998	521,855	4,408	526,263
1999	555,255	873	556,128
2000	590,790	938	591,728
2001	628,600	1,292	629,892
2002	668,830	567	669,397
2003	711,635	1,198	712,833
2004	757,180	1,915	759,095
2005	805,640	5,272	810,912
2006	857,200	16,123	873,323
2007	912,060	38,621	950,681
2008	970,430	73,230	1,043,660
2009	1,032,540	122,368	1,154,908
2010	1,098,625	184,407	1,283,032
2011	1,168,935	263,828	1,432,763
2012	1,243,745	359,571	1,603,316
2013	1,323,345	471,449	1,794,794
2014	1,408,040	602,031	2,010,071
2015	1,498,155	752,886	2,251,041
2016	1,594,035	926,474	2,520,509

*1/4 of 1% diverted for operations beginning in 1982 **1/2 of 1% diverted for operations beginning in 1982

The 6.4 percent was calculated by dividing $1.94081 billion by $30.10516 billion. Dollar figures were determined through a statistical computation and analysis of the state taxable transactions for the 25 year period from 1950 through 1974. $1.94081 billion is the average annual trend increase in state taxable transactions or the statistical average of each annual increase or decrease over the 25 year period. $30.10516 billion is the statistical dollar volume of state taxable transactions for the midpoint (1962) of the 25 year period. By dividing the average annual increase ($1.94081) by the midpoint transaction volume ($30.10516) average annual percentage increase (6.4 percent) is calculated.

The method of least squares is the statistical method used.

The mathematical model established for purposes of this calculation recognizes the fluctuations both in growth and inflation over a projected period of time. The 25 year history of the rate of change in taxable transactions as shown in Figure B reflects such fluctuations. For the purposes of the mathematical model, such fluctuations are not calculated. The percentage of change statewide has fallen below the projected 6.4 percent increase in only seven of the last 25 years (from 1950 through 1974).

BONDING CAPACITY AND THE EFFECTS OF INFLATION

For purposes of the calculation of available revenues and the bonding capacity of the proposed SCRTD bond issue, a mathematical model has been established, assuming $500 million in bond issuance for each year during the fifteen years of construction. The actual rate of issuance will be affected by the flow of construction and national economic factors. It is projected that the amount of indebtedness incurred in any given year will more closely resemble a skewed bell curve, with lower levels of indebtedness in years 1 through 3 and years 14 and 15.

The $7.5 billion projection shown in Figure C reflects the greatest possible bonded indebtedness required. That is, it assumes double digit inflation for the life of the project. The project costs $4.72 billion in 1976 dollars; it is axiomatic that any decrease in the rate of inflation over the years would dramatically reduce both the final cost of the system and number of bond dollars required for financing.

It is assumed that authorization for the entire $7.5 billion in bonded indebtedness should be obtained on the ballot in order to cover the

ESTIMATED TAXABLE TRANSACTIONS
BASED ON STATE BOARD OF EQUALIZATION'S
RECORD OF PERCENTAGE INCREASE
FOR YEARS 1950 THROUGH 1974

Year	Percentage of Change	Estimated Amount in millions
1950*	13.1	$12,258
1951	10.0	13,484
1952	6.7	14,387
1953	6.2	15,279
1954	no change	15,279
1955	17.6	17,968
1956	7.1	19,244
1957	4.3	20,071
1958	(-1.9)	19,690
1959	15.6	22,762
1960	2.5	23,331
1961	2.7	23,961
1962	8.3	25,950
1963	7.4	27,870
1964	8.5	30,239
1965	5.4	31,872
1966	7.3	34,199
1967	2.6	35,088
1968	11.1	38,983
1969	8.6	42,336
1970	2.0	43,183
1971	8.3	46,767
1972	14.6	53,595
1973	14.9	61,581
1974	10.3	67,924

*Base Year

Figure B

DEBT SERVICE REQUIREMENTS

Year	Bond Issue	Amount of Bonds Issued	Principal Payments	Interest Payments	Total Debt Requirement
1977	1	$500,000,000	$ —	$ —	$ —
1978	2	500,000,000	100,000,000	40,000,000	140,000,000
1979	3	500,000,000	100,000,000	72,000,000	172,000,000
1980	4	500,000,000	90,000,000	104,000,000	194,000,000
1981	5	500,000,000	100,000,000	136,800,000	236,800,000
1982	6	500,000,000	100,000,000	168,800,000	268,800,000
1983	7	500,000,000	90,000,000	200,800,000	290,800,000
1984	8	500,000,000	70,000,000	233,600,000	303,600,000
1985	9	500,000,000	80,000,000	268,000,000	348,000,000
1986	10	500,000,000	135,000,000	301,600,000	436,600,000
1987	11	500,000,000	100,000,000	330,800,000	430,800,000
1988	12	500,000,000	100,000,000	362,800,000	462,800,000
1989	13	500,000,000	100,000,000	394,800,000	494,800,000
1990	14	500,000,000	100,000,000	426,800,000	526,800,000
1991	15	500,000,000	100,000,000	458,800,000	558,800,000
1992			150,000,000	490,800,000	640,800,000
1993			150,000,000	478,800,000	628,800,000
1994			150,000,000	466,800,000	616,800,000
1995			150,000,000	454,800,000	604,800,000
1996			150,000,000	442,800,000	592,800,000
1997			150,000,000	430,800,000	580,800,000
1998			150,000,000	418,800,000	568,800,000
1999			200,000,000	406,800,000	606,800,000
2000			200,000,000	390,800,000	590,800,000
2001			250,000,000	374,800,000	624,800,000
2002			325,000,000	354,800,000	679,800,000
2003			375,000,000	328,800,000	703,800,000
2004			450,000,000	298,800,000	748,800,000
2005			500,000,000	262,800,000	762,800,000
2006			495,000,000	222,800,000	717,800,000
2007			445,000,000	183,200,000	628,200,000
2008			400,000,000	147,600,000	547,600,000
2009			335,000,000	115,600,000	450,600,000
2010			305,000,000	88,800,000	393,800,000
2011			230,000,000	64,400,000	294,400,000
2012			185,000,000	46,000,000	231,000,000
2013			160,000,000	31,200,000	191,200,000
2014			120,000,000	18,400,000	138,400,000
2015			80,000,000	8,800,000	88,800,000
2016			30,000,000	2,400,000	32,400,000

Figure C

"worst case" projection of the inflationary spiral. Given a projected inflation rate of ten percent, it is less expensive to mortgage the system with six to seven percent municipal bonds than it is to pay for extra years of inflation under a pure pay-as-you-go program.

(It should be noted that while the inflation rate projected for this cost estimate is ten percent, the increase in sales tax revenues has been assumed to be 3.2 percent per annum. This inconsistency reflects our policy of conservative projection reflected throughout this proposal:

- construction costs have been estimated at the highest levels
- revenues at the lowest levels.

In fact, the most recent [January, 1976] projection of inflation for long-term construction projects is 8.5 percent, as established by the *Engineering News Record,* which is the Standard and Poor's Index for heavy construction cost estimating.)

Given proper project administration, the full authorization bond figure should not have to be drawn in any case. The construction timetable will permit a flexible scheduling of individual projects in such a manner as to minimize the burden of a shifting inflationary economy. Further, a constant review of the bonding market during the entire construction period will make it possible to use current or banked revenues at times when bonding is least cost effective.

Finally, it should be noted that the revenues projected from the sales tax do not reflect the effect of the infusion of $500 million a year (with its concomitant employment multiplier) into the local economy. It is probable that the combination of high employment in the local economy along with the increased investment of outside funds as a result of the bonding issue – will produce an increase in sales tax revenues, thus further reducing the dependence on bond dollars. Because these economic benefits will be strictly local in nature, they should not adversely affect the national inflation picture, and therefore, should not increase the real cost of the system.

FINANCING OPERATIONS

Under the authority established in PUC 30830, et seq., the second one-half cent sales tax may be used for both capital and operational expenses for this system. The construction and financing projections assume that limited sections of the system will be operational by January, 1982. For that purpose, one-fourth of one percent of the total revenue will be diverted from capital outlay to system operational costs, beginning on that date.

Five years later, in January, 1987, the mathematical model provides for diversion of the total of one-half of one percent for purposes of system operation. This will provide a total of $96,695,000 in 1982 for initial operations and will increase in a sliding scale to $263,750,000 in 1987 for continued operations. The available operational dollars are shown in Figure D.

ESTIMATED REVENUE FOR OPERATIONS

Year	Estimated Amount of Sales Tax Collections for Operations (in millions)
1977	–
1978	–
1979	–
1980	–
1981	–
1982 Sales Tax at ¼ of 1%	$ 96,695
1983	102,885
1984	109,469
1985	116,476
1986	123,930
1987 Sales Tax at ½ of 1%	263,750
1988	280,630
1989	298,590
1990	317,700
1991	338,035
1992	359,670
1993	382,690
1994	407,180
1995	433,240
1996	460,965
1997	490,465
1998	521,855
1999	555,255
2000	590,790
2001	628,600
2002	668,830
2003	711,635
2004	757,180
2005	805,640
2006	857,200
2007	912,060
2008	970,430
2009	1,032,540
2010	1,098,625
2011	1,168,935
2012	1,243,745
2013	1,323,345
2014	1,408,040
2015	1,498,155
2016	1,594,035

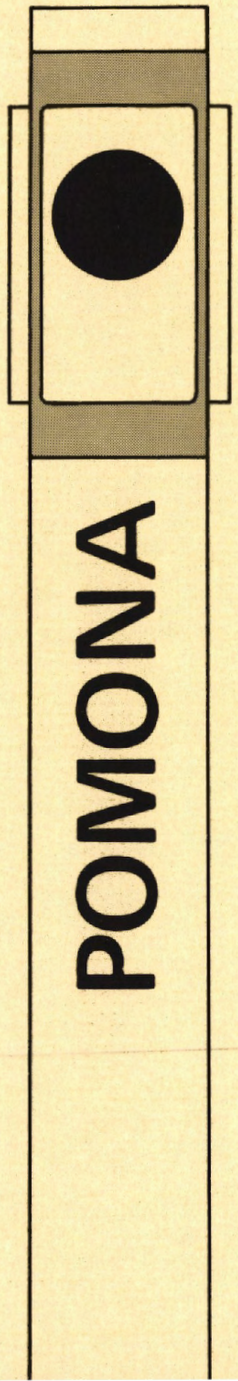
Figure D

PROJECTED CASH FLOW
PROPOSED SCRTD BOND ISSUE

Year	(1) *Revenue in millions	(2) Available Funds (Col. 1 + Col. 6) in millions	(3) Debt Requirement in millions	(4) Balance (Col. 2 – Col. 3) in millions	(5) Interest on Balance at 7.5% in millions	(6) Retained Revenue (Col. 4 + Col. 5) in millions
1977	$ 283,660	$ 283,660	$ –	$ 283,660	$ –	$ 283,660
1978	301,810	585,470	140,000	445,470	33,410	478,880
1979	321,130	800,010	172,000	628,010	47,101	675,111
1980	341,680	1,016,791	194,000	822,791	61,709	884,500
1981	363,550	1,248,050	236,800	1,011,250	75,844	1,087,094
1982	290,115	1,377,209	268,800	1,108,409	83,130	1,191,539
1983	308,685	1,500,224	290,800	1,209,424	90,707	1,300,131
1984	328,440	1,628,571	303,600	1,324,971	99,373	1,424,344
1985	349,463	1,773,807	348,000	1,425,807	106,936	1,532,743
1986	371,828	1,904,571	436,600	1,467,971	110,097	1,578,068
1987	263,750	1,841,818	430,800	1,411,018	105,827	1,516,845
1988	280,630	1,797,475	462,800	1,334,675	100,101	1,434,776
1989	298,590	1,733,366	494,800	1,238,566	92,892	1,331,458
1990	317,700	1,649,158	526,800	1,122,358	84,177	1,206,535
1991	338,035	1,544,570	558,800	985,770	73,933	1,059,703
1992	359,670	1,419,373	640,800	778,573	58,393	836,966
1993	382,690	1,219,656	628,800	590,856	44,314	635,170
1994	407,180	1,042,350	616,800	425,550	31,916	457,466
1995	433,240	890,706	604,800	285,906	21,443	307,349
1996	460,965	768,314	592,800	175,514	13,164	188,678
1997	490,465	679,143	580,800	98,343	7,375	105,718
1998	521,855	627,573	568,800	58,773	4,408	63,181
1999	555,255	618,436	606,800	11,636	873	12,509
2000	590,790	603,299	590,800	12,499	938	13,437
2001	628,600	642,037	624,800	17,237	1,292	18,529
2002	668,830	687,359	679,800	7,559	567	8,126
2003	711,635	719,761	703,800	15,961	1,198	17,159
2004	757,180	774,339	748,800	25,539	1,915	27,454
2005	805,640	833,094	762,800	70,294	5,272	75,566
2006	857,200	932,766	717,800	214,966	16,123	231,089
2007	912,060	1,143,149	628,200	514,949	38,621	553,570
2008	970,430	1,524,000	547,600	976,400	73,230	1,049,630
2009	1,032,540	2,082,170	450,600	1,631,570	122,368	1,753,938
2010	1,098,625	2,852,563	393,800	2,458,763	184,407	2,643,170
2011	1,168,935	3,812,105	294,400	3,517,705	263,828	3,781,533
2012	1,243,745	5,025,278	231,000	4,794,278	359,571	5,153,849
2013	1,323,345	6,477,194	191,200	6,285,994	471,449	6,757,443
2014	1,408,040	8,165,483	138,400	8,027,083	602,031	8,629,114
2015	1,498,155	10,127,269	88,800	10,038,469	752,886	10,791,355
2016	1,594,035	12,385,390	32,400	12,352,990	926,474	13,279,464

*Revenue = Sales tax of 1% for first 5 years, 3/4 of 1% for next 5 years and 1/2 of 1% thereafter. – 1/4 of 1% in years 1982 - 1986 and 1/2 of 1% from 1987 thereafter to be used for operation of system.

Figure E



environmental considerations

environmental impact of the sunset coast line

INTRODUCTION

Earlier studies for Los Angeles area rapid transit ballot measures have provided little or no substantial data relating to a comparatively recent requirement in U.S. urban life — the environmental impact report.

However, the Clean Air Act of 1970, AB 69, the California Environmental Quality Act, the Environmental Protection Agency (EPA) and the Friends of Mammoth Decision by the California State Supreme Court, all require the filing of environmental impact studies before construction on a rapid transit system can begin.

The Sunset Coast Line has been designed, in large part, with these requirements in mind. If is our belief that the Sunset system will effectively reduce smog and other air pollution levels, will reduce — rather than increase — ambient sound levels, and will provide a dramatic reduction in energy consumption for travel. Every effort has been made to minimize the visual impact of the guideways. The travel corridors and distribution centers of the system have been selected to provide an affirmative effect on land use and development, rather than increase the urban sprawl that has characterized the development of the Los Angeles basin.

Further, the policy of utilizing existing transportation corridors and allowing local communities and cities to make the decisions as to where stations and distribution systems should be located within their jurisdictions, will tend to localize the environmental questions.

For example, a high-speed rail line passing through a city on a freeway should not produce a negative impact on the community in terms of noise or visual considerations. In fact, with the addition of noise barriers along the freeway (which have been included in the cost of this system) the sound level of the freeway should decrease slightly. The sound levels produced by the electrical powered trains, with their resilent-lined wheels and cushioned tracks (refer to the earlier section on sound level characteristics) will be favorably offset by a reduction in automobile traffic.

The primary local impact then, will be centered in the area of the particular city's station location and attendant parking facilities. It is here that local decisions, made with local community needs and values in mind, will be the most satisfactory.

A policy of providing for specific environmental statements relating to specific jurisdictional requirements, as in the above example, will also provide a beneficial side effect: construction on the over-all system can continue without pause even if development in particular locations is delayed while consensus on local environmental criteria is sought.

THE CONSTRUCTION PHASE

In many cases the primary negative impact of transit development occurs during the construction of the system. In some cities underground — cut and cover — subway work has disrupted travel and business patterns for the better part of a decade. Aboveground, condemnation proceedings and destruction of existing structures for the creation of new transit corridors has had a disruptive influence ranging from simple inconvenience to a serious reduction in local tax structures. The construction of massive support structures for guideways through residential areas has also added to the problems of some systems.

The layout of the Sunset system minimizes the impacts of these traditional transit development problems. Subway construction has been held to an absolute minimum and in those areas where it is unavoidable, deep-bore tunneling methods will effectively reduce surface congestion or disruption. The use of existing transit corridors or public rights-of-way almost completely eliminates the need for condemnation of private property.

Enhanced Aesthetics of Wilshire and Santa Monica Boulevards

The construction of large-scale support structures has been limited to existing transit corridors. The distribution and feeder systems which lead directly into business and residential communities are either light guideway structures or light rail systems which will produce the least possible noise and visual impacts. Wherever construction of such light guideway structures is contemplated over the medians of wide city avenues — such as the median of Hawthorne Boulevard — provision has been made for extensive planting of ground cover plants, grass and trees, which, in conjunction with the relocation of existing overhead utility structures, could soften the visual appearance of the corridors, rather than adding harshness.

TRANSIT CONSTRUCTION ON FREEWAYS, RAILROAD RIGHTS-OF-WAY AND FLOOD CONTROL CHANNELS

It is expected that the on-freeway construction, both at grade and in aerial configuration, will have a slight but not significant effect on both air pollutants and ambient sound levels. Since the bulk of construction will be performed during non-peak traffic hours with machinery specifically designed to allow a continuous flow of traffic, the extent of diverted traffic and increased congestion which would create a higher level of pollutant admissions will be held to a minimum. Obviously no impact is foreseen on soil, climate, hydrology, water quality, and vegetation as a result of on-freeway construction. The impact of construction in these corridors has already occurred and the change of mode will not otherwise affect these elements.

Similar considerations apply to construction on railroad rights-of-way and flood control channels. The nature of these rights-of-way is such that

natural vegetation has already been eliminated. In fact, subsequent construction with proper planning can improve the hydrological aspects and provide for the development of green belts along the corridors.

The specific flood control channels and railroad lines selected for preferential use in this system have been given consideration because they will produce the least noice and visual impacts on established communities.

ENERGY CONSUMPTION

The operation of the entire transit system will require electrical energy in an amount equal to approximately one to two percent of the current (1976) production for the area; a factor that can be met without the addition of new power plants.

However, the overall effect of the operation of the system will be a significant reduction in the energy needs for the Los Angeles area, especially in gasoline consumption. According to the Transit Fact Book of the American Transit Association, autos carrying 1.4 passengers achieve a level of 19 passenger miles per gallon of fuel assuming 13 vehicle miles per gallon of gasoline. Conversely, electrically driven rapid transit vehicles carrying 135 passengers achieve a level of 540 passenger miles per gallon of fuel (oil) based on an assumption of four vehicle miles per gallon, converted (at a rate of 14 kilowatt hours per gallon) into electricity. That passenger mile figure is further increased by operating transit cars in four and five car trains.

Computation of total energy savings will not be completed prior to a systems analysis which will produce an estimate of total passenger/miles for the transit system, but it is anticipated that the conservation of energy will be impressive, even considering the lower efficiency ratios achieved during off-peak travel hours.

In addition, it also is assumed that an operating County-wide transit network will greatly benefit other forms of public transportation leading to a benefical impact on the cost effectiveness of bus operations.

LAND USE IMPACT

One of the most positive benefits growing out of the construction of the system will be a limitation of further urban sprawl, and the development of interconnected commercial and residential centers (as opposed to isolated segregated clusters.) The central tendency of development will be to enhance open space preservation and to encourage business redevelopment and community recycling.

If no improvements were made to the transportation system, congestion can be expected to increase in existing activity centers. This tendency causes employers to move out, thus encouraging urban dispersal. However, a comprehensive rapid transit network will lead to a revitalization of existing centers, particularly if it is concentrated along present transportation corridors.

While a transit network relying solely on line or corridor development generally could be expected to further segregate the centers of activities, a balanced network, offering both long corridor and local circulation systems, will produce the most beneficial land use impact.

The light rail systems, and the small Monorail, or Group Rapid Transit systems augmented with increased bus grid service, will serve inter-center travel and thus encourage a balanced mix of land uses in the centers. At the same time, high-speed corridor travel will relieve much of the burden placed on Los Angeles residents, who have traditionally accepted the extra hours required by the Southern California necessity of living in one area and working or going to school in another area and seeking entertainment in yet another area of the Basin. Sunset trains will save valuable time on trips of any length.

REGIONAL ECONOMICS

The effect of the infusion of 500 million construction dollars per year for more than a decade into the economy of Los Angeles is treated in another section of this book. However, the creation of a widely available mass transit system will have numerous long range economic impacts on the region.

The development of the Sunset System will permit the Los Angeles area to remain economically sound in the event of future fuel rationing or expected major increases in the cost of gasoline. Those employment centers which, in the past, have been totally dependent on automobiles for employees and customers will remain financially secure through the construction of the system and its future feeder networks. It reasonably can be assumed that major commercial facilities will plan and include lines to the transit system as part of their future construction. The creation of these links to the Main Line will significantly reduce the requirements for parking space and the economic burden growing out of such inefficient land usage.

project management

PROJECT MANAGEMENT AND ADMINISTRATION

A basic policy inherent in the concept of the Sunset Coast Line is that the management and administration of the construction project – the largest ever financed by the residents of a single county – must be the obligation of the County of Los Angeles.

This policy has been adopted for two primary reasons:

The first (as we have stated earlier) is that a project of this magnitude must be viewed as a contract between the people and the government and that there must be a continuity of directly elected local officials accountable to the public for the development of the system, as promised on the ballot.

The second is that a project of this magnitude demands the kind of comprehensive control for program management, program planning, fiscal management, design and engineering, construction management and public agency coordination that can be achieved only by a large multi-tiered departmental effort directed by administrators responsible to the public for the cost of the system.

The County of Los Angeles is the only agency capable of fulfilling those two basic criteria.

Private sector engineering and consulting firms still will have a major role in the creation of the Sunset system. And the expertise and manpower of the SCRTD and CalTrans will be invaluable – but we also recognize the difficulties those two agencies face.

CalTrans is directed by the State Highway Commission – which is not responsible to the residents of Los Angeles County. And the RTD engineering and administration staff is expected to be fully engaged in the development of the Starter Line project.

The very size of the Sunset project dictates priorities. The single most important task in the creation of the system will be the organization of a management system capable of administering a project of this complexity. Although major consulting firms will perform much of the work, the responsibility for the development of specifications and for the control of the consultants and contractors in performing work under those specifications must rest in the hands of the administrating agency.

The San Francisco Bay Area Rapid Transit System (BART) ran into almost insurmountable problems as a result of its failure to control or to coordinate its project consultants. In the beginning, BART started with a small staff, turning the conceptualization and systems work over to consultants. However, problems began to appear when BART realized it had broken down the program into too many pieces and discovered that the BART core staff did not have the capability to coordinate all the consulting work and fit the pieces together.

Finally, the BART financial situation became so extreme that the State presumed to excercise serious controls over the development, costs and plans of the system. By that time, however, the penalties of inadequate control and conceptualization had already resulted in the partial construction of a system with major design and planning flaws.

It is clear that expectations of a similar situation here could cause difficulty in voter attitudes toward the June ballot issue.

COUNTY CAPACITY

The 80,000 person County government has the largest pool of technical and managerial skills of any public or private agency in Southern California. For example, existing County classifications include the skills of:

288 Civil Engineers
21 Electrical Engineers
7 Engineer Geologists/Geologists
25 Mechanical Engineers
18 Structural Engineers
31 Architects
9 Landscape Architects
27 Construction Project Managers
30 Construction Cost Estimators
78 Construction Inspectors
13 Contract Administrators

Above them are the managers, supervisors, administrators and other high echelon directors of County government whose year-round job is building.

The Facilities Department currently handles about $125 million per year in construction, engineering and design work. Flood Control has built 1600 miles of channels, paid for by bond issues. The County Engineer maintains a plan-check department that deals with private sector construction throughout the County. The Personnel Department maintains hiring programs and establishes work standards for 80,000 employees and has experienced administrators in labor relations and other functions relating to construction projects. The Auditor-Controller develops cost controls and accounting systems for a $3 billion annual budget.

PASADENA

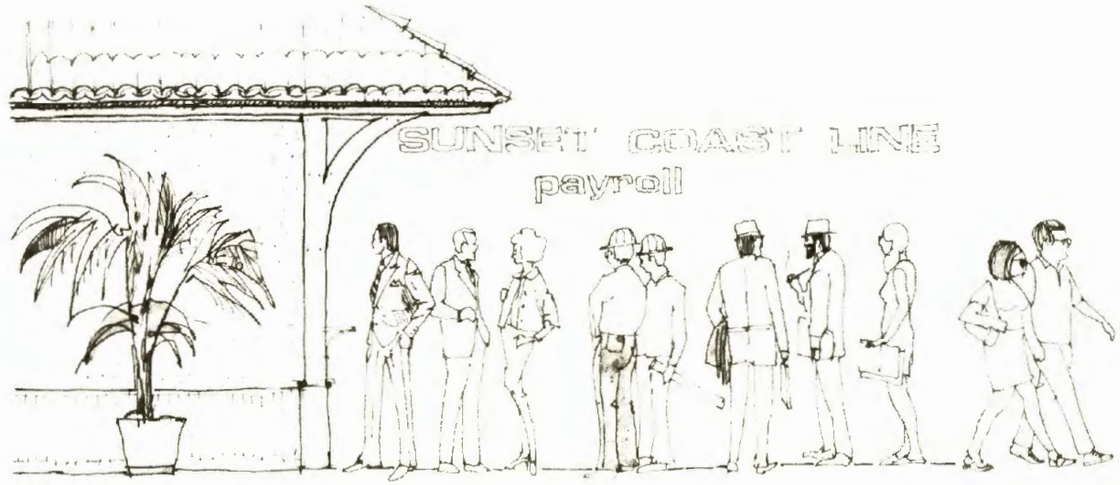
economic and social impacts

THE IMMEDIATE ECONOMIC AND SOCIAL IMPACT OF THE SUNSET COAST LINE

The construction in Los Angeles County of one of the world's largest and most comprehensive rapid transit systems will do much more than improve transportation for seven million people. The immediate effect, during the construction period itself, on the area's overall economic and social health will be highly significant.

The number of jobs created, the amount of business generated, the tax revenues produced and the government savings that will be derived, are all factors which need to be incorporated into any analysis of the cost of constructing the system.

According to the Los Angeles County Department of Personnel, the California State Personnel Board and the Federal Bureau of Economic Analysis, the infusion of $500,000,000 a year into the local economy, as a result of construction, would:



* Create more than 35,000 jobs a year
* Reduce the current overall county unemployment rate from 10.2% to 8.4%.
* Reduce the current county unemployment rate in the construction industry from 17.9% to 9.7%.
* Return $316,000,000 a year in tax revenues produced by new jobs and from savings in unemployment insurance and welfare.
* Produce $1,828,000,000 a year in gross capital formation

These conservative projections do not reflect a number of other cost benefits that accrue to a major rapid transit construction project, such as the dollar benefits to the business community resulting from the expanded purchasing power of the area's labor force.

The various departments and bureaus evaluating the economic impact of the project for this initial report have concluded that the reduction in unemployment is the single most important factor in terms of immediate return benefits.

The employment situation in Los Angeles County has not shown any sign of improvement during the last two years. Since 1973, when the rate of unemployment was 6.5 per cent, there has been a steady increase in the number of unemployed. In February of 1975, the rate jumped to 9.4 per cent and in April it reached above 10 per cent, where it generally has remained (holiday hiring resulted in a December dip to 9.6 percent, but that figure is expected to rise again in the first quarter).

Current estimates of the total number of unemployed persons in Los Angeles County range from 300,000 to 400,000. Without considering the human factor, just the financial loss to the tax payer resulting from this level of unemployment is staggering.

The construction of the Sunset Coast Line would open up more than 35,000 jobs a year – an amount equal to 10 per cent of the unemployed – and would thus make an important contribution toward stimulating overall economic growth.

The Bureau of Economic Analysis, in the U.S. Department of Commerce, has conducted recent studies on the potential impact of the construction of rapid transit systems in various areas of the country. Estimates have been based upon spending levels for the number of jobs created in each affected industry, the change in area earnings, and the gross capital formation resulting from the direct construction dollars.

According to the federal estimates, a $500 million annual spending level to construct a rapid transit system in the greater Los Angeles area would result in the creation of 35,353 jobs each year, produce $444.02 million in earnings and contribute $1.828 billion in gross capital formation (See Table F).

If half the jobs created in the area were filled by the unemployed the County's present unemployment rate would be reduced from 10.2% to 8.4%. (See table 2)

Improved employment translates into markedly increased purchasing power.

Using a family of four with yearly earnings of $12,559 (the average yearly wage of all persons working in the construction of a rapid transit system) as a norm, a total of $45,852,841 would be generated in income tax revenues and $6,858,482 in sales tax. Projected over a 15 year period, $687,793,615 in income taxes would be produced and $102,876,930 in sales taxes.

Some economists believe that for every $1 billion the government spends, $2 billion in gross national product is created. Given an effective federal tax rate of 20 percent from all sources of income, a $7.5 billion investment would create $15 billion in gross national product which would return $3 billion to the Treasury. A $500 million annual investment would produce $1 billion in gross national product and yield $200 million in federal taxes. In turn, many of these federal tax dollars would return to this area through revenue sharing.

In terms of savings in unemployment insurance and welfare costs, if half of the 35,000 jobs were given to the unemployed, $95.6 million would not have to be paid out each year in unemployment checks, and $20.5 million would be saved in the administration and payment of welfare (incuding food stamps, medical and AFCD).

This $316.1 million in immediate return on each annual $500 million spent on construction of the system is only a portion of the cost-benefit effects. Once completed, the cost-benefit ratio will actually exceed the dollars spent on the Sunset Coast Line . . . it is estimated that in the final analysis, nearly two dollars will be returned for every dollar expended.

TABLE F
ANNUAL INPUT/OUTPUT
OF $500 MILLION IN RAPID
TRANSIT CONSTUCTION

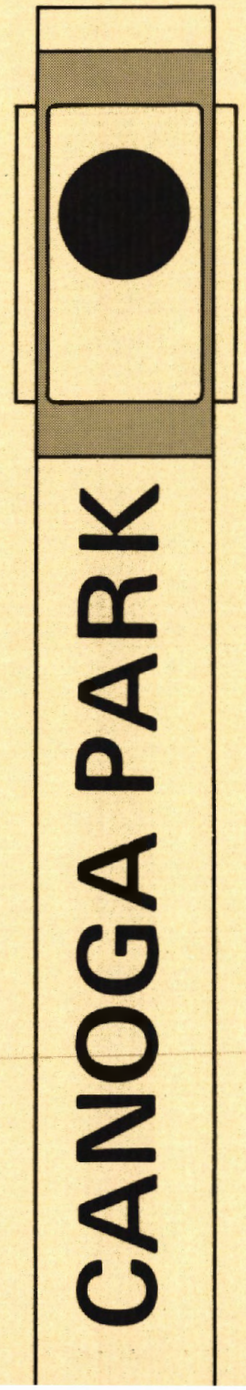
Industry	Change in Gross Output (millions)	Change in Earnings (millions)	Annual Increase in Jobs
Agriculture	$ 3.98	$ 1.15	256
Construction	543.50	157.07	10,508
Mining	5.03	.85	44
Manufacturing	304.05	72.97	5,057
Transportation, Communications and Utilities	68.45	21.29	1,552
Trade (Wholesale & Retail)	168.89	86.64	7,364
Finance, Insurance and Real Estate	61.30	9.81	498
Services	193.51	94.24	10,074
Household Industry	479.29		
TOTAL	$1,828.00	$444.02	35,353

Factors: For every 100 million invested in rapid transit construction, $365,600,000 in gross capital formation is produced.

Source: Federal Bureau of Economic Analysis, Department of Commerce

TABLE G
Impact for
Periods of 1, 5, 15 years
(Based on 1975 Dollars and Figures)

FACTOR	RESULT 1 Year	5 Years	15 Years
INCREASE OF JOBS	35,353		
Reduction in unemployment rate	10.2% to 8.4%	Same	Same
Reducation in unemployment rate in Construction Industry	17.9 to 9.7%	Same	Same
Cost/Benefit (includes welfare savings, tax revenues and increased disposable income). Assuming half of those to be employed are from ranks of the unemployed	$ 117,976,496	$ 589,882,481	$ 1,769,647,443
Income tax revenues generated by earnings	45,852,841	229,264,205	687,793,615
Sales tax revenues generated by earnings	6,858,482	34,292,310	102,876,930
Savings in unemployment insurance (half those employed were unemployed)	95,594,512	477,972,560	1,453,917,680
Gross Capital Formation	1,828,000,000	9,140,000,000	27,420,000,000
Increase in Gross National Product	1,000,000,000	5,000,000,000	15,000,000,000
Effective federal tax rate (20% from all sources of income)	200,000,000	1,000,000,000	3,000,000,000
Savings in welfare (if 20% of the unemployed who receive jobs were also on welfare).	20,545,420	102,727,100	308,181,450



january 12 addition and revision

JANUARY 12 ADDITION AND REVISION

During the course of the preparation of this rail transit proposal, it has been necessary to make certain changes in order to adjust to the dimensions of the Starter Line proposal.

As we began drawing these plans in the early fall, it was assumed then that the Starter Line dispute between the City of Los Angeles and the County of Los Angeles would remain unresolved, at least until the date of the ballot, June 6th. For that reason our initial plans and maps were drawn to allow for the possibility of a fluid Starter Line situation.

Concerned by the relationship between this proposed locally-financed 281 mile project and the Federal funding for any Starter Line that might develop, Supervisor Ward met with Urban Mass Transit Administrator Robert Patricelli in Washington, DC, on Friday, October 24, to determine the Federal viewpoint. An exchange of correspondence resulted, from which Mr. Patricelli's reply is reproduced on these pages.

The position taken by UMTA administrator Patricelli was positive and reassuring to Supervisor Ward that a region, such as Los Angeles, could develop a transit facility totally independent of Federal strings or conditions.

On November 21, 1975, representatives of the funding partners (the State of California, the County of Los Angeles, the City of Los Angeles, the City of Long Beach) met in a second session to fix the exact terminals of a Starter Line. The meeting resulted in the designation of the Long Beach to Union Station corridor as the one on which the RTD would base its application for Federal matching funds. Originally it was thought that the total of the amounts available from the four sources, when matched 4 to 1 by UMTA, would be $1 billion.

However, in the interval between the first informal funding assurances of mid-summer and that November meeting, the State contribution has been reduced by 40 percent, and there are serious indications their funding might face equally significant reductions in the months ahead.

Also, there has not been a financial commitment of any kind from the City of Los Angeles toward the Starter Line. The result of these diminishing funds indicates that, even if the Long Beach to Union Station corridor remains the final choice and is approved by Washington, DC, there will be financial difficulty in completing the line.

DEPARTMENT OF TRANSPORTATION
URBAN MASS TRANSPORTATION ADMINISTRATION
WASHINGTON, D.C. 20590

THE ADMINISTRATOR

Mr. Baxter Ward
Supervisor, Fifth District
County of Los Angeles
869 Hall of Administration
Los Angeles, California 90012

Dear Mr. Ward:

This is in response to your October 31 letter in which you discuss your proposal for locally financed development of rapid transit in Los Angeles.

Use of local funds to build a rapid transit network within the Los Angeles urban area would not prejudice future capital grant applications for Federal funds to construct additional fixed guideway segments. However, the proposed segments to be built with Federal funds would have to meet all normal capital grant requirements, including those outlined in the enclosed Proposed Policy on Major Urban Mass Transportation Investments.

I hope this information is helpful to you.

Sincerely,

Robert E. Patricelli

Robert E. Patricelli

Enclosure

(The Starter Line proposal also failed to include funds for the purchase of vehicles and further operating costs that will develop – and those missing dollars must be made available by the Los Angeles region prior to UMTA approval of the RTD grant application. These two costs, alone, are of such size that it is unlikely that they can be met by other than some extraordinary measure such as the one cent sales tax we are proposing here, which does make provision for them.)

If the City of Long Beach is not reached by the initial Starter Line, it is implied that city will withhold its contribution to Starter Line funds, and this will have the result of reducing the net money available for line construction by an additional $85 million.

Should the Starter Line route be other than from Long Beach to Union Station, the funding from Los Angeles County also would be in question, inasmuch as the financial commitment ($53 million) was based specifically on the Long Beach route. There can be no guarantee that the Board of Supervisors will provide financial support for another corridor.

Obviously, the Starter Line financial situation is in serious peril.

In a letter received by the RTD January 6th, UMTA Administrator Patricelli advised that it would be valuable from the Federal standpoint if the entire Canoga Park to Long Beach corridor were examined again, including its two potential and controversial sub-corridors, Wilshire and Burbank/Glendale.

That advice prompted the RTD Board on January 12, in an emergency session called by President Byron Cook, to agree to a full alternative analysis

of the total corridor, Canoga Park to Long Beach.

The result of that analysis will not be completed until late April or early May, and must be included within any formal application to UMTA for a funding grant. While this study will attempt to satisfy the UMTA requirement for further analysis, it does not deal with another UMTA requirement for pre-application procedures, and that is confirmation of the local financing picture.

Until the State Highway Commission and the City of Los Angeles agree to specific dollar support, the RTD application will be seriously flawed, and could impair the UMTA grant.

To allow transit development to be that precarious, we consider disorderly, and we would expect serious criticism of ourselves if we had not taken steps to anticipate the problem, and develop a means to deal with it.

It is our position that a proper transit structure in Los Angeles County must include a main line through South Central Los Angeles and down to Long Beach, whether there is a Starter Line or not.

Accordingly, we recognized the need to consider these developments and to deal with them in this text. Therefore, we are adding this special section, "January 12 Addition and Revision," as a supplement to the book, which already had been prepared for printing.

Since developing our original figures and projections, and sending them out for publication, the situation of uncertainty regarding the Starter Line has caused us to rework large sections of our dollar projections and construction timetables. We have done this with the intent of now absorbing the South Central Los Angeles/Long Beach trackage as a part of this County-wide transit plan — and thus to remove it from any dependency upon the wishes of Washington, DC., or some possible lack of concensus among the funding partners for a Starter Line.

This route, therefore, will be proposed to progress as follows:

- The Starter Line alternative begins in Long Beach at Third and Pacific streets at the proposed transportation center;
- The line extends westward on an aerial structure to the embankment of the Los Angeles River;
- The line turns north, operating at grade on the embankment of the river with viaducts at the overcrossing streets;
- The line turns northwestward off the river embankment onto the median of the proposed Century Freeway;
- The line runs at grade in the median of the freeway to the Harbor Freeway;
- The line turns north onto a structure supported over either shoulder of the Harbor Freeway;
- The line runs north to a connection with the Cross-County line at the Santa Monica Freeway;
- This line is 23.71 miles in length.

Locations and types of stations for this line are listed below:

Location	Access Bus/K&R/Park			Station Type	Travel time from Union Station
Santa Monica Freeway Portal					
Exposition	X			Freeway	1:30
Slauson	X			Freeway	3:15
Manchester	X			Freeway	5:15
Imperial	X	X	X	Freeway	7:30
San Pedro	X		X	Freeway	8:15
Long Beach Blvd.	X	X	X	Freeway	11:45
Rosecrans		X	X	Grade	13:30
Willow	X	X	X	Grade	20:15
Long Beach Transportation Ctr.	X	X	X	Aerial	23:15

The cost of this extension in escalated dollars is: $688,290,000.

The result of the inclusion of the Long Beach leg now makes complete our transit picture for Los Angeles.

Yet it still leaves room for the development of a Starter Line that can work out from the hub of the system, Union Station Annex, in a subway development under downtown Los Angeles and the Central Business District to terminal or connection points that will be developed by the Starter Line funding partners, in concert with the RTD, and with approval of UMTA.

The addition of this section in the book will be noted in the ballot proposition as well, to give assurances to the residents of the County that this project is self-sufficient, and capable of providing total service to the residents who would support it.

The Sunset Coast Line