Title
When Finance Leads Planning: The Influence of Public Finance on Transportation Planning and Policy in California

Author
Taylor, Brian Deane

Publication Date
1992

UNIVERSITY OF CALIFORNIA

Los Angeles

When Finance Leads Planning:
The Influence of Public Finance
on Transportation Planning and Policy in California

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy
in Urban Planning

by

Brian Deane Taylor

1992

The dissertation of Brian Deane Taylor is approved.

Donald Chisholm

Paul Ong

Martin Wachs, Committee Chair

University of California, Los Angeles

1992

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGEMENTS

This dissertation is the culmination of several years of work and I owe a debt of thanks to many people who have helped me along the way. Each of my dissertation committee members -- Donald Chisholm, Eric Monkkonen, Paul Ong, and Donald Shoup -- took an interest in my work and offered insightful comments that helped to shape this final product. Professor Martin Wachs, my dissertation chair, gave me more time, attention, support, and encouragement than any student has the right to expect. His thoughtful and perceptive comments on my work were all the more remarkable given his hectic schedule; I had virtually free access to his time (and his office) from the day I arrived at UCLA. I have been very fortunate to have had Professor Wachs as my mentor these past three years.

My research was funded by the University of California Transportation Center (UCTC), under the directorship of Professor Melvin Webber; the timely completion of this dissertation was due largely to the generous financial support of the UCTC. Thanks also to the Charles F. Scott Foundation for fellowship support during my studies at UCLA.

This dissertation would not have been possible without the support of many others over the years. My three years of work and study with Dr. David Jones at the UC Berkeley Institute of Transportation Studies directly informed the first two sections of this dissertation; Dr. Jones' creative mind and historical approach to policy questions have greatly influenced my work. Professor Elizabeth Deakin at the UC Berkeley Department of City and Regional Planning has been tireless in her support and encouragement from the first time I stepped into her office to the present day. Probably more than he realizes, Professor

Russell Arslan at Long Beach City College profoundly shaped my views on economics and inspired me to pursue an academic career. And no professor ever pushed me harder or motivated me more than my curmudgeonly law teacher, Dr. Joseph Yoseloff at Millikan High School in Long Beach.

And finally, thanks to my family and friends for their years of encouragement and support: my parents, Bettsie and Deane, my dear friend, Kathi Jaramillo, and, most of all, my partner, Evy Blumenberg. Evy's inspiration and contribution to this endeavor has been immeasurable; without her encouragement, discipline, and tireless editing, this dissertation would undoubtedly have been many more years in the making.

VITA

Born	Long Beach, California
June 1983	B.A., Geography University of California, Los Angeles Los Angeles, California
July 1985 - January 1987	Junior Specialist Institute of Transportation Studies University of California, Berkeley Berkeley, California
May 1986	M.S., Civil Engineering University of California, Berkeley Berkeley, California
February 1987 - September 1989	Associate Transportation Planner / Analyst Metropolitan Transportation Commission Oakland, California
May 1988	M.C.P, City and Regional Planning University of California, Berkeley Berkeley, California

PUBLICATIONS

Jones, David W. and Brian D. Taylor (1987). "Mission and Mix: A Study of the Changing Staffing Requirements of the California Department of Transportation," *ITS Research Report 87-08*. Berkeley: University of California, Institute of Transportation Studies.

Taylor, Brian D. and David W. Jones (1987). "Engineering Registration in Organizational Context: A Study of the California Department of Transportation," *ITS Research Report 87-01*. Berkeley: University of California, Institute of Transportation Studies.

Taylor, Brian D. (1991). "Unjust Equity: An Examination of California's Transportation Development Act," *Transportation Research Record*, 1297, pp 85-92.

ABSTRACT OF THE DISSERTATION

When Finance Leads Planning:

The Influence of Public Finance

on Transportation Planning and Policy in California

by

Brian Deane Taylor

Doctor of Philosophy in Urban Planning

University of California, Los Angeles, 1992

Professor Martin Wachs, Chair

This dissertation examines the role that finance plays in shaping transportation planning and policy making, and concludes that the key to understanding the development of metropolitan transportation systems is found in the political negotiation and compromises made to secure public investment in those systems. The particular circumstances leading to or preventing a tax increase or appropriation for a program or project explains most of the success or failure of that program or project. Three cases from California are examined: (1) the planning and finance of urban freeways prior to 1960, (2) the shift from "freeway-first" to "multi-modal" urban transportation policies after 1960, and (3)

the development of state subsidies of public transit after 1970. Each of these cases is a significant chapter in the transportation history of California and each will show that the goals of the rational planning model have largely gone unfulfilled; in each case, the politics of finance superseded planning at the local level and policy making at the state level.

A planner is the worst kind of a person to head a state department. Their heads are in the clouds. They lack the necessary practical experience.

-- "Highway Lobbyist"
Quoted in the *Los Angeles Times*
March 1976

INTRODUCTION

Transportation planning is the sub-field of urban planning most closely associated with the city practical movement of the early 1900s. City practical, like the scientific management movement of the same era, sought to bring the powers of science and rationality to bear on the planning of cities. One of the many Progressive Era reform movements, city practical was a reaction to the deplorable living and working conditions in cities, political corruption in local government, and the inability of the earlier city beautiful movement to materially improve either the efficiency of, or equity within cities.[1] The modern planning profession, with its emphasis on rational planning, emerged largely from the city practical movement, and many of the early leaders of the city practical movement -- Harland Bartholomew, Charles Cheney, and Frederick Law Olmstead -- were noted transportation planners.[2]

One reason that transportation planning was a central part of the city practical movement and the professionalization of planning was that transportation was the most empirical of the planning sub-fields. Many early urban transportation planners were civil engineers by training, and the first

---

[1] The city beautiful movement was largely the work of architects and urban designers around the turn of the century. Most closely associated with the work of urban designer Daniel Burnham, city beautiful emphasized form over function; the movement attempted to improve city life through more aesthetic design of public spaces -- imposing civic centers, grand boulevards, and ornamental park.

[2] For historical overviews of the city practical movement, see Richard Foglesong, *Planning the Capitalist City*, Princeton: Princeton University Press, 1986; Peter Hall, *Cities of Tomorrow*, New York: Basil Blackwell, 1988; or Donald Krueckeberg, *Introduction to Planning History in the United States*, New Brunswick: Center for Urban Policy Research, 1987.

urban traffic models were borrowed from physics and hydraulics. Other sub-fields of planning, such as housing and park planning, were far less empirically based. Thus, of any part of planning, the science of transportation planning offered hope to the reformers of the Progressive Era that urban transportation could be improved and the waste and corruption of urban politics could be tamed.

But urban transportation facilities -- be they streets, highways, subways, or buses -- are among the largest and most visible public expenditures, and they profoundly shape urban form. The political stakes in such investments are high; too high for elected officials to relinquish control over them to planners. Indeed, the apolitical promise of the rational planning model is a direct threat to local political power. To locally elected officials -- city council members, county supervisors, state legislators, or Congress members -- urban transportation investments are anything but apolitical. Thus, the transportation planning process is most politicized at the point when financial commitments are made by elected officials.

This dissertation examines the role that finance plays in shaping transportation planning and policy making. The focus on finance is based on the premise that transportation plans and policies are not formulated and implemented, rather they are negotiated and financed. Many plans are made, but interchanges and tunnels do not get built without funding. This research argues that the key to understanding the development of metropolitan transportation systems is found in the political negotiation and compromises made to secure public investment in those systems. The particular circumstances leading to or

preventing a tax increase or appropriation for a particular program or project explains most of the success or failure of that program or project. In other words, finance leads planning.[3]

The sections that follow examine three case studies: (1) the planning and finance of urban freeways prior to 1960, (2) the shift from "freeway-first" to "multi-modal" urban transportation policies after 1960, and (3) the development of state subsidies of public transit after 1970. Each of these cases is a central chapter in the transportation history of California and each will show that the goals of the rational planning model have largely gone unfulfilled; in each case, the politics of finance superseded planning at the local level and policy making at the state level.[4]

Part One argues that years of metropolitan expressway planning by urban planners was superseded by funding negotiations in Sacramento and Washington during the 1930s, 1940s, and 1950s that profoundly altered the course of metropolitan freeway planning and development. These negotiations largely

---

[3] The definition of planning can range from premeditated action in the broadest sense, to the processing of building permits at a city zoning desk in the narrowest sense. Clearly, academics, federal regulators, state highway engineers, environmental activists, regional planners, city traffic engineers, and community organizers all do transportation planning. The purpose here, however, is to examine urban transportation planning as an established part of government. From this institutional perspective, planning is defined rather narrowly. Urban transportation planning is assumed to be the conception and development of urban transportation systems -- such as streets, freeways, and public transit -- by professionals associated with the mainstream planning profession under the auspices of local (municipal, county, and regional) governments.

[4] Policy is used here to describe the formally adopted programs and procedures of states and the federal government intended to direct the planning and development of urban transportation systems. For example, Part Three examines a 1971 California tax program intended to subsidize the operations of financially troubled public transit operators in Los Angeles and San Francisco; such policy making is, in effect, urban transportation planning at the state level.

cut local government and urban planning out of freeway planning and development by making state highway departments responsible for all metropolitan freeway development. In turn, the freeways built by state highway departments were (1) too large to fit easily into cities, (2) in networks too sparse to adequately disperse urban traffic, and (3) were financially separated from property taxation which insured that metropolitan freeways would be difficult to finance on an ongoing basis.

Part Two argues that California stopped building metropolitan freeways, not because of state policy decisions in the mid-1970s, but because the freeway program began running out of money in the 1960s. This occurred because the highway finance program established during the 1950s to fund ambitious plans for freeways could pace neither the rapid escalation of freeway costs nor the growth in vehicle travel. Inflating construction unit costs, the upscaling of freeway designs, rapidly increasing right-of-way costs, increased maintenance load, and expanded environmental costs combined to drive up freeway costs beginning in the mid-1960s. And California's status as a "donor state" in federal highway finance, a growing vehicle travel/fuel use gap, and static highway tax rates combined to slow the growth of revenues for freeways at about the same time. Rising costs and lagging revenues combined to curtail freeway development prior to the adoption of "anti-freeway" policies in the 1970s, and in spite of the adoption of "pro-freeway" policies in the 1980s.

The transition in the 1970s from freeway-centered policy to transit-centered policy in California is the subject of Part Three, which argues that efforts to subsidize central city public transit in California were largely unsuccessful and

have resulted in the proliferation of lightly patronized suburban transit service in California. The built-in suburban bias of the largest transit subsidy program in California is the result of partisan compromises made to secure passage of the program in 1971; compromises to assuage a Republican governor opposed to new taxes and to include the interests of rural and suburban counties. As a result, California has dozens of new, well-funded, and expanding suburban transit operators that attract few riders while older, heavily patronized central city transit operators are forced to cut service because of funding shortfalls.

The dissertation concludes with a discussion of the state's most recent trend in transportation finance: transportation finance plebiscites. During the 1980s, California voters have responded to severe traffic congestion with a series of county sales tax increases for highways and transit that culminated in 1990 with statewide bond measures and a gas tax increase to support both metropolitan rail and freeway development. These voter-approved tax measures are tied to detailed transportation project lists that all but eliminate any role for planning.

The purpose here is not to dismiss planning, but to understand how transportation planning is shaped and directed by the politics of finance. In the worst cases, transportation planning can serve as little more than a veneer of technical legitimacy over the exercise of political power; but more often planning and planners serve as a check on the free rein of political power. Planning and planners do affect outcomes, but more marginally than the idealized model of planning would imply. The sections that follow will show that the current systems of transportation in cities are the product of both planning and political

rationality; and the purpose of this work is to shed light on the mechanics of this combined rationality.

PART ONE

FINANCE AND THE PLANNING OF URBAN FREEWAYS

> Freeways are catalysts in shaping the land-use patterns within the modern metropolis, and exert a positive influence on land uses: they stimulate new, carefully planned developments; they stabilize land uses by delimiting basic long-range patterns, and by giving an aspect of permanence to new freeway-oriented developments. In built-up areas, they effectively aid community development by containing residential units, and serving as buffers between conflicting land uses. Freeways also improve accessibility, and hence the competitive position of the central business district.
>
> -- Wilbur Smith and Associates, *Future Highways and Urban Growth*, 1961

> Our great urban centers have been subjected to the busy concrete mixers and asphalt rollers in the guise of progress, where ribbons of highway they create are further strangling automobile traffic, adding to the already dangerous air pollution levels and displacing the city's residents with still more cars while transportation daily becomes more difficult. ...Freeways do the most damage to these cities.

-- Helen Leavitt,
Superhighway-Superhoax,
1970

OVERVIEW

The National System of Interstate and Defense Highways is the largest public works project in world history. It is a 43,000 mile network designed and built by the highway departments in each state; Interstate freeways comprise just one percent of all roadway mileage nationally, yet carry nearly a quarter of all vehicle travel.[5] In California the Interstate system comprises about half of the 5,500 mile California freeway and expressway system, itself the largest public works project ever built by a single organization.[6]

Though most freeways were developed as part of a national, "interstate" system, the most profound effects of freeways, in California and around the country, have been in cities. Though comprising only a tiny fraction (0.5%) of urban street and road mileage, freeways nationally carry about a third (32%) of all urban vehicle travel, in California the figure (45%) is closer to half. Interestingly, freeways actually play a smaller role outside of cities; about a quarter of all rural vehicle travel, in California (27%) and nationally (23%), is on freeways.[7]

---

[5] Much of the data presented in this paper were compiled from a variety of sources into a single database to permit both cross-jurisdictional and time-series analysis. Because many of the data cited are the author's calculations of raw data from several sources, it would be difficult and somewhat misleading to separately cite only the raw data sources used to calculate the footnoted data. To streamline the footnoting and still allow all of the cited data to be traced to its source, each of the sources used is detailed by subject area in the Appendix. For example, all of the sources used to calculate freeway route mileage are listed separately in the Appendix under the heading of "Freeway Mileage." Hereafter, data drawn from this database will be cited in the footnotes as "Highway database," with all of the raw data sources listed in the Appendix.

[6] Schaeffer Interview, 1992.

[7] Highway database.

With the possible exception of New York City, freeways are the centerpiece of every metropolitan transportation system in the country, a feature that distinguishes American cities from all others. Most cities around the globe have some grade-separated, limited-access roadways, but none rely on these roadways for a significant proportion of metropolitan travel. As such, metropolitan freeways in the U.S. have been embraced by some observers as a foundation of suburban living favored by most Americans and vilified by others as a prime cause of urban decay, air pollution, and auto dependence. Whether embracing or vilifying them, no one dismisses freeways in American cities as irrelevant.

Most writers on the subject of freeways have tended to treat the urban freeway networks of today as the inevitable outcome of past conditions and events, either the inevitable result of automobility or auto conspiracy.

Writers such as David Brodsly[8] and Mark Foster[9] argue that urban freeways were a necessary accommodation to rapidly growing auto use, that today's freeways were an inevitable result of low-density urban growth and dispersed metropolitan travel. Brodsly is particularly deterministic in his history of freeways in Los Angeles, arguing that freeways were a near ideal match for the geography and culture of Los Angeles. Foster focuses on urban transportation planning before 1940 and argues that planners generally embraced freeways as a way to cope with burgeoning automobile use in cities.

[8] Brodsly, 1981.

[9] Foster, 1981.

More common are writers such as Buel, Burby, Hebert, Kelly, Leavitt, Lupo, Mowbray, and Schneider[10] who see urban freeways as uniformly negative products of the "highway lobby," a powerful coalition of auto makers, oil companies, tire makers, and the construction and trucking industries bent on destroying urban public transit and using freeways to remake cities to serve the automobile.

While there is some truth in each of these views, freeways are not the inevitable result of automobility or the highway lobby; nor are freeways simply an example of bad urban planning. Writers such as Gary Schwartz,[11] Mark Rose,[12] Jonathan Gifford,[13] Bruce Seely,[14] and David Jones[15] generally agree with Foster and Brodsly about the dominant role of the automobile in cities, but they argue that institutions -- political and bureaucratic -- critically shaped technological, economic, and social forces to bring about freeways in cities.

Seely argues that the federal Bureau of Public Roads' reputation for apolitical technical expertise gave the engineers in that agency a unique role in directing national highway policy from the Bureau's inception in 1893 to the

---

[10] Buel, 1972; Burby, 1971; Hebert, 1972; Kelly, 1971; Leavitt, 1970; Lupo, 1971; Mowbray, 1968; Schneider, 1971.

[11] Schwartz, 1976.

[12] Rose, 1979.

[13] Gifford, 1984 and 1991.

[14] Seely, 1987.

[15] Jones, 1989.

funding of the Interstate Highway System in 1956. Gifford, like Seely, sees a powerful role for the Bureau of Public Roads, but more broadly argues that the federalist structure of national highway policy developed between the World Wars both directed and constricted the development of intercity and metropolitan freeways. Jones, like Gifford, argues that the federalist model -- which gives state highway departments control over both urban and rural freeways -- is the key to understanding metropolitan freeway development; Jones believes that this model originated with the experience of the California Division of Highways in Los Angeles, and later spread throughout the country.[16]

Schwartz and Rose focus primarily on the legislative process in creating the Interstate System in the 1950s. Rose argues that this legislative process was particularly influenced by two interest groups: state highway engineers (similar to Seely, Gifford, and Jones) and the trucking industry (similar to many of the freeway conspiricists). Schwartz, on the other hand, takes more of a pluralist perspective in arguing that freeways were the product of a broad coalition of interest groups, including cities; like Foster, Schwartz argues that urban freeways, in many respects, are products of urban planning:

> Since urban freeways then carried the city planners' collective seal of approval, there is little merit in the idea that the 1956 Act subverted the planners' collective wisdom.[17]

---

[16] Both Jones and Seely attribute much to individual personalities. Seely sees Bureau of Public Roads' Director Thomas MacDonald as largely responsible for creating and maintaining the Bureau's powerful influence over the years. Jones sees Los Angeles City Engineer Lloyd Aldrich as the driving force behind California's commitment to building freeways in cities.

[17] Schwartz, 1976, p 512.

Schwartz and Foster are correct in arguing that planners actively supported express highway development in cities, but both are wrong in assuming that the facilities and networks eventually constructed in cities were products of planners' "collective wisdom." On the contrary, urban planners and urban planning played almost no role in the development of today's metropolitan freeways. Further, the freeways that did get built in cities bear little resemblance to the facilities and networks conceived by planners in cities around the country. This is because, unlike most urban infrastructure improvements that preceded them, metropolitan freeways were not locally designed, constructed, or, most importantly, financed; they were instead the products of institutions and funding outside of cities -- state highway departments, the federal Bureau of Public Roads, and the state and federal highway user taxes.

How freeways in cities came to be designed and built by state highway departments and financed by the federal and state governments is the subject of Part One. Like Seely, Gifford, and Jones, the focus here is on institutions and the role they play in shaping larger social forces; the particular focus is on early metropolitan transportation planning and its role *vis-a-vis* state and federal highway planning in the development of metropolitan freeways.

The thesis here is that to secure funding, cities and their planners were forced to relinquish control over the planning, development, and operation of urban freeways: that finance leads planning. The most salient features of modern metropolitan freeways -- their scale, routing, and network density -- were shaped more by the weeks and months of negotiations to secure funding for freeways

than by the years and decades of freeway planning that preceded and followed these negotiations.

This part of the dissertation will show that years of metropolitan expressway planning -- both by urban planners and by highway engineers -- was superseded by funding negotiations in Sacramento and Washington during the 1930s, 1940s, and 1950s that profoundly altered the course of metropolitan freeway planning and development. These negotiations:

1. Largely cut local government and urban planning out of freeway planning and development by making state highway departments responsible for all metropolitan freeway development.

2. Led to freeways too large to fit easily into cities and freeway networks too sparse to adequately disperse urban traffic.

3. Resulted in a finance program unrelated to property values or property taxes, which meant that revenues could not keep pace with rapidly appreciating urban land costs for right-of-way.

4. Created a finance program primarily dependent on the gas tax revenues which could not match rising construction costs without frequent, politically unpopular tax increases.

5. Abandoned the traditional one-to-one federal/state fund matching ratio in favor of a nine-to-one ratio which dramatically skewed highway investment decisions in favor of Interstate Freeways.

The focus here is on California, but the implications are national. Freeways were not invented in California, but California cities were the first to make freeways the centerpiece of their urban transportation systems. And the California model of metropolitan freeway finance and development, as Jones

argues, became the national model copied by every state in the country.[18]

The remainder of Part One is divided into three sections. The first examines the common characteristics of the early metropolitan expressway plans developed by cities in the 1920s and 1930s. These plans are then contrasted with the early plans for the Interstate freeway system from the same era. The second section examines how the negotiation of highway finance dramatically curtailed the role of cities and planning in metropolitan expressway development: first by tracing the transition from property tax to the gas tax as the centerpiece of urban highway finance in the 1930s; second by outlining the shift in urban highway planning responsibilities that accompanied California's financial commitment to metropolitan expressways in the 1940s; and third by exploring how the structure of the funding program negotiated for the Interstate system in the 1950s dictated much of the subsequent planning of metropolitan freeways. Finally, the third section shows how the loss of local control over freeway planning to state highway departments and the structure of freeway finance ultimately shaped the development of freeways in California.

EARLY PLANS FOR FREEWAYS

In the 1920s and 1930s, both urban and rural roadway planners were refining plans for hierarchical, interconnected networks of grade-separated, limited-access roadways. However, the scale of the new road networks and the priorities given to different trip types varied substantially between the plans

[18] Jones, 1989, pp 1-3.

prepared by major cities and the plans prepared by state highway departments and the federal Bureau of Public Roads. In cities, the planned systems and facilities reflected the prevalent concerns with reducing traffic congestion and improving local automobile circulation. State and federal highway engineers, on the other hand, were designing new facilities for high-speed intercity travel and improved safety.

The expressway networks planned for cities and the highway network planned to connect cities were quite different, reflecting the very different purposes they were intended to serve. These differences were widely acknowledged and it was generally agreed that the construction of expressways in cities was largely an exercise in urban planning that required careful attention to scale, routing, and land use. But, as we will see, the roles of urban planners and urban planning in the development of metropolitan freeway systems were all but eliminated in the process of freeway funding.

With enormous resources at stake, the holders of the purse strings in Sacramento and Washington were unwilling to delegate control over metropolitan freeways to cities and planners. This reluctance to delegate dealt a blow to the progressive planning model of objective analysis and rational action; for the first 25 years of the freeway program, urban planners and planning exercised little control over the largest and most influential public investments in cities.

Urban Expressway Plans

During the 1920s and 1930s, Boston, Chicago, Detroit, Los Angeles, New York, and San Francisco all prepared metropolitan expressway plans for metropolitan scale networks to serve primarily intra-metropolitan trips.[19] Although, the facilities[20] contemplated in these plans varied from one another, compared to modern urban freeways, they all:

- Had less capacity, lower design speeds, and simpler interchanges;
- Were often multi-modal -- in addition to passenger autos, they usually included special facilities (such as separate rights-of-way, interchanges, or stations) for trucks, buses, or trains;
- Were in denser networks that were closely tied to existing boulevards and arterials;
- Were concerned with and closely tied to adjacent land use, and often included plans for redevelopment and new development.

The goal of these plans was to facilitate local travel by reducing traffic congestion for both autos and transit, especially in downtowns. Traffic congestion was a serious problem in all major cities, particularly in the central business districts. The primary cause of traffic congestion in most cities was the at-grade mixing of autos, trucks, streetcars, and pedestrians;[21] and congestion due to the volume of traffic was exacerbated by growing building heights, inadequate

---

[19] Jones, 1989, p 31.

[20] The terms used in the plans for cities -- parkways, motorways, limited ways, throughways, expressways, and freeways -- were used interchangeably by early planners. For the sake of consistency "expressways" will be used to describe the facilities envisioned by urban planners, and "freeways" to describe the larger facilities conceived by highway engineers.

[21] Planners for Los Angeles described such problematic traffic mixing as "promiscuous" (Olmstead, et.al., 1924, p 11).

off-street parking, antiquated street design and inconsistent traffic regulations.[22]

The expressway networks were planned primarily to grade separate major roadways and move streetcars out of mixed traffic; they also limited roadway access between interchanges and prohibited on-street parking. Expressways were universally seen as keeping downtowns viable by connecting them with expanding suburbs. Interestingly, it was frequently argued by planners that the new expressways would slow suburban sprawl and encourage more compact urban development, the idea being that commercial and employment growth in the residential suburbs was due to inadequate access to the central business district.[23]

The first urban expressway network proposed for a U.S. city was actually part of larger plan for rail rapid transit in Detroit in 1923.[24] The plan called for a downtown subway connected to residential suburbs by a grade separated surface line that would run in the medians of grade-separated, limited-access expressways.[25] A year later a "Major Traffic Street Plan," sans rail transit, was prepared for Los Angeles by Frederick Law Olmstead, Harland Bartholomew, and Charles Cheney -- all nationally noted planners. It was not an expressway

---

[22] Bartholomew, 1924, pp 766-767.

[23] Holley, 193?, p 32 and U.S. Bureau of Public Roads, 1939, p 94.

[24] The earliest plans for limited-access, grade-separated (freeway-type) facilities were parkways in New York and elsewhere. Parkways, however, were designed as recreational motoring facilities in major parks or to connect cities with the neighboring countryside. They generally were not intended to carry commercial traffic or to serve as arterials in urban road networks.

[25] Foster, 1981, p 81.

plan *per se*, but it did include a proposal for Los Angeles' first freeway[26] as well as numerous special facilities for commercial traffic and trucking, such as a trucks-only "speedway" on the bed of the Los Angeles River.[27]

In 1932, another nationally known transportation planner, Miller McClintock,[28] developed an expressway plan for Chicago. Building on his earlier study of traffic in the city, McClintock recommended that Chicago shift its resources from upgrading the existing street network to constructing an all new network of "Limited Ways" with operating speeds in excess of 40 miles-per-hour.[29] McClintock argued that the right-of-way costs of incremental street widening were so high that a new network of grade-separated, limited-access limited ways (with sufficient rights-of-way for subsequent expansion) was more cost effective.[30] Five years later, McClintock produced a similar "Limited Ways" plan for San Francisco, calling for elevated highways in the downtown area and parkways in outlying areas.[31]

Perhaps the most important of these metropolitan expressway plans was

---

[26] The Arroyo Seco Parkway, which runs from downtown Los Angeles to Pasadena, opened for traffic in 1940.

[27] Olmstead, et.al., 1924, p 31.

[28] McClintock also produced expressway plans for Boston, Kansas City, and Washington, D.C..

[29] McClintock, 1932, p 28.

[30] The importance of advanced right-of-way acquisition would be echoed by succeeding generations of urban highway planners, but the right-of-way problem framed by McClintock persists to the present day.

[31] Jones, 1989, p 43. In the 1920s and 1930s, the planning profession was in its infancy and major cities frequently did not have planning departments or staff. During this era, a coterie of high-profile planners, such as Daniel Burnham, Frederick Law Olmstead, Harland Bartholomew, and Miller McClintock, prepared many of the early general and transportation plans for cities.

the 1939 plan developed for Los Angeles because it formed the basis for the first metropolitan freeway network built in the U.S. Prepared by Los Angeles City Engineer Lloyd Aldrich and adopted by the city and county in 1939, the plan called for a 612 mile network of expressways to blanket Los Angeles County by 1954.[32] While the plan borrowed much from earlier metropolitan expressway plans, it was unique in its comprehensiveness, scope, and scale:

[32] Transportation Engineering Board, 1939.

- The focus of the plan was a regional expressway and transit system that integrated the congested downtown with the many sprawling suburbs. The expressways were intended to serve all types of intra-metropolitan travel in a growing region, "radial, circumferential,

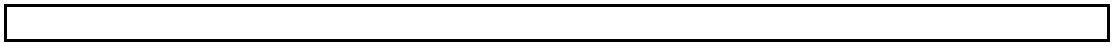

Figure 1

direct interdistrict, and bypass traffic"[33] (Figure 1).

[33] Transportation Engineering Board, 1939, p 11.

Figure 2

- The plan was explicitly multi-modal. The expressway network was planned in concert with a regional express bus system; the plan included expressway grade crossings, for example, including bus transfer stations. Grade separation of rail transit was included as well, either in separate subways or in median right-of-ways on the expressways[34] (Figure 2).

[34] The transit components of the plan were remarkably far sighted as well. Public transit in most cities of this era, including Los Angeles, was privately owned and publicly regulated. In the thirty years after World War Two, nearly all private transit companies were converted to public ownership and operation. The 1939 plan, however, called for regional planning and administration of transit, public ownership of vehicles and right-of-way, and private contract operations and maintenance; an organizational structure argued by many as the most efficient and effective model for public transit in the 1990s (Transportation Engineering Board, 1939, pp 38-40).

- There was less emphasis than many of the earlier plans on parallel park development and more on integration with the existing street system and commercial and residential development. The downtown facilities were to be tightly integrated with existing and

Figure 3

planned commercial development (Figure 3).

- o A key to financing the entire system was advance right-of-way acquisition "in order to avoid prohibitive costs" and insure that commercial or residential displacement would not be required. Land would then be developed to fit the capacity and location of the expressways.[35]

Even by today's standards, the 1939 plan for Los Angeles was remarkable. Proposals for public investment in mass transit were controversial and many expressway planners did not want to damage the popularity of their plans by including public transit.[36] But the plan for Los Angeles was based on the integrated development of both expressways and transit that, according to Jones, proved to be a plan for growth acceptable for nearly every constituency: central business interests and transit users liked it because the ring-radial plan and exclusive transit rights-of-way promised uncongested downtown access;[37] auto users and the Auto Club liked the expansion of parkway-like facilities around the region; land developers loved the expansion of developable land proposed in the plan; and the state and federal governments liked the lower cost and more

---

[35] Transportation Engineering Board, 1939, p 19.

[36] Mass transit in this era was almost exclusively privately owned and operated, and transit companies were often unfavorably viewed by the riding public as greedy monopolies. Proposals for public investment in privately owned mass transit were usually unpopular and often unsuccessful. For a detailed history of transit companies in Los Angeles, see Scott Bottles, *Los Angeles and the Automobile*, Berkeley: University of California Press, 1985. For a more general history of urban transit in this era, see David Jones, *Urban Transit: A Political and Economic History*, Englewood Cliffs: Prentice Hall, 1985.

[37] Though the rail transit companies opposed it, fearing that the new rights-of-way would open the door for competition from bus operators or new rail transit companies.

practical orientation of the expressway *vis-a-vis* parkways.[38]

Popular or not, the financial resources available to Los Angeles in the 1940s could not begin to finance a 612 mile expressway and transit system. Los Angeles had been able to leverage state and federal funding for the Arroyo Seco Parkway in 1937 and the city was proceeding with the land acquisition and design for the Hollywood Freeway,[39] but progress was slow. At existing funding levels, the entire Los Angeles system would take a century to complete, and the opportunity for advance right-of-way acquisition would be lost.

To fund its ambitious plan, Los Angeles turned to the state and federal government for funding. In doing so, it began the process of turning control of metropolitan expressway development over to state highway departments in exchange for funding. This process, begun in California, would eventually spread to every city in the country with the passage of the Federal Highway and Highway Revenue Acts of 1956.

Intercity Freeway Plans

During the 1930s the Bureau of Public Roads, in cooperation with state highway departments, began planning for a safe, high-speed national network of highways. The focus of this planning, quite naturally, was substantially different from the planning for expressway systems in cities; the primary goals were better

---

[38] Jones, 1989, p 58.

[39] The Hollywood Freeway, consistent with the design guidelines in the 1939 Los Angeles plan, included rail transit in the median.

intercity highway connections, improved safety, and increased travel speeds, particularly near cities. In contrast with the expressway plans discussed above, these plans, also quite naturally, did not address urban concerns; they did not consider public transit and were much less concerned with adjacent land uses. Local traffic congestion was addressed in the plans, but primarily with the concern that local congestion would inhibit the free-flow of intercity traffic.

The plans themselves, published by the Bureau of Public Roads in 1939 and President Roosevelt's Interregional Highway Committee in 1944, were each a reflection of the "good roads movement" of the Progressive Era. The federal highway program in general and the Bureau of Public Roads in particular were strongly rooted in the Progressive Era goals of bringing science, planning, and objectivity to the routing, design, construction, and operation of rural roads and both of these plans embodied these goals.[40] Despite sharing progressive roots with city planning and urban traffic engineering, however, the "antiurban orientation"[41] of the highway programs of this era can hardly be overstated. Concerned primarily with getting "the farmer out of the mud,"[42] federal highway efforts during the first two decades of this century focused on improving farm-to-market roads; urban highways were completely excluded. Over time, the focus of federal highway policy shifted from farm-to-market trips to intercity travel, reflecting the growth of intercity passenger and freight movement. This shift in

[40] See Seely, 1987 for a detailed account of highway engineering in this era.

[41] Schwartz, 1976, p 416.

[42] Fairbank, 1937, p 2.

focus did not bring the federal highway program into cities, urban highways remained ineligible for federal highway funds; intercity travel was the new focus, but only from city-edge to city-edge.

Prior to substantive federal involvement in highways, rural road development was generally locally controlled and piecemeal in character. Public expenditures on rural roads were usually either spread thinly over entire country and state road networks, or controlled by the politically connected. The Federal Highway Acts of 1916 and 1921 sought to remedy the dual problems of jurisdictional fragmentation and piecemeal development to encourage the development of an improved system of roads.[43] The 1916 Act (1) required the establishment of state highway departments, (2) designated states as the recipients of all federal highway funds, (3) established fund apportionment formulas, and (4) required a one-to-one federal/state match for all funds. In addition, the 1921 Act required states to designate highway networks, limited to 7 percent of the entire state road mileage, for the expenditure of all federal highway funds.[44]

Together, the success of the 1916 and 1921 Federal Highway Acts had at least three important effects. First, the new federal highway program overcame the problem of jurisdictional fragmentation and piecemeal development in rural highway systems; federal policy successfully encouraged the development of a

---

[43] Gifford, 1984, p 321.

[44] U.S. Congressional Budget Office, 1978, pp 2-3.

quality network of rural roads.[45] Second, the successful improvement of rural roads and the technical competence of the Bureau of Public Roads in administering the new federal highway program gave the Bureau an extraordinary level of credibility and authority in the subsequent planning and construction of the Interstate Highway System.[46] Third, the success of the particular policy innovations -- disbursement of funds to state highway departments, fund matching requirements, expenditure of funds only on a limited road network -- in the effort to improve rural roads, led them to become "inviolable doctrines of the federal-aid program" that dictated all federal highway planning for decades to come.[47]

Through the 1920s and 1930s, the Bureau of Public Roads was at the forefront of highway engineering innovation and pushed highway departments to improve the planning and engineering of state road systems. The drive for higher and higher engineering standards led the Bureau to resist state efforts for "more miles of usable roads, rather than for a very limited mileage of super-service highways."[48] The Bureau's growing interest in super-highways was given a boost in 1937 when President Roosevelt and later Congress directed the Bureau to investigate the feasibility of a national system of toll "super-highways."[49]

---

[45] U.S. Congressional Budget Office, 1978, pp 2-3.

[46] Seely, 1987.

[47] Gifford, 1984, p 324.

[48] MacDonald, 1936, p 69.

[49] Congress clearly had some expectation of what such a system might look like in advance of the Bureau's investigation. The 1938 Federal Highway Act specified that the Bureau of Public Roads investigate

The Bureau reported back in 1939 with *Toll Roads and Free Roads*, an extensively researched advocacy piece that "was a minor sensation in its time."[50] The report examined the feasibility of a 14,000 mile system of six transcontinental toll roads, and conclusively rejected such a system as unworkable because of insufficient travel demand; barely one percent of the system was projected to be self-supporting with tolls.[51] The report drew on extensive travel survey data[52] showing that the vast majority of rural highway traffic was short trips of less than 10 miles made to or from cities; only a tiny fraction (1.5%) of trips were over 100 miles.[53]

In estimating the costs of the toll road system, the Bureau assumed that the entire system would be built to a uniform high standard -- wide rights-of-way, full access-control and grade-separation, high design speeds, etc. -- whether or not projected demand warranted such a facility. The Bureau's logic was that to attract sufficient traffic, the toll facilities must have clear advantages over the

---

"the feasibility of building, and cost of, super-highways not exceeding three in number, running in a general direction from the eastern to the western portion of the United States, and not exceeding three in number, running in a general direction from the northern to the southern portion of the United States, including the feasibility of a toll system on such roads" (U.S. Bureau of Public Roads, 1939, p 1).

[50] Gifford, 1991, p 8.

[51] U.S. Bureau of Public Roads, 1939, p 2.

[52] The data had recently been gathered in planning studies funded in a large part by the 1934 Hayden-Cartwright Act, which allowed states to spent 1.5 percent of federal highway apportionments (subject to the one-to-one federal/state matching requirement) on highway research and planning (Fairbank, 1937, pp 1-2).

[53] U.S. Bureau of Public Roads, 1939, pp 5-11.

surrounding free roads. The roads, therefore, were expected to provide safe, continuous operation at 70 miles-per-hour, over twice the average rural highway speeds of the time.[54]

The light patronage forecasts and the projected high costs of the toll system, however, did not dissuade the Bureau from including a second ("free roads") section of the report which recommended the development of a 27,000 mile intercity network of grade-separated, limited-access freeways built to the same uniform high standards proposed for the toll system. This "Master Plan for Free Highway Development,"[55] was strongly endorsed by the Bureau and it served as the founding plan that guided the development of the Interstate Highway System.

Of particular importance to cities was the report's recommendation that the highways penetrate metropolitan areas to serve the central business district in each city. This recommendation gave the entire proposal a strong urban component, which was a radical departure from longstanding federal highway policy. It was based on extensive travel survey evidence showing that the vast majority of highway traffic was to and/or from cities. The recommendation of metropolitan penetration was not motivated by a particular concern for intracity

[54] U.S. Bureau of Public Roads, 1939, pp 38-39. Gifford has argued that the Bureau was opposed to a system of toll roads from the outset, and that the report consistently underestimated toll revenues and overestimated the costs of the toll road system. He reasons that the Bureau was opposed to toll roads, among other reasons, because they were perceived as a direct threat to the federal highway program; a successful system of toll roads would not require federal subsidy, which in turn would have dramatically lessened the power and authority of the Bureau over highway policy, planning, and design (Gifford, 1984, pp 323-324).

[55] U.S. Bureau of Public Roads, 1939, p 89.

traffic, but by the Bureau's desire to stimulate sufficient intercity movement to justify the scale of intercity highways proposed.[56]

Herein lies a dramatic contrast between metropolitan expressway planning and intercity highway planning. In cities, traffic congestion was the problem, and metropolitan expressways were proposed as the means to cope with growing travel demand. For the federal highway program, however, an intercity highway system was the desired outcome in search of problems to justify its development. Given the Bureau's own traffic data, a national system of superhighways, toll or free, could not be justified without connecting with the major highway traffic generators: cities. This roundabout logic -- constructing a 27,000 mile national intercity highway system to meet largely metropolitan traffic needs -- was the essence of *Toll Roads and Free Roads* and the guiding principle in the subsequent development of the Interstate Highway System.

The desire for a national intercity highway system, however, did not rest solely with the Bureau of Public Roads. *Toll Roads and Free Roads* was a response to presidential and congressional requests, not for a study of national highway needs, but for an evaluation of a national system of six super-highways. Given a draft of *Toll Roads and Free Roads* for review, President Roosevelt reportedly asked the Bureau to revise the report to focus less on metropolitan travel and highways.

---

[56] Gifford (1984, 1991) has argued that the decision to penetrate cities reveals a "primary focus on improving urban highways;" I disagree. While *Toll Roads and Free Roads* and its successor *Interregional Highways* devoted considerable attention to the question of urban penetration, both documents were clearly devoted to planning a national, intercity highway network. In both plans, it was recognized that the inter-city highways would serve a high proportion of local trips near cities, but the focus throughout was clearly inter-city and not intra-city travel.

Minor changes were made, but the report submitted to Congress was essentially unchanged from the original draft.[57] The reason the Bureau did not accede to Roosevelt's request for changes, of course, is that it could not; removing the metropolitan links of the plan would remove most of the traffic used to justify the entire system. Given the nature of metropolitan traffic, the Bureau was forced to acknowledge that the intercity highways penetrating to the center of large cities would serve large volumes of intra-city traffic. In *Toll Roads and Free Roads*, the Bureau conceded that, in addition to intercity traffic:

> There is usually added to these streams in the outer reaches of the city or its immediate suburbs a heavy movement of purely city traffic that mounts to high peaks in the morning and evening rush hours...There are cases in which the daily peak of "in-and-out" city traffic exists without any substantial addition from main rural highways.[58]

Given the large volumes of local traffic on the intercity highway system, the Bureau concluded (with no supporting data) that these intra-city "movements...largely follow the same lines as the traffic entering the city from main rural highways simply because the peripheral city areas and suburbs in which they are generated have developed along such highways" and therefore the "requisite facility" to adequately serve both intercity and intra-city travel was "an express highway...in all essentials similar to facilities designed to carry

---

[57] Gifford, 1991, p 8.

[58] U.S. Bureau of Public Roads, 1939, p 93.

external traffic across the city."[59]

[59] U.S. Bureau of Public Roads, 1939, p 93.

Figure 4

The Bureau's simple, universal descriptions of local traffic in all cities ("It always is largely a movement from the periphery to the center of the city, and is little concerned with intermediate city sections...")[60] lacked the richness, complexity, or supporting travel data found in the metropolitan expressway plans described above; public transit and non-central business district bound auto trips, for example, were not mentioned. And the metropolitan highway systems proposed -- usually a radial highway or highways converging on the city center surrounded by a beltway -- reflected the Bureau's simple conceptions of urban travel. The report includes a sample ring-radial plan for Baltimore (Figure 4) which contrasts sharply with the comprehensive proposal for Los Angeles shown earlier.[61]

Two years after the publication of *Toll Roads and Free Roads*, President Roosevelt appointed an Interregional Highway Committee headed by Bureau of Public Roads Commissioner Thomas MacDonald and staffed by Bureau engineers to continue examining the feasibility of a national intercity highway system. Interestingly, three of the seven committee members -- Harland Bartholomew, Frederic Delano, and Rexford Tugwell -- were noted city and regional planners. The strong presence of urban planners on a committee charged with planning a national highway system certainly explains the very

---

[60] U.S. Bureau of Public Roads, 1939, p 93.

[61] In fairness to the Bureau, however, the report did recommend that cities develop parallel facilities to complement the proposed metropolitan ring-radial highway systems. But, as the discussion of freeway finance in the following section will show, the structure of state and federal highway programs all but prevented cities from developing such complementary facilities.

different tone than *Toll Roads and Free Roads* with regard to urban highways.[62]

The committee's report, published as *Interregional Highways* in 1944, reiterated and expanded the findings in *Toll Roads and Free Roads* regarding the short distances and urban basis of most rural traffic. *Interregional Highways* recommended a 39,000 mile intercity highway system to connect nearly every metropolitan area in the country with a population over 100,000. The proposed system was substantially more ambitious than the 27,000 miles proposed in *Toll Roads and Free Roads* and had an even stronger urban component; nearly a quarter (9,400 miles) of the system was to be built in metropolitan areas. But unlike the Bureau of Public Roads' authored *Toll Roads and Free Roads*, the *Interregional Highways* report was much more deferential to cities and planners regarding the routing, design, and operation of the urban segments of the system. While the rural segments of the system were carefully detailed in the plan, over half of the metropolitan mileage (fully 13 percent of the entire system) was left to be determined later because:

> ...the selection of routes for inclusion in the interregional system within and in the vicinity of cities is properly a matter for local study and

---

[62] Roosevelt's appointments to the Interregional Highway Committee were an interesting mix of "planners, state road engineers, and old-fashioned political appointees..." (Rose, 1979, p 19). The planners were Harland Bartholomew (a nationally known planner from Saint Louis), Frederic Delano (Chair of the National Reconstruction Planning Board), and Rexford Tugwell (a nationally known regional planner and former Chair of the Resettlement Administration). The road engineers were George Kennedy (Michigan State Highway Engineer), Charles Purcell (California State Highway Engineer), and, of course, Thomas MacDonald (of the Bureau of Public Roads). And the old-fashioned political appointee was Bibb Graves (appointed to help his successful campaign for Governor of Alabama). The most active planner on the committee was Bartholomew, who (along with highway engineers Kennedy, MacDonald, and Purcell) attended most of the committee meetings and took an active role in writing the final report (Rose, 1979, p 108f).

determination.[63]

The Interregional Highway Committee was insistent, to the point of redundancy, that the routing, design, and operation of the metropolitan highways be left to "local planning" authorities and officials because:

> Once the routes enter the environs of the city...they become a part of the sum total of urban transportation facilities, and as such must bear a proper relation in location and character to other parts of the street system.[64]
>
> How near they should come to the center of the area, how they should pass it or pass through it, and by what course they should approach it, are matters for particular planning consideration in each city.[65]

In further contrast with *Toll Roads and Free Roads*, the Interregional Highway Committee was mindful of the complexity of urban travel and deeply concerned with the effects that the interregional highways would have on cities:

> The interregional routes, however they are located, will tend to be a powerful influence in shaping the city...improperly located, they will become more and more of an encumbrance to the city's functions and an all too durable reminder of planning that was bad.[66]

And as such, *Interregional Highways* offered nothing short of a ringing endorsement of city and regional planning and the role planning should play in

---

[63] Interregional Highway Committee, 1944, p 56.

[64] Interregional Highway Committee, 1944, p 56.

[65] Interregional Highway Committee, 1944, p 61.

[66] Interregional Highway Committee, 1944, p 71.

metropolitan highway development:

> It is very important, therefore, that the interregional routes within cities and their immediate environs shall be made part of the planned development of other city streets and the probable or planned development of the cities themselves.[67]
>
> By careful and complete functional studies of the city organism, it may be possible to devise a rational plan of future land use...In such a case, the planning of city streets, the interregional routes and other express ways, and all other urban facilities would take the forms and locations necessary to serve the intended land uses, and these facilities would be provided in essential time relationship to the development of the entire plan, and in a manner to bring about its undistorted realization.[68]

While the focus on the importance of urban planning in metropolitan transportation development reflected in part the presence of Bartholomew, Delano, and Tugwell on the Interregional Highway Committee, these views were frequently shared by highway engineers of the time. Highway departments had little experience in cities and, in their writings, highway engineers often expressed apprehensiveness about express highway developments in cites.[69] Thomas MacDonald expressed this wariness in a 1954 speech following his retirement as Commissioner of the Bureau of Public Roads:

> Still, we could plan with much more assurance and comfort if we could clarify and unify somehow the

[67] Interregional Highway Committee, 1944, p 71.

[68] Interregional Highway Committee, 1944, p 70.

[69] Fairbank, 1937, p 3; Purcell, 1940a, p 26.

> understanding of where we are headed in the forms and ecology of the city organism.[70]

With a strong focus on metropolitan highways and an unequivocal position that urban planning should play a central role in their development, *Interregional Highways,* was submitted to Congress in 1944 and was used as the basis of the designation of the Interstate Highway System in the 1944 Federal-Aid Highway Act. The stage was now set for a national commitment to post-war highway development with a focus on cities and a commitment to urban planning. All that remained, of course, was funding. And funding, as the next section will show, insured that the metropolitan expressway systems envisioned by urban planners would never be built.

NEGOTIATING A FINANCE PACKAGE FOR FREEWAYS

Given the number of multi-modal, intra-urban expressway plans prepared by major cities around the country and the expressed intent in the 1944 plan for the Interstate Highway System to leave urban expressway planning to cities, why were none of the plans prepared by cities during the 1930s implemented? Why, instead, were the higher design speed, higher capacity, single mode freeways in sparse ring-radial networks (like the Bureau of Public Roads proposal for Baltimore) built in nearly every major city in the country? The answer lies in funding agreements reached in the 1930s, 1940s and 1950s to finance freeway development:

---

[70] MacDonald, 1954, pp 15-16.

- In the 1930s, the property tax was abandoned in favor of the gas tax as the main source of urban highway funding. As a result, the opportunity to recapture the appreciative effect metropolitan freeway development would have on land values was lost. And this, in turn, prevented highway revenues from pacing right-of-way cost increases of metropolitan freeways.

- In the 1940s, the Interstate system was adopted, but without funding. In California, the state agreed to raise highway user taxes to, among other things, begin construction of the Los Angeles expressway plan. But in doing so, the legislature placed the state highway department in charge of all metropolitan expressway development -- contrary to the recommendations of the *Interregional Highways* plan. This precedent-setting move helped separate urban planning from metropolitan freeway development for the next quarter century.

- In the 1950s, the funding of the Interstate program critically shaped metropolitan freeway development. First, to secure the support of urban legislators, the Bureau of Public Roads -- again, contrary to the recommendations of *Interregional Highways* -- published routing plans for every urban Interstate Highway in the country, which effectively set the metropolitan freeway planning process into stone. Second, to give priority to the Interstate system, the traditional one-to-one federal/state matching ratio was changed to nine-to-one, which encouraged states to devote all their resources to Interstate construction and emphatically discouraged them from developing parallel facilities in cities.

The result of these funding actions was to effectively eliminate any role for urban planning in metropolitan expressway development. The major planning decisions -- the design, routing, and size of the system -- were either specified in advance or delegated to state highway departments. How each of these funding agreements came to be is the subject of the remainder of this section.

Early Urban Road Finance

Until the Depression, street and boulevard development in most cities was paid for jointly by cities and counties with property taxes and bonds; special assessment districts were frequently created to tax the property owners benefiting from major boulevard developments. In Los Angeles, for example, special assessments contributed 78 percent of the revenues used to amortize street and highway bonds in 1928.[71]

Nationally, property taxes accounted for over 70 percent of all local government revenues for streets and highways in the 1920s; in many cities the figure was closer to 100 percent. The logic of property tax funding of streets and highways was straightforward: public investments in road improvements increase the value of adjacent land and property owners should pay for the private benefits conferred by public road investments. This principle worked best when applied to local street improvements; property owners paid, either through property taxes or special assessments, for street improvements abutting their property. For urban highway improvements benefitting a larger area of property owners, the principle of assessing adjacent property owners broke down, although this was not a major concern during the 1920s, because most urban road improvements were of a fairly small scale.

With the Depression came the collapse of the property tax and urban highway finance. In Los Angeles, general and special assessment district funds for streets and roads plummeted 90 percent from over $27 million in 1929 to less than $3

[71] Jones, 1989, pp 147-149.

million by 1935.[72] The dramatic drop in property tax revenues, in Los Angeles and around the country, was due to widespread property tax defaults and subsequent property tax relief efforts to stem the tide of defaults. Nationally, extraordinary property tax revenue declines were the rule. Property tax revenues to all local governments for streets and highways dropped 72 percent from $1.2 billion in 1930 to just $330 million in 1939. For municipalities nationally, the collapse in property tax revenues for roads over the same period was even greater; revenues dropped 83 percent from $787 million in 1930 to $137 million in 1939.[73]

Gas tax revenues, on the other hand, fared quite well during the Depression. Gas taxes are fixed per gallon levies on motor fuels and revenues are based entirely on the gallons of fuel sold. Except for a small dip in fuel consumption at the onset of the Depression, fuel consumption and gas tax revenues increased annually until fuel rationing was adopted during the Second World War.[74]

The gas tax was first adopted by four states in 1919. Other states quickly followed suit; by the time California adopted a two cent per gallon gas tax in 1923, 33 other states had begun taxing motor fuel consumption.[75] California's gas tax was increased to three cents per gallon in 1927 and, like most other states,

[72] Jones, 1989, p 150.

[73] Highway database.

[74] Highway database.

[75] Highway database.

California generally earmarked gas tax revenues for rural highway expenditures. In other words, although gas tax revenues were deposited in the state general fund, they were roughly linked with state highway expenditures.[76]

The resiliency of the gas tax made it an attractive fund source for Depression-era legislatures struggling to shore-up sagging revenues. And in the early 1930s, several states began "diverting" gas tax revenues to non-highway purposes. This trend was addressed in the Hayden-Cartwright Act of 1934 which declared:

> ...it is unfair and unjust to tax motor-vehicle transportation unless the proceeds of such taxation are applied to the construction, improvement, or maintenance of highways.[77]

Such federal indignation is ironic considering the fact that the one cent federal gas tax, enacted two years earlier, was adopted as an emergency Depression measure unrelated to the federal highway program.[78] In any case, state diversion of gas tax revenues to general purposes was limited and most states, California included, adopted constitutional amendments prohibiting the diversion of gas tax revenues to non-highway purposes.[79]

With property tax and assessment funding for streets and roads drying up in the early 1930s, cities and urban counties began pushing the state for gas tax

---

[76] Purcell, 1940a, p 26; Schwartz, 1976, p 420.

[77] U.S. Congressional Budget Office, 1978, p 4.

[78] Schwartz, 1976, p 421.

[79] Purcell, 1940a, p 26; Schwartz, 1976, p 420-421.

revenues to support highway expenditures in cities. In California, the legislature responded to this lobbying pressure in 1931 by expanding the state highway system to include state highways that passed through cities.[80] This legislation was immensely popular with cash-strapped cities; two years later, bowing to the increasingly organized pressure of urban interests, the 1931 state highway legislation was amended to expand the state highway system to include major urban highways and to apportion some gas tax funds for the construction and maintenance of major boulevards and arterials in cities.[81]

While states like California began relaxing prohibitions against using state highway funds in urban areas during the Depression, federal highway assistance to cities took a different tack. Through heavy lobbying and staunch support in Congress, the Bureau of Public Roads managed to keep the federal highway program, outlined above, largely intact, though the federal-aid program was amended in 1934 and again in 1937 to allow states to use some federal funds for urban extensions of the federal-aid primary system.[82] Most federal Depression-era support of urban highways, however, came in the form of wage support for urban road maintenance programs; this support, administered by the Works Progress Administration, was kept entirely separate from the federal highway program.[83]

---

[80] Prior to this time, and consistent with prohibitions against spending state and federal highway funds in cities, state highway designations ended at the city limits.

[81] Jones, 1989, pp 150-155.

[82] Schwartz, 1976, p 415-416; Gifford, 1984, p 323.

[83] Gifford, 1984, p 323; U.S. Congressional Budget Office, 1978, p 5.

Figure 5

Figure 5 below shows the dramatic shift in the relative roles of property taxes and motor fuel taxes in local street and highway finance between 1921 and 1949. The shift from property taxes to motor fuel taxes was not uniform across road types. Given the clearer link between local street improvements and abutting property values, available property tax revenues were used solely for local streets; and given state and federal limitations on the use of gas tax revenues in cities, gas tax revenues were used solely for urban highways.

In California and around the country the collapse of property tax revenues drastically reduced local funding for streets and highways. And around the country, motor fuel taxes, collected by the states were used to fill the void. So with the Depression came a restructuring of urban highway finance, and this restructuring was important in two respects:

1. By abandoning property and special assessment finance for the gas tax, any opportunity to recapture the appreciative effect freeways would have on metropolitan land values was foreclosed. And insufficient funding for right-of-way acquisition would quickly prove the major obstacle in metropolitan freeway development.

   This fact was not lost on highway planners at the time. Concerned that the Depression-era shift from property tax finance to gas tax finance would foreclose the future use of property taxes for urban highways, a Bureau of Public Roads deputy warned in 1937: "Property taxes once gone will be difficult to get back."[84]

2. Where urban roads were once the exclusive financial burden of cities, they were now the primary responsibility of the state and

[84] Fairbank, 1937, p 2.

federal governments. And with this shift in funding burden came a gradual shift in planning focus and development control: from congestion relief and multi-modal intraurban movement in cities to intercity highway connections and automobile movement on highways. This shift would become more important in the post-war years when cities turned to the states and federal government to fund urban expressway development.

Evolution of Freeway Finance in California

The federal Defense Highway Acts of 1941 and 1943 called for states to improve intercity highways to support defense industries. Congress recognized that construction materials were in short supply, so funds were made available for right-of-way acquisition and design work. While most states set to work on rural highway improvements, Los Angeles and San Francisco lobbied effectively through the California Division of Highways to use the funds for urban land acquisition and freeway design.[85] This gave California the lead in post-war urban transportation development. The state had not only committed to urban expressways, but was land banking and stockpiling engineering design plans in anticipation of post-war funding.

Near the end of the Second World War, the Federal-Aid Highway Act of 1944 significantly increased federal highway appropriations for the post-war years and, importantly, stepped up federal commitment to urban highways.

First, the Act formally designated the National System of Interstate Highways based on the system -- including the focus on metropolitan areas and

[85] Jones, 1989, pp 182-184.

planning -- proposed in the *Interregional Highways* report. The designation, however, was largely symbolic; it would be six years before the system would receive its first appropriation.[86]

Second, the Federal-Aid program was substantially revised to include "secondary" rural roads and "urban extensions" of the federal-aid system, in addition to the federal-aid primary system, which had long been promoted by the Bureau of Public Roads as the centerpiece of the federal highway program.[87] While federal support of urban roads had begun in the 1930s, such assistance was part of Depression relief efforts, outside of the federal highway program. This new three-part -- primary, secondary, and urban -- program codified urban highways for the first time as an integral part of the federal highway program. And under this new structure, the urban extensions program received one-quarter of federal-aid funding, which amounted to about 22 percent of total annual federal highway appropriations between 1946 and 1948.[88]

But while the earmarking of federal-aid funds for urban areas was new, the administrative structure of the highway program, developed between 1916 and 1921 to "get the farmer out of the mud,"[89] remained unchanged. Of particular importance to cities were the "inviolable doctrines of the federal-aid

---

[86] Congressional Quarterly, 1964, pp 527-529; U.S. Congressional Budget Office, 1978, p 6.

[87] Congressional Quarterly, 1964, p 527; Seely, 1987, pp 187-191; U.S. Congressional Budget Office, 1978, p 6.

[88] Congressional Quarterly, 1964, p 527.

[89] Fairbank, 1937, p 2.

program"[90] that (1) all federal-aid funds be administered by state highway departments and (2) funds be expended only on a limited system of roadways. In other words, federal policies developed at the dawn of the automobile era to improve rural farm-to-market roads would guide the development of metropolitan freeways throughout the second half of the 20th century. From the outset, the structure of federal urban highway finance ceded control of metropolitan expressway planning to state highway departments.

In response to the new federal-aid urban program and the desire to get long-dormant road programs up and running after the war, both cities and rural counties in California began lobbying politicians in Sacramento for increased road funding. Legislative deliberation over the future of state highway development dragged on for three years amidst the vocal opposition of the oil and trucking industries' opposition to motor fuel tax increases and bitter debates between rural road and urban highway interests. After protracted hearings and negotiations, California approved a comprehensive statewide highway package in 1947 that, among other things:

- Altered the rural focus of the state highway system by adding about half of the Los Angeles expressway plan to the state highway system;
- Increased the state fuel tax by one and a half cents per gallon to finance highway and expressway construction; and
- Followed the federal model of highway administration by placing the state Division of Highways in charge of all metropolitan

[90] Gifford, 1984, p 324.

expressway development.[91]

In addition, the Collier-Burns Act of 1947 substantially modified the existing system of vehicle taxes and fees that had existed with only minor changes since adopted along with the state gas tax in 1923.[92]

Table 1

The Evolution of Highway User Taxation in California: 1923-1947

	1923	1927	1947
Motor Fuel Tax	$0.020 / gallon	$0.030 / gallon	$0.045 / gallon
Unladen Commercial Vehicle Weight Fee	$5-$20 / year	$15-$70 / year	$40-$200 / year
For-Hire Commercial Vehicle Gross Receipts Fee	4.0% / receipts	4.0% / receipts	4.0% / receipts
Vehicle Registration	$3 / year	$3 / year	$3 / year
Drivers' Licenses			$2 / 4 years

Source: Zettel, 1980b.

The net financial effect of the 1947 legislation was to increase state highway revenues about 65 percent. By far the largest increase in funding was for urban highways, both through increased highway funding for cities and through the funding of the new urban freeway segments of the state highway

91 Jones, 1989, pp 191-195.

92 Zettel, 1980b, p 2.4.

system. The 1947 Act shifted the apportionment of state highway funding as follows:

- The state highway program received 63 percent of all funds (an 80 percent increase);
- The counties got 27 percent of all funds (a 29 percent increase); and
- Cities received 10 percent of all funds (a 143 percent increase).[93]

So in separate actions over a three year period, the federal government (in 1944) and California (in 1947) made substantial commitments to finance metropolitan highways. But in each case, those commitments required that cities give up control over expressway development. With the shift in financial responsibility came a shift in control: from cities and urban planning to states and highway engineering.

Evidence of this shift in control was apparent in the earliest designs by the state Division of Highways for freeways in Los Angeles. The freeways designed by state highway planners for intercity travel differed from urban expressways designed by city planners for intracity traffic in many important respects. The new designs closely resembled the intercity super-highways described in *Toll Roads and Free Roads*, and were much more heavily engineered than the facilities envisaged in the cities' plans for Los Angeles and San Francisco. The new freeways were larger, on much wider rights-of-way, and designed for much higher speeds (70 mph instead 40 to 50 mph).[94] Finally, the Division of Highways

[93] Zettel, 1980b, p 2.7.

[94] The metropolitan expressway plans were proposed to reduce congestion by streamlining traffic movement and eliminating cross-traffic, not by permitting high-speed urban travel. In recommending a 45 miles-per-

adopted a practice of uniform design standards, regardless of location. Thus, the admonition in *Interregional Highways* that metropolitan freeways must vary to "...take the forms and locations necessary to serve the intended land uses...,"[95] was abandoned in favor of the trend in highway engineering toward uniform design standards.[96]

Perhaps more significantly, all public transit and joint development components were eliminated; freeways were to be stand-alone facilities. In an update of the Los Angeles expressway plan after the war, a board of consulting engineers recommended that rail transit rights-of-way be reserved on five freeways and special provisions for express bus service be included on seven others.[97] The state Division of Highways, however, opposed such provisions for mass transit, which was viewed as a competing mode and an inappropriate recipient of highway funds.[98]

The refusal to include provisions for mass transit in metropolitan freeway plans drew complaints from Mayor Fletcher Bowron of Los Angeles and other city and county officials, who pressed the matter with Sacramento. The Division of Highways eventually agreed to include right-of-way, ramps, and bays for

---

hour design speed for the Los Angeles expressway system, the 1939 plan noted that "a road speed of 60 miles-per-hour would, in the Board's opinion, be an inefficient and unsafe use of expensive highway" (Transportation Engineering Board, 1939, p 18).

95 Interregional Highway Committee, 1944, p 70.

96 Gifford, 1984, pp 324-325.

97 Jones, 1989, p 234-235.

98 Jones, 1989, p 222.

public transit, but only if Los Angeles paid for all transit-related costs of the improvements. The city, with the support of downtown business interests and the Chamber of Commerce, sought legislative approval for a bond measure to finance the transit component of the expressway system. The bond authority was opposed by suburban cities and developers (as a giveaway to downtown interests), the Auto Club (because it might delay freeway construction), and the privately-owned rail transit operators (because it opened the door for competition). In the face of strong opposition, the measure lost in legislative committee and public transit was divorced from the expressway plan.[99] Reflecting on the exclusion of mass transit from metropolitan freeways in Los Angeles, Jones concluded that:

> The idea of parkway transit was foreign to the state, as was the concept of joint development. These were urban concepts extrinsic to state highway policy and beyond the pale of rural highway-building practice. Nor were they ideas that most highway departments were prepared to assimilate as the assumed urban duties.[100]

With or without public transit, the 1947 gas tax increase was not nearly enough to finance substantial development of metropolitan freeways in California;[101] by 1952, only 37 miles of freeways had been built in Los Angeles and 74 miles in the

---

99 Jones, 1989, pp 235-236.

100 Jones, 1989, p 222.

101 Zettel, 1953, p 23.

entire state.[102] Anxious to get things moving, the city, at the behest of City Engineer Aldrich, proposed to secede from the state highway system to create a metropolitan transportation district (a move that would have been consistent with the recommendations of *Interregional Highways*) to move ahead on the 1939 expressway plan using Los Angeles' share of the state gas tax, bonds, and special assessments.[103]

Not wanting to lose Los Angeles or its gas tax revenues, the state responded with the second of three motor fuel tax increases between 1947 and 1956. The tax increase added one and a half cents to the gasoline tax, 2 1/2 cents to the diesel fuel tax[104], and increased the commitment to metropolitan freeway construction. Between 1953 and 1955, freeway construction in California increased to 51 miles per year, up from about 10 miles per year for the previous six years.[105]

By 1956, when Congress authorized $27.8 billion to fund the 41,000 mile Interstate freeway program, California had already built over 330 miles of freeways[106] (mostly in metropolitan areas) and had established a model for metropolitan freeway development. This model, in turn, was based on the federalist model of the federal highway program originally championed by the Bureau of Public Roads between 1916 and 1921 to improve rural road

[102] Zettel, 1959, p 13.

[103] Jones, 1989, pp 238-239.

[104] Highway database.

[105] Zettel, 1959, p 13.

[106] Zettel, 1959, p 13.

development; a model that placed the state highway department in complete charge of all freeway development -- rural and urban. And because California cities led the nation in post-war freeway development, the California model became the prototype for the rest of the country with the funding of the Interstate Highway System in 1956.

Funding the Interstate Highway System

While California was actively building freeways in the first ten years after the Second World War, the national Interstate Highway program received total appropriations of only $50 million in the ten years after its designation by Congress in 1944.[107] In the mid-1950s, however, funding for the Interstate System was seriously debated by the Eisenhower Administration and Congress, culminating in the Highway Revenue Act of 1956 which raised federal motor fuel taxes and fees and created a Highway Trust Fund.

The funding of the Interstate program, and particularly the creation of the Highway Trust Fund outside of the traditional congressional appropriations process, has been extensively chronicled.[108] But two aspects of the Interstate funding process have particular importance to urban planning:

1. The abandonment of the traditional one-to-one federal/state fund matching ratio in favor of a nine-to-one ratio which dramatically skewed metropolitan highway investment decisions; and

2. The fixing of urban route locations by the Bureau of Public Roads in

---

[107] Congressional Quarterly, 1964, pp 527-530.

[108] See for example: Schwartz, 1976; Rose, 1979; and Seely, 1987.

> consultation with state highway departments prior to the appropriation of funds.

The requirement that federal highway funds be matched with state funding on a dollar-for-dollar basis was begun with the Federal Highway Act of 1916. The purpose of the matching requirement was to insure a vested state interest in and commitment to federally funded highway projects.[109] The one-to-one matching requirement was successful in that it stimulated the adoption of state motor fuel taxes and substantial highway funding programs in every state, and it remained intact for almost 40 years.[110]

In 1954, the federal matching requirement was changed -- for Interstate Highways only -- for the first time. The 1954 Federal-Aid Highway Act marked the first substantial financial commitment to the Interstate System; from general revenue sources, the Interstate System was appropriated $175 million annually, which constituted 18 percent of the entire federal highway budget (up from less than 4 percent the year before).

The rationale for the new matching rules was that, unlike local roads or even the Federal-Aid primary system, the Interstates were first and foremost a national system. Despite the urban orientation of the *Interregional Highways* plan outlining the system, the Interstate program was being touted in Congress, first and foremost, as a transcontinental system serving interstate commerce and

---

[109] Gifford, 1984, p 321.

[110] U.S. Congressional Budget Office, 1978, p 3.

national defense;[111] and anxious that states give the new Interstates a high priority, the 1956 Federal Highway Act established a more attractive three-to-two federal/state match to encourage states to build Interstates first. This change meant that Interstate projects -- from the states' perspective -- were 20 percent cheaper than other federally funded projects and 60 percent cheaper than highway projects built without federal funding.

In 1956 the Highway Trust Fund was created and the Interstate System became a national priority. The "national interest" rationale was again used to modify the Interstate matching requirement; this time the change (to a nine-to-one federal/state ratio) was so radical that it dramatically altered the planning calculus of state highway departments. From the states' perspective, building a metropolitan freeway without Interstate funding was now 900 percent more expensive than building an Interstate freeway; even Federal-Aid Urban projects, financed with the traditional one-to-one federal/state match were 400 percent more expensive than comparable Interstate projects.

The effects of this nine-to-one match were even more distorted by the mileage limit of the Interstate system. From the original Bureau of Public Roads studies of "...a very limited mileage of super-service highways,"[112] the Interstates had been planned as a fixed system. Fixed in mileage, but not in cost. Beginning in 1960, all Interstate funds were apportioned to states on the basis of each state's

[111] In 1949, the Bureau of Public Roads published a report called Highway Needs for the National Defense which argued that the most significant deficiencies of the national highway system were defense-related (U.S. Bureau of Public Roads, 1949).

[112] MacDonald, 1936, p 69.

estimated cost to complete the system.[113] In concert, the nine-to-one matching ratio and the fixed system length with no cost ceiling had two significant effects on metropolitan freeway planning:

1. They encouraged states to design as much capacity as possible -- more lanes, more and bigger interchanges -- into each mile of Interstate highway.[114] This served to both drive up costs and concentrate very large volumes of traffic on the metropolitan Interstates; from the states perspective, however, bigger Interstates were still a bargain.

2. They strongly discouraged states (or cities) from developing companion facilities to the metropolitan Interstates.[115] In other words, the structure of the Interstate funding program all but prohibited the kind of expressways envisioned by the early metropolitan transportation planners to circulate and distribute traffic in cities.

The result, of course, is the dominant role of metropolitan Interstate freeways in nearly every major city in the country; a role that the authors of *Toll Roads and Free Roads* and *Interregional Highways* emphatically advised against. Nationally, over 60 percent of the metropolitan freeways and expressways in the country are on the limited 11,500 mile urban Interstate System;[116] over 20 percent of all vehicle-miles travelled in cities are on these 11,500 miles of urban

---

[113] Each state's share was calculated by dividing the estimated cost of completing the Interstate System in that state by the estimated cost of completing the entire system.

[114] Gifford, 1984, p 320.

[115] Gifford, 1984, p 320.

[116] Highway database. Because Interstates are usually the largest metropolitan freeways, lane mile data, if they were available, would almost certainly reveal an even larger role for metropolitan Interstates.

Interstates.[117]

The second action that reduced the role of planning was the selection of urban route locations prior to the approval of the Highway Trust Fund. In 1947, the Bureau of Public Roads in consultation with each of the state highway departments agreed on locations for all of the rural routes and 3,900 miles of the 9,400 route miles slated for urban areas. The location of the urban mileage was generally for major Interstate routes passing through metropolitan areas, the remaining mileage of urban circumferential routes -- as recommended in *Interregional Highways* -- were reserved for later designation when better urban traffic data were available.[118]

In 1954, when the Administration and Congress began the Interstate financing debate, the remaining urban Interstate routes remained undesignated. Most of the funding debate in the 1955 session centered on whether the system should be financed with bonds or increased highway user fees. The debate was resolved in 1956 with the increase in user fees, including the gas tax, and the creation of the Highway Trust Fund.

What is interesting, however, is that a funding proposal, almost identical to the one which passed almost unanimously in both houses in 1956, was soundly defeated in a nonpartisan House vote 123-292 at the close of the 1955 session. Schwartz attributes this failure to (1) the organized opposition to increased taxes by the rubber, petroleum, and trucking industries (ironically, these industries

[117] Highway database.

[118] Schwartz, 1976, pp 424-425.

represented most of the highway lobby) and (2) lack of interest and support by urban Congress members in what they saw as a primarily rural highway program.[119] Both of these conditions changed for the 1956 Interstate deliberations.

Concomitant with the 1955 Interstate funding debates, the Bureau of Public Roads began work on the route locations for the remaining undesignated urban route mileage. In June 1955, the Bureau announced the criteria to be used by state highway departments in selecting the final urban route locations, which were essentially guided by rural highway engineering practice. While the document outlining the criteria included a passing reference to the recommendations in *Interregional Highways* that the final urban "routes should be located and designed to be an integral part of the entire urban transportation plan,"[120] this statement was essentially obviated by the detailing of the criteria to be used in selecting the routes. Again acknowledging that most of the traffic on these routes would be local, the Bureau nevertheless clearly established that long-distance, inter-city traffic would be given priority in determining the location of the urban routes:

> The routes...should be those which will to the greatest degree provide auxiliary service to the traffic that is interstate in character on the routes of the interstate system as now designated.[121]

---

[119] Schwartz, 1976, pp 433-436.

[120] Clark, 1955, p A-10.

[121] Clark, 1955, p A-1.

Further, the criteria included no requirements that the route selections be made in consultation with local or county governments, nor were they required to be consistent with metropolitan transportation plans. The document was clear that the urban route locations were to be selected jointly by the state highway departments and the Bureau of Public Roads:

> [With regard to] the designation of the remaining balance of available mileage[, t]he Bureau of Public Roads and the state highway departments are working to accomplish this full objective.[122]

In the process of urban Interstate route selection, Schwartz has noted that "...many of the state departments, in making their route selections, did not even bother to confer with elected city officials, let alone with the less politically influential city planners."[123] Breaking with the long-standing tradition of working exclusively with state highway departments would have been both a radical departure for the Bureau and a time-consuming endeavor; interjurisdictional coordination of any kind is a drawn out process, and time was of the essence in the summer of 1955.[124]

---

122 Clark, 1955, p A-3.

123 Schwartz, 1976, pp 508-509.

124 In the Bureau's words: "The Bureau plans to make the final location of the entire remaining 2,300 miles shortly" (Clark, 1955, p B-3).

The Bureau wanted the urban routes selected and mapped in time for the 1956 federal highway funding deliberations. Indeed, just three months after the announcement of the route selection criteria, the Bureau published the final route location plan for all urban Interstates (including the previously undesignated

Figure 6

Figure 7

urban routes) for every major city in the country.[125] The yellow jacketed "plan" (known as the Yellow Book) was really just a picture book of urban freeway maps with no accompanying text (see Figures 6 and 7). The entire "planning process" for the Yellow Book was completed by the Bureau in eight months.[126] The fact that the Yellow Book was published in the wake of the failure to fund the Interstate system in the 1955 legislative session, particularly given the haste with which the plan was assembled, was hardly coincidental. The effect of the Yellow Book on the 1956 Interstate funding deliberations "...was to render the Interstate program more attractive to Congress members from urban areas where Interstates were specifically displayed..."[127].

With the increased interest and support of urban members of Congress, due in part to the urban route designations in the Yellow Book, and heavy lobbying from the construction industry, the tide was turned and the Interstate funding package passed almost unanimously in both houses.

So with the passage of the 1956 Federal Highway Act, local transportation planning was essentially cut out of urban freeway development. The nine-to-one matching ratio strongly discouraged the development of parallel facilities (arterials, expressways, freeways, and transit) recommended in the *Toll Roads and Free Roads* plan and the preemptive designation of the urban Interstate routes by

---

[125] U.S. Bureau of Public Roads, 1955b.

[126] The Bureau first requested that states submit proposals for urban Interstate route locations on 6 January 1955. The document outlining the route selection criteria was circulated to the state highway departments on 9 June 1955. The final Interstate route plan was published on 15 September 1955.

[127] Schwartz, 1976, p 435.

the Bureau directly contradicted the recommendations of *Interregional Highways*. Thus, with the funding program in place and control of freeway development in the state highway department, the stage was now set for the mass production of freeways in California cities.

STATE PLANNING OF URBAN FREEWAYS IN CALIFORNIA

The creation of the Highway Trust Fund was the largest part of the significant federal and state financial commitment made to freeways in the late 1950s. Combined state and federal motor fuel tax rates, the principal revenue source for freeway development, increased 72 percent nationally between 1947 and 1959; in California the increase was 133 percent during the same period. These higher tax rates combined with average annual increases in fuel consumption in excess of 5 percent to dramatically increase highway revenues. Nationally, revenues for highways increased 381 percent between 1947 and 1959; in California the increase during the same period was much higher -- 495 percent.[128]

This extraordinary growth in highway revenues radically changed highway planning practice. No longer were scarce resources allocated incrementally to highway projects based on existing demand; new, large-scale freeway networks now were possible. Freeway plans that appeared fanciful in the late 1940s, were not only possible, but often appeared conservative just ten years later.

---

[128] Highway database.

Following the funding of the Interstate Highway System, the California Legislature in 1957 instructed the state Division of Highways to prepare a comprehensive plan "...for the ultimate freeway and expressway system of the entire State..."[129] The Division of Highways returned in 1958 with an ambitious 12,241 mile plan titled simply, *The California Freeway System*.[130] The plan called for the extensive development of both urban and rural freeways in networks far more dense than the systems proposed by national highway planners.

In the cities, the freeways were platted on roughly a four-mile by four-mile grid, which was a substantial departure from the ring-radial networks favored by most early metropolitan expressway planners. The ring-radial freeway plans were based on the existing patterns of roads and rail lines leading to and from city centers. But state freeway planners in 1958 argued that the proportion of trips to and from city centers was dwindling; metropolitan freeway networks, they concluded, should be modeled after urban street grids to better distribute traffic around the region, rather than funneling trips downtown.[131]

Such a position typifies the contrast between state and local approaches to planning freeways for cities. The early metropolitan expressway plans were motivated, in large part, by the desire to stem the decline of central business districts and inner-ring residential and manufacturing areas *vis-a-vis* the suburbs. Urban planners saw expressways as a central feature of land use planning in the

[129] Metropolitan Transportation Engineering Board, 1958, p 13.

[130] California Division of Highways, 1958.

[131] Jones, 1989, pp 242-243.

automobile age. Highway engineers, on the other hand, had little patience for such efforts at social engineering. The task of the state highway planner was to accommodate, not manipulate, travel demand:

> We cannot classify today's travel and transportation patterns as perverse or irrational and dismiss them as something that should be changed or modified by edict of some all-powerful agency.[132]

Metropolitan land use was mentioned in the 1958 freeway plan for California, but only with respect to the negative effect development adjacent to highways had on traffic flows. The land-use planning practiced by state highway engineers was to design facilities that interacted as little as possible with metropolitan land uses; the purpose of grade-separating and limiting access to freeways was to isolate them as much as possible from the tangled city traffic that surrounded them:

> ...the new freeway will preserve capacity to move traffic and avoid low-value string development with consequent deterioration of public investment in highways.[133]

Despite the major commitment of route mileage to metropolitan areas, only one of the ten explicit criteria used to identify and select freeway routes for the 1958 freeway plan referred to intracity travel; the other nine all concerned intercity travel. Though the plan acknowledged that two-thirds of all vehicle

---

[132] Edward Telford, California State Division of Highways District Engineer for the Los Angeles in a 1961 speech. Quoted in Jones, 1989, p 243.

[133] California Division of Highways, 1958, p 20.

travel in California was in the Los Angeles and San Francisco metropolitan areas[134] and that a "...majority of travel [statewide was] local,"[135] its authors concluded that:

> The primary function of a state-wide freeway system is to provide relatively rapid through-traffic service for the longer distance trips in the most direct and economical manner possible.[136]

In the late 1930s, the federal Bureau of Public Roads struggled to identify sufficient travel demand to justify a national interstate highway system. There was broad presidential and congressional support for superhighways and the Bureau had a strong orientation toward rural highway development, but there was indisputable evidence that most vehicle travel and traffic problems were urban. In its struggle to balance political will and bureaucratic tradition with the evidence, the Bureau, in its *Toll Roads and Free Roads* report, concluded that a national superhighway network connecting city centers was the answer.

---

134 California Division of Highways, 1958, p 8.

135 California Division of Highways, 1958, p 10.

136 California Division of Highways, 1958 p 22.

Twenty years later, the California Division of Highways similarly struggled to accommodate political will, bureaucratic tradition, and travel demand in the preparation of its 1958 freeway plan. To justify the need for a statewide freeway system, the plan focused on the need for improved recreational and commercial intercity travel, presumably because the average lengths of these trips (15.5 miles and 8.5 miles respectively) were the longest of all trip types. No data were presented in the plan, however, showing that intercity recreational and commercial travel constituted a significant proportion of vehicle travel or that such travel warranted special attention.[137]

The incompatibility between data showing that most travel was both urban and local, and the Division of Highways' rural highway orientation toward "...rapid through-traffic service for longer distance trips...,"[138] helps to explain

Table 2

Actual Versus Projected Traffic Shares in California

	Projected for 1980	Actual in 1980	Percent Difference
Percent of Planned Rural System Completed	100%	44%	- 56%
Percent of Rural Travel on Rural Freeways	60% to 75%	20.3%	- 66% to - 73%
Percent of Planned Urban System Completed	100%	46%	- 54%
Percent of Urban Travel on Urban Freeways	52% to 62%	47.0%	- 10% to - 24%

Source: California Division of Highways, 1958, p 26.

[137] Though data from numerous traffic studies over the previous two decades, including the data discussed earlier in *Toll Roads and Free Roads* and *Interregional Highways*, had clearly revealed the very small role of long-distance, inter-city vehicle travel.

[138] California Division of Highways, 1958, p 22.

why the 1958 plan for California substantially overestimated the role of freeways in rural areas and underestimated their impact in urban areas.

Assuming a linear relationship between the size of the freeway system and freeways' share of vehicle travel,[139] one can adjust the Division of Highways' freeway travel share estimates by accounting for the fact that less than half the planned freeway system was completed by 1980. The resulting adjustments in the projections for 1980 freeway traffic shares show that the California Division of Highways overestimated the role of freeways in rural areas by about 33 percent and significantly underestimated the role of freeways in metropolitan areas by about 81 percent.[140] In other words, the role of freeways in metropolitan areas in 1980 was nearly double what was anticipated by state highway planners in the 1950s.

---

[139] Which is probably a conservative assumption given that the freeways built, especially in rural areas, were in the corridors with the highest travel demand (Schaeffer Interview, 1991).

[140] This is done simply by multiplying the projected freeway traffic share for 1980 by the proportion of the system actually completed in 1980:

(projected traffic share) * (proportion of system completed) = (adjusted traffic share projection)

High Rural Estimate: (75%) * (44%) = 33%
Low Rural Estimate: (60%) * (44%) = 26%
Composite Rural Estimate: (33%) + (26%) / 2 = **30%**

High Urban Estimate: (62%) * (46%) = 29%
Low Rural Estimate: (52%) * (46%) = 24%
Composite Urban Estimate: (29%) + (24%) / 2 = **26%**

(actual 1980 traffic share) / (adjusted traffic share projection) = (percent of over- or under-estimation of freeway traffic share)

Rural Freeways: (20%) / (30%) = **- 33%**
Urban Freeways: (47%) / (26%) = **+ 81%**

Figure 10

Figure 8

Figure 9

And since 1980, the role of urban freeways in statewide vehicular travel has continued to grow. Figure 8 shows the trend of vehicle travel in California since 1967.[141] The figure shows that most of the growth of vehicle travel statewide has been in cities, much of it on urban freeways; only a small proportion of total travel since 1967 has been on rural freeways. And while the role of freeways in urban vehicle travel has been growing nationwide, Figure 9 shows that the proportion of travel on urban freeways in California is about 50 percent higher, on average, than U.S. cities as a whole. The larger role of freeways in California cities, however, is not simply the result of larger freeway networks in California cities compared to most other U.S. cities; Figure 10 shows that the density of urban freeway travel[142] is both higher in California and is increasing at a much faster rate than for U.S. cities as a whole. Thus, despite the fact that urban freeway mileage in California grew by only 3.4 percent during the 1980s, urban freeway travel grew by a whopping 72.9 percent over the same period;[143] the intercity focus of state highway plans in the 1950s could not have been more misplaced.

The California plan was silent on the cost of the freeway system, saying only "...that the system herein is economically feasible and can be accomplished

---

[141] 1967 was the first year that such data were available.

[142] Measured in this case as:

(annual urban freeway vehicle-miles of travel) / (centerline miles of urban freeway)

Such a measure indicates relative levels of freeway use, but not relative levels of traffic congestion.

[143] Highway database.

within the framework of present highway user finances within a reasonable period of years."[144] In hindsight such a conclusion might appear naive, but at the time it appeared quite reasonable. Inflation-adjusted highway revenues in California doubled and then doubled again between 1947 and 1959, and there appeared to be no end in sight. Recalls a retired Chief Engineer at the Division of Highways:

> In the late 1950s we couldn't build freeways fast enough. The money was piling up faster than we could spend it.[145]

A financial evaluation of the plan was prepared for the legislature which set the cost of completing the system by 1980 at $10.5 billion dollars; about two-thirds of the projected costs were for metropolitan freeways and one-third rural freeways.[146] The financial evaluation concluded that the freeway system could be built with projected funds from existing highway revenue programs, assuming little cost escalation over the twenty-one year life of the program.[147] In 1958 dollars, $10.5 billion was a staggering sum for a state public works project, equivalent to $51.2 billion today. To soften the impact of this figure, the evaluation presented several indexed measures of the total system cost such as cost per vehicle per year and cost per vehicle-mile travelled:

---

144 California Division of Highways, 1958, p 32.

145 Schaeffer Interview, 1992.

146 Zettel, 1959, pp I-10 to I-11.

147 The report concluded, however, that subsequent tax increases would likely be required to cover the effects of inflation (Zettel, 1959, pp II-27 to II-28).

> In terms of cost per mile of travel, the average is well under one-half cent per vehicle-mile. Reducing billions to these more meaningful terms, then, the program cost no longer appears to be fantastic.[148]

But "fantastic" accurately describes the scope and scale of the system proposed. At 12,241 miles, the California Freeway System was nearly a third the size of the entire Interstate Highway System and was the largest single public works project ever undertaken by a single agency. The plan projected extraordinary growth for the state, even more it turns out, than the extraordinary growth that actually occurred.

Table 3

1959 California Freeway Plan Projections versus Actual Outcomes

	Actual in 1957	Projected for 1980	Projected Change	Actual in 1980	Actual Change
Population	13 mil	31 mil	+ 139%	23.8 mil	+ 83%
Vehicle Registration	7 mil	17 mil	+ 143%	16.9 mil	+ 141%
Vehicle Travel	65 bil	200 bil	+ 208%	155.9 bil	+ 140%

Source: California Division of Highways, 1958, p 15; Highway database.

In spite of its ambition, or perhaps because of it, the plan met with almost universal local and legislative support. Most of the debate surrounding the plan was whether the Division of Highway's growth projections were too

[148] Zettel, 1959, p I-13.

conservative. After adding an additional 171 miles to the plan, it was adopted almost unanimously by both houses of the legislature in 1959.[149]

So with the creation of the Highway Trust Fund in 1956 and the adoption of the California Freeway System in 1959, popular and political support for freeways was at an all-time high. Freeway development, in California and around the country, geared up quickly in the late 1950s. In California, more miles of freeways were opened between 1957 and 1959 than had been built up to 1956, and then more miles of freeways were opened between 1960 and 1964 than had been built up to 1959.[150]

[149] Jones, 1989, pp 246-247.

[150] Highway database.

Figure 11

Freeway development continued to expand in the 1960s, reaching a peak, both nationally and in California, in 1966; that year 271 miles of freeway opened in California, 3,608 miles nationally. But just as quickly as it had begun, and long before the planned systems were completed, freeway development began to decline. Between 1966 and 1976, the annual miles of freeway opened dropped 51 percent nationwide. In California, the downward trend was even sharper; from the peak of 271 miles opened in 1966, new freeway mileage dropped to 107 miles in 1974, and to just 17 miles in 1978, a 94 percent drop in 12 years. To date, freeway development has not rebounded appreciably; in California, more miles of new freeway were opened in 1966, than were opened in the 14 years between 1977 and 1990 (Figure 11). Though the Interstate System is nearly complete, over half of the 1958 California freeway plan remains unbuilt.[151]

The freeway-building era, then, was short-lived. Eighty percent of the current California freeway system and 81 percent of all freeways nationally, were built between 1956 and 1974.[152] The causes of this dramatic rise and fall of freeway development are the subject of the next section, and they are further examples of finance leading planning.

CONCLUSION

The modern urban freeway, then, is a hybrid creature that has been distinctly shaped by the funding process. In order to secure funding for

[151] Highway database.

[152] Highway database.

expressway development, cities turned to the states and the federal government. In the Depression, there was a shift from property tax financing to the gas tax, which separated urban freeway finance from the enormous impact freeways would have on land use. In California, the state agreed to finance metropolitan freeways under the condition that cities give up control over the planning, design, and operation of freeways to the state highway department. And the financing of the Interstate system both set the location of the urban routes and placed a distorted emphasis on Interstate freeways over other forms of urban transportation -- including other freeways.

Retrofitting new freeways into cities was socially disruptive and expensive. But the levels of disruption and expense were a function of the size of the new freeway. The expressways envisaged by most early planners would have required some displacement of existing homes and businesses, but far less than the freeways that were eventually built. The freeways built in cities were larger, noisier, facilities that concentrated traffic and pollution much more than the expressway systems envisioned by early planners. The new urban freeways were also very expensive; supported only by highway user fees that did not grow in proportion to rising costs and increasing travel, they quickly lost ground to inflation and rapidly appreciating urban land values. Urban freeway development, in other words, was destined to a financial breakdown from the start. This financial breakdown and the planning and policy changes that followed it, are the subject of Part Two.

PART TWO

FINANCE AND URBAN FREEWAY POLICY FROM 1960

I am...firmly convinced that the demand for good roads will not end. In fact, I expect a resurgence of freeway building in the years ahead. ...our freeway program will have to be expanded -- and soon.

-- James A. Moe
Director of the Department of Transportation
State of California
December 1973

This Administration has no intention of participating in the construction of any more Cadillac-commuter systems that have very little chance of providing adequate benefits... As for starting new freeways, I just do not see that happening.

-- Donald E. Burns
Secretary of Business and Transportation
State of California
March 1975

OVERVIEW

The relationship between freeway finance and freeway policy in California during the 1960s and 1970s is the subject of this part. There is a popular perception that worsening air pollution, fuel shortages, and community opposition to particular freeway projects combined in the 1970s to stop freeway development in California; this anti-freeway movement is said to have culminated in 1975 when the state formally renounced the 1959 Freeway Plan and adopted a new "multi-modal" stance. While state freeway policy was changed in 1975, the idea that a policy change stopped freeway development in California is simply not correct. California stopped building freeways, not because of state policy decisions in the mid-1970s, but because the freeway program began running out of money in the 1960s. This occurred because the highway finance program established during the 1950s to fund ambitious plans for freeways could pace neither the rapid escalation of freeway costs nor the growth in vehicle travel.

The first section of this part examines state freeway policy during the 1970s, particularly with respect to the shift in the mid-1970s from a state commitment to completing the 1959 California Freeway System plan to the multi-modal policies of the Jerry Brown Administration. The timing of policy changes is juxtaposed in the second section with the trends of freeway costs and revenues from 1960 to 1990; these trends reveal a cost/revenue squeeze that curtailed new freeway development in the mid-1960s and continues, in spite of recent highway user tax increases, in the 1990s.

CALIFORNIA FREEWAY POLICY AND PLANNING AFTER 1960

The enormous financial commitment to freeways and the widespread

belief in the early 1960s that the planned freeway systems were fully funded contributes to the popular perception that the rapid decline of freeway construction in the late 1960s and early 1970s was due largely to shifts in public policy from metropolitan transportation development centered on freeways, to multi-modal transportation development that balanced investments in freeways with other modes such as public transit.

In California, these shifts in public policy and transportation planning are commonly attributed to Democratic Governor Jerry Brown and his Department of Transportation Director[153] Adriana Gianturco. Indeed, blaming Brown and Gianturco for the state's traffic congestion problems has become California lore. For example, a 1986 report by the California State Automobile Association on the California highway program asserted that:

> ...the state, under the Brown Administration, virtually halted its highway construction program in the as yet unfulfilled hope that mass transit would solve our urban traffic problems.[154]
>
> Under Governor Brown's Caltrans Director, Adriana Gianturco, California abandoned planned freeways and cut back on construction. Efforts were invested in trains and high technology while the highway system languished.[155]

---

[153] The California Division of Highways was renamed the California Department of Transportation (Caltrans for short) in 1973 to reflect the new multi-modal responsibilities of the agency. The vast majority of Caltrans' activities, however, continued to center on the state highway system.

[154] California State Automobile Association, 1986, p 5.

[155] Patton, 1986a, p 29.

In the same vein, a recent *San Francisco Chronicle* editorial found Brown and Gianturco largely to blame for the state's worsening traffic congestion problems. California's "traffic mess," the *Chronicle* claimed, was the result of:

> ...an anti-freeway movement that reached its peak when then-governor Jerry Brown and his transportation director Adriana Gianturco, crippled the state's freeway program.
>
> Californians today are paying the price for these politician's arrogant -- and naive -- view that drivers could be forced out of their cars by simply not building any more freeways.[156]

[156] *San Francisco Chronicle*, 1986, p P-1.

Figure 12

Even a cursory examination of Figure 12, however, reveals such interpretations of history to be more histrionic than factual. The Brown Administration did in fact issue "a major policy statement" in March 1975 announcing a shift in state transportation priorities from the construction of new freeways to implementing operational improvements on the existing freeway system and expanding urban public transit.[157] But Figure 12 clearly shows that freeway development in California began a precipitous decline in 1967, seven years before Brown's election as governor and eight years before the formal shift in state transportation policy. In other words, California had stopped building freeways years before the state announced its intent to stop building freeways.

The causes of the decline of freeway construction in the 1960s, as we will see below, were primarily financial. Funding simply did not exist to build many new freeways, and the 1975 pronouncement of the Brown Administration brought freeway policy and planning in line with this financial reality. This shift in transportation policy to match the financial reality is an example of finance leading policy.

Even if the Brown Administration had announced in 1975 that the state remained committed to implementing the 1959 freeway plan, it is unlikely that any additional miles of freeway would have been built. To substantially reverse the decline of freeway construction in 1975 would have required an extraordinary new financial commitment to freeways; the cost/revenue squeeze on freeway development was so severe by 1975 that even a doubling of highway revenues in

[157] Hebert, 1975a, p 1.

the mid-1970s would not have restored freeway construction to the levels of the early 1960s.

Two years before Brown took office, the *Los Angeles Times* proclaimed the "southland's freeway program [to be] slowly dying."[158] Yet, despite the indisputable wind-down of the California freeway program between 1966 and 1974, Brown's "balanced transportation" policies and his appointment of an urban planner (Gianturco) to implement them were subjected to ongoing partisan attacks and media criticism for unilaterally stopping freeway development in California.

Gianturco's stormy tenure as Caltrans Chief, in particular, is an example of the paradigmatic conflict between urban planning and highway engineering that has shaped metropolitan freeway development from the 1930s. Like all other state highway departments around the country, the California Division of Highways had been created to improve the state's highway system; the Division was, first and foremost, a highway building organization. Its mission was narrowly drawn and its goals were product- oriented: to improve the supply of highways given a growing demand for travel. In the last section, we saw how the Division of Highways, when given the responsibility for metropolitan freeway development in 1947, rejected the components of cities' expressway plans -- transit rights-of-way, joint-development, etc. -- that diverged with its mission of building highways. The California Freeway System plan had become the organization's *raison d'etre* in 1959 and, even as freeway funding ran short in the

[158] Hebert, 1973a, p 3.

mid-1960s and construction was scaled back, the Division of Highways remained focused on its primary product: freeway construction.

Adriana Gianturco's appointment as Caltrans Director (as both a planner and a woman) was a shock to the Caltrans organizational culture dominated by white, male engineers steeped in the public works tradition of civil engineering.[159] Gianturco was an urban planner by training and trade; she began her career as a community development planner for an anti-poverty agency in Boston and had been Director of Planning for the Massachusetts Office of Planning and Management in the early 1970s. She was at Harvard working on a PhD in urban and regional planning when Brown asked her to join his administration in 1975.[160]

Gianturco's planning approach was more process-oriented and less product-oriented than her predecessors. While her immediate predecessor "...expect[ed] a resurgence of freeway building in the years ahead,"[161] Gianturco's approach was more incremental and behavioral. For Gianturco, travel demand was not simply a given, but rather was a function, in part, of the supply of

---

[159] A shock that remained with the organization years after her departure. For example, funding shortfalls forced Caltrans to begin laying off engineers in 1970. By the time of Gianturco's arrival in 1976, the Department's engineering staff had been reduced to one-third of the 1968 peak of over 9,000 engineers. From this 1976 low point, the size of the engineering staff increased by half (to over 4,000 engineers) during Gianturco's directorship. Yet, despite the fact that the layoffs preceded Gianturco's arrival by six years, and staffing actually increased during her tenure, a 1986 survey of over 2,000 Caltrans engineers found that many blamed Gianturco for slowing freeway development by reducing the size of the Caltrans workforce (Jones and Taylor, 1987).

[160] Liebert, 1976a, p 8.

[161] Moe, 1973, p II-7.

highways; as such, the demand for freeway travel could be manipulated by adjusting the supply. These adjustments are called Transportation Demand Management today, but, to most highway engineers in the early 1970s, such thinking was heretical.

Caltrans had been investigating and gradually implementing some operational changes (such as high-occupancy-vehicle lanes) for years, but such programs became priorities under Gianturco. Freeway operations (ramp-metering and high-occupancy vehicle lanes), environmental improvements (sound walls and landscaping), and multi-modal projects (busways and park & ride lots) -- features the Division of Highways had deleted from cities' early plans for expressways -- replaced new freeway construction as top priorities.

Given the conflict between product-oriented highway engineering and process-oriented urban planning, it is not surprising that critics of Gianturco's appointment seized on her urban planning credentials as evidence of her unfitness for the position. Randolph Collier, the venerable chair of the Senate Transportation Committee, publicly opposed Gianturco's nomination on the grounds that her planning background disqualified her as state transportation director, saying "...she is not competent in this field because she is a planner..."[162]

Highway lobbyists, quite naturally, were similarly concerned with Gianturco's planning credentials. Unnamed sources told the *San Francisco Chronicle* that Gianturco was "an environmentalist who hates freeways,"[163] and an

[162] *Los Angeles Times*, 1976a, p II-5.

[163] Liebert, 1976a, p 6.

LA Times source concluded that:

> A planner is the worst kind of a person to head a state department. Their heads are in the clouds. They lack the necessary practical experience.[164]

The editors of the *San Francisco Chronicle* were a bit more charitable toward the new "highway lady."[165] Though she was not a person they could "...envision in a hard hat and whipcord breeches hopping out of her state car to pal around with concrete-mixer crews laying their ribbons of freeway," they saw "...no reason why a woman with professional planning competence should not be able to manage this important job."[166]

---

[164] Gillam, 1976, p I-16.

[165] *San Francisco Chronicle*, 1976, p 18.

[166] *San Francisco Chronicle*, 1976, p 18. The *Los Angeles Times*, on the other hand, waged an open battle against Gianturco over the installation of high-occupancy-vehicle (HOV) lanes on the Santa Monica Freeway. While Gianturco was an enthusiastic supporter of the project, freeway HOV lanes had been under study by Caltrans for four years before Gianturco's arrival (Anderson, 1977, p VIII-3) and the Santa Monica HOV project, coincidentally, opened the day before Gianturco began her term as Caltrans Director (Bauer Interview, 1992).

The *Times*, however, made opposition to the HOV project its *cause celebre* and criticized Caltrans, Brown, and Gianturco on a regular basis for the duration of the short-lived project. While Caltrans had secured local support for the HOV lanes before initiating the project in March 1976 (*Los Angeles Times*, 1975d, p II-8), the *Times* accused Caltrans and Gianturco of "social engineering" in the HOV project which was described as both "a plot" and "a total flop" (See the following editorials: *Los Angeles Times*, 1976a, p IV-2; *Los Angeles Times*, 1976b, p II-4; *Los Angeles Times*, 1976c, p II-6; *Los Angeles Times*, 1976d, p II-6; *Los Angeles Times*, 1976e, p II-6; and *Los Angeles Times*, 1976e, p IV-2); all told, the paper printed 102 articles, 96 letters to the editor, six editorials, and six editorial cartoons on the project in just over six months.

The *Times*' attacks on Gianturco did not end when the HOV project was abandoned and the controversy had subsided; in 1977, an entire editorial was devoted to ridiculing Gianturco for an internal memorandum she wrote criticizing her staff for the frequent grammatical errors in Caltrans reports; for this, the *Times* patronizingly declared, Gianturco was "on the warpath again." (*Los Angeles Times*, 1977a, p 42).

Two of Gianturco's more notable critics were State Senator George Deukmejian and San Diego Mayor Pete Wilson, the two men who succeeded Brown as Governor. On the eve of her appointment as Caltrans Director, for example, Deukmejian joined the chorus of concern over Gianturco's planning background: "Obviously, there is some concern about her...experience, what she has or hasn't done, what she has advocated or been against."[167] Wilson was less cautious; in 1976 the current California Governor charged that "...Ms. Gianturco has either failed to recognize the need for improved freeways or 'arrogantly' disregarded them."[168]

When Deukmejian took office in 1983, he promised that the state would return to a pro-freeway policy and replaced Gianturco with a senior highway engineer who had spent his career with Caltrans. Indeed, the California State Automobile Association claimed in 1986 that "...the state's [freeway] construction program has been resurrected under current Governor George Deukmejian..."[169] In spite of this new pro-freeway policy and a renewed commitment to the California freeway plan, however, the cost/revenue squeeze in freeway finance continued and freeway construction did not rebound. In fact, more than twice as many new miles of freeway were built during the eight years of the "anti-freeway" Brown Administration (291 miles) than during the eight years of the

---

[167] Gillam, 1976, p I-16.

[168] *Los Angeles Times*, 1977b, p I-23.

[169] Patton, 1986a, p 29.

"pro-freeway" Deukmejian Administration (103 miles);[170] lacking increased funding, Deukmejian's new pro-freeway policies were all but irrelevant.

The intent here is neither to vindicate Brown, nor to imply that Ronald Reagan (Brown's predecessor) or George Deukmejian (Brown's successor) were responsible for halting freeway construction; the intent is to show that freeways were not stopped by policy shifts and changed plans. Freeway construction was stopped by rising costs and lagging revenues that financially squeezed the freeway program in California and around the country. The causes and dimensions of this financial squeeze are the subject of the next section.

THE COLLAPSE OF FREEWAY FINANCE

This section traces the trends of highway user taxation, freeway revenues, and freeway expenditures in California over time. First, the evolution of highway user taxes is traced to show that the regular pattern of post-World War Two tax increases ended when freeway plans were thought to be fully funded in 1961; no freeway-related tax increases were enacted until the 1980s. Second, the factors contributing to increasing freeway development costs are outlined. And finally, the causes of lagging revenues are detailed to complete the picture of the cost / revenue squeeze in freeway finance between 1960 and 1990.

[170] Highway database.

Highway User Taxation in California[171]

Table 4

A Summary of the Highway User Fee Tax Increases: 1947 to 1961.

Type of Tax or Fee:	Cal 1947	U.S. 1951	Cal 1953	U.S. 1956	U.S. 1959	U.S. 1961
US Gas / Gallon		$0.02		$0.03	$0.04	$0.04
CA Gas / Gallon	$0.045		$0.06			
CA Other Fuels / Gallon	$0.045		$0.07			
US Lubricants / Gallon		$0.06		$0.06	$0.06	$0.06
US Vehicle Rubber / Pound		$0.05-$0.09		$0.03-$0.09	$0.03-$0.09	$0.05-$0.10
US Vehicle Registration / Year		$3.00		$3.00	$3.00	$6.00
CA Commercial Vehicle Empty Weight / Year	$40-$200		$50-$250			
CA For-Hire Carriers	4% of rcpts		4% of rcpts			
US Vehicle Special Tax		$1.00		$1.00	$1.00	$1.00
CA Vehicle Registn / Year	$6		$8			
CA Drivers' Lcnse / 4 Years	$2		$3			

Source: Highway database.

[171] The Federal Highway Administration has compiled extensive highway data in the annual *Highway Statistics* report, but the data are organized by funding program (such as Federal Aid Primary, Interstate, state highways, county roads, and so on) and not by highway facility type (such as freeway, other highways, local streets, etc.). Extensive data are available on the freeway-only Interstate System, but Interstates comprise only a portion of all freeway mileage; in California, for example, over 40 percent of the freeway mileage is not part of the Interstate System.

Where complete freeway data are not available, state highway department data are used as a proxy. Such data are a fair indicator of freeway development activity because nearly all urban and rural freeways in the U.S. were designed and built by state highway departments, and eighty to ninety percent of highway department activity during the 1950s and 1960s was devoted to constructing freeways (Schaeffer interview, 1992).

The creation of the Highway Trust Fund in 1956 was the most significant freeway funding legislation of the 1950s, but the entire freeway funding package for California was gradually assembled, first in Sacramento and later in Washington between 1947 and 1961. By 1961, an enormous financial commitment to freeways had been made. Inflation-adjusted revenues for state highways in California increased over 400 percent between 1947 and 1961 to the 1990 equivalent of over $3.5 billion per year.[172] The six major post-World War Two tax increases for highways between 1947 and 1961 are summarized in a simplified format in Table 4.[173]

Much of the debate over increasing highway taxes for freeways concerned, not the gas tax, but the "fair share" to be paid by trucks. Studies of highway finance consistently showed that trucking imposed more costs on the highway system that it paid in taxes,[174] but the difficulty of equitably assessing heavy vehicles and the consistent, organized opposition to increased fees by the trucking industry precluded large increases in heavy vehicle fees. Instead, a complex system of vehicle fees has evolved at both federal and state levels that

---

[172] Highway database.

[173] Highways are somewhat unique among government programs because of the earmarking of specific taxes to support program expenditures. Most states, including California, have constitutional provisions prohibiting the "diversion" of highway user taxes to non-transportation purposes. And, while the U.S. constitution contains no such provisions, highway advocates have successfully maintained a link between highway taxes and highway (and later transportation) expenditures in all post-Depression highway programs until 1990. The use of dedicated user taxes linked to highway development has provided freeway programs a long term financial base somewhat separate from the annual and biennial appropriations processes.

[174] Congressional Quarterly, 1964, p 533; U.S. Congressional Budget Office, 1978, pp 24-26; Zettel, 1953, p 40; Zettel, 1980b, pp 3-1 to 3-6.

have shifted some additional financial burden on the trucking industry, but still short of the costs trucks are estimated to impose on the highway system.

In California, a particularly complicated set of commercial vehicle taxes has evolved since the first adoption of such fees in 1923. The first was an annual tax on the unladen weight of the vehicle; this tax has remained, with many modifications, to the present day. It is likely that taxing the unladen (empty) weight was chosen by the Legislature instead of the gross (loaded) weight because of the difficulty in the 1920s of accurately measuring and assessing gross vehicle weights. Over the years such measurement has become routine, however the unladen tax has remained. Because the costs trucks impose on the highway system (excluding traffic congestion costs) are a function of the loaded vehicle axle weight and the miles travelled, most states have adopted some sort of gross weight and/or mileage tax; California, however, continues to tax the unladen weight which substantially favors large trucks (with high loaded-to-empty weight ratios) over small trucks and buses (which have much lower loaded-to-empty weight ratios).[175]

The second commercial vehicle tax -- the gross receipts tax -- was controversial from its adoption in 1923, yet remained in place for fifty years. The gross receipts tax, which was originally modeled after the gross revenue taxes charged to railroads and public utilities at the time, charged for-hire (or third party) carriers a percentage of their gross receipts. While a high proportion of trucking was for-hire in the 1920s, the tax completely exempted all proprietary

[175] Zettel, 1980b, p 2.2.

trucking; thus, one class of trucking was singled-out for taxation, while the other class was exempted.[176] As years passed, the gross receipts tax was modified to more equitably distribute the tax burden between for-hire and proprietary trucking, yet the unpopular (and essentially indefensible) tax persisted until 1973.[177]

[176] Zettel, 1980b, pp 2.2 to 2.3.

[177] Highway database.

Figure 13

Figure 13 below shows the relative contributions of motor fuel (gas and diesel) taxes and the other highway user taxes shown in the table above. Despite some dramatic changes in highway funding levels since the Second World War, the relative roles of fuel taxes and other user fees have remained remarkably consistent; about half of all highway user revenues nationally and a little over half of highway user revenues in California come from fuel taxes, and about half from other user fees.

When the last of the freeway-related tax increases was adopted as part of the Federal Highway Act of 1961, freeway funding appeared set. The freeway system in California was growing by over 150 miles per year[178] and it appeared that the federal/state financial program shown in the table below was sufficient to complete both the Interstate Freeway System and the California Freeway System by 1980.[179] So widespread was the belief that California freeways were adequately funded, that the only highway tax increase in California during the 1960s was made to redress the relative lack of state support for city and county roads during the 1950s. When the state gas tax was increased $0.01 per gallon (and most other fees were raised about 15 percent) in 1963, ~~none~~ of the additional revenues went to the state highway program because:

> ...it was widely felt that balance would be restored to the total highway program by accelerated financing

---

[178] Highway database. Freeway miles nationwide were increasing by an average of over 2,500 miles per year during this era. This compares with an annual average of 410 miles per year nationwide (and just 11 miles per year in California) in the late-1980s (Highway database).

[179] Congressional Quarterly, 1964, p 533; Zettel, 1959, pp II-24 to II-25.

of local facilities.[180]

[180] Zettel, 1980b, p 2.8.

Figure 14

At first glance, such views appear well-founded. While the construction of new freeways fell off in the late 1960s and 1970s, highway revenues and highway expenditures continued to rise. Figure 14 shows that the trend of revenues available for highways in California and nationwide has followed a steady upward trend since World War Two. The figure also shows that revenues for highways have been growing at an increasing rate; in California and the nation as a whole, highway revenues doubled during the 1980s. In absolute terms, revenues for highways increased more during the 1980s than in any previous decade.

Likewise, the trend of highway expenditures reveals a similar, albeit more variable, growth in every decade. While there have been single year drops in

Figure 15

expenditures in every decade since World War Two, Figure 15 shows that the only multi-year decline in expenditures was in California between 1970 and 1974, Ronald Reagan's last term as Governor.

These figures, however, present a misleading picture of highway finance since 1965. They do not account for freeway revenues and expenditures *vis-a-vis* other streets and roads; they do not account for the rising costs of highway construction and maintenance; and they do not account for the explosive growth in vehicle travel. When each of these factors is controlled for, a far different picture of highway finance emerges.

Figure 16

Figure 16 shows the trend of revenues for state highway programs in (CPI-adjusted) 1990 dollars per 100 vehicle-miles of travel. In contrast with Figure 14, this figure shows that adjusted state highway revenues declined nationally by two-thirds between the mid-1960s and the late 1970s; in California, adjusted state highway revenues dropped by three-fourths during the same period. Figure 16 also shows that, except for 1955, adjusted state highway revenues in California have been below the national average every year since 1945. Further, Figure 16 shows that since 1975, adjusted revenues for the state highway program in California have run at about half of the national average.

Figure 17

Figure 17 contrasts with Figure 15 by showing the trend of state highway construction expenditures per 100 vehicle-miles of travel in 1990 dollars.[181] This figure shows that, in real terms, highway construction expenditures peaked nationally in 1959 and in California in 1961. Adjusted nationwide highway construction expenditures began a steady fifteen-year decline beginning in 1964; since 1979 expenditures have remained fairly stable at about $1.00 per 100 VMT, about one-third of the 1959 peak.

Figure 17 also shows that adjusted highway construction expenditures in California were substantially higher than the national average in the 1960s, experienced a much sharper drop in the 1970s, and have leveled out at a much lower level during the 1980s. State highway construction expenditures remained at or near peak levels of roughly $3.50 per 100 VMT for nearly fifteen years from 1954 to 1968; but, beginning in 1968, expenditures went into a decade long freefall. In 1978, expenditures leveled off at about $0.50 per 100 VMT, less than one-eighth the 1961 peak and less than half of the national average.

The trends of Figures 16 and 17 diverge from the those in Figures 14 and 15 in the mid-1960s when rising costs and lagging revenues began to take their toll. The causes of these rising costs and lagging revenues are the subject of the next two sections.

Rising Costs

[181] In this case, construction expenditures are adjusted using the U.S. and California Highway Construction Cost Indices. The derivation of these indices is described below.

The principal cause of the decline of freeway development was the dramatic rise in construction and maintenance costs during the 1960s, 1970s, and 1980s. Freeway development costs nationwide grew much faster than the general rate of inflation between 1960 and 1990; freeway costs rose faster in California than the nation as a whole, and faster in cities than in rural areas. There were four primary causes of the rapid escalation of freeway costs, each is discussed in turn below:

1. The general rise in construction and maintenance costs;

2. The significant upscaling of freeway designs;

3. Rising urban land values that caused right-of-way costs to skyrocket; and

4. Environmental and community concerns that increased administrative and planning costs.

Increasing Construction and Maintenance Costs

Figure 18

Construction costs of all kinds rose faster than the general rate of inflation between 1960 and 1990, and highway construction costs were no exception. The Federal Highway Administration compiles highway construction, maintenance, and operation costs into annual highway cost indices. The indices, which have been published for over fifty years, are calculated by averaging contractor bid prices for an "average" highway project.[182] These indices -- one for construction and one for maintenance and operations -- indicate unit cost changes in construction, maintenance, or operating costs only; they do not reflect per mile cost increases due to facility upscaling, increased right-of-way costs, or increased project planning and engineering costs. They do, however, reveal a significant increase in highway construction and maintenance costs between the 1950s and the three decades that followed. Figure 18 below shows the trend (or lack thereof) in highway construction costs in California and nationwide during the 1950s. The figure shows that highway construction costs were essentially flat for the entire decade. These inflation-free cost trends were what informed the financial planning of freeways in the late 1950s and led analysts to assume in their calculations that there would be little or no escalation in construction costs between 1959 and 1980.[183]

---

[182] For highway construction, for example, changes in average contractor bid prices are calculated for earthwork, structures, and surfacing. The "average project" used to calculate construction cost changes involves 3,641,885,000 cubic yards of roadway excavation, 154,953,000 square yards of portland cement concrete surfacing with an average thickness of 9.1 inches, 111,516,000 tons of bituminous concrete surfacing, 2,206,879,000 pounds of reinforcing steel for structure, 2,581,462,000 pounds of structural steel, and 14,583,000 cubic yards of structural concrete (U.S. Federal Highway Administration, 1962, p 174).

[183] Zettel, 1959, p II-25. Though the financial analysis of the California Freeway System did mention that there might be some reason "...to anticipate upward pressures on highway costs over the long run" (Zettel,

Figure 19

1959, p II-27), which would require subsequent "...changes in rates of user taxation when appropriate" (Zettel, 1959, p II-28).

Figure 19 is simply a continuation of Figure 18, showing the trend of highway construction costs between 1960 and 1990 with the trend of the U.S. Consumer Price Index included for comparison. The figure reveals an extraordinary rise in highway construction costs during the 1960s and 1970s. Further, this figure shows that highway construction costs rose faster than the general rate of inflation for the nation as a whole, and that costs in California rose much faster than highway construction costs nationally, especially during the 1970s.

The reasons for the rapid increase in highway construction unit costs are the same as for the increase in all construction costs during the same period: high levels of demand for construction services, strong demand for construction materials and equipment, and high levels of unionization resulting in rapidly climbing wage rates. Yet the rapid growth of construction unit costs was only part of the picture; only 26 percent of the increase in California freeway construction costs was due to increasing construction costs.[184]

[184] California Division of Highways, 1970, p 1.04.

Figure 20

Figure 21

Figure 20 below shows a similar, albeit more consistent, increase in maintenance and operating costs between 1960 and 1990.[185] This figure shows that national highway maintenance and operating costs have risen faster than the general rate of inflation (indicated by the U.S. Consumer Price Index), especially in the 1980s; in fact, maintenance and operating costs increased at a much faster rate than highway construction costs throughout the 1980s. This is particularly important because maintenance costs comprise a growing proportion of highway costs (Figure 21). In recent years, freeway maintenance has come to mean much more than landscaping and lane striping; as the freeways built in the 1950s reach the end of their thirty-year design lives, they require major repaving and reconstruction.[186]

The Upscaling of Freeway Designs

Nearly half (46%) of the increased freeway development costs during the 1960s and 1970s was due to the upscaling of designs.[187] The freeways designed by state highway departments in the 1950s were larger and more elaborate than the expressways envisaged by city planners of the previous generation; but the freeway designs of the 1950s were also much smaller and simpler than the facilities designed and built by succeeding generations of highway engineers.

---

185 The maintenance and operations index traces unit cost changes in four areas: labor, materials, equipment rentals, and overhead. This index differs from the construction index because it includes government agency costs for activities like ice control and snow removal in addition to average contractor bid prices for standard resurfacing and reconstruction projects. (U.S. Federal Highway Administration, 1986, p 55).

186 Jones and Taylor, 1987.

187 California Division of Highways, 1970, p 1.04.

There were several reasons for the upscaling of freeway designs. First, there was a continuing trend toward uniform design standards. From its inception, the federal Bureau of Public Roads had encouraged states to adopt uniform standards for highways; highway safety research had repeatedly shown that consistent signage, lane striping, and roadway geometry reduced accidents. By the 1950s, the desirability of uniform design standards was an inculcated belief in the highway engineering profession; uniform standards for freeways was the adopted position of the American Association of Highway Officials and was a requirement for all facilities in the Interstate System.[188]

The earliest freeways in Los Angeles and San Francisco were built with 55 miles-per-hour design speeds,[189] but all freeways on the Interstate system and eventually all new freeways in the California Freeway System were built for 70 miles-per-hour design speeds. These uniform, high design speeds required substantially more right-of-way to accommodate sweeping, high-speed curves, which made it more difficult to shoe-horn urban freeways into built-up areas without substantial displacement.[190] Table 5 below contains some examples of the orders-of-magnitude increases in minimum design standards for California

Table 5

Some Examples of the Upscaling of Freeway Design Standards.

Design Feature	1955 Minimum	1985 Minimum	Difference
Left Freeway Shoulder Width	2 feet	10 feet	+ 400%
Right Freeway Shoulder Width	8 feet	30 feet	+ 275%
Urban Freeway Curve Radius	1,100 feet	3,000 feet	+ 173%
Left Bridge Shoulder Width	2 feet	5 feet	+ 150%
Rural Freeway Curve Radius	2,200 feet	5,000 feet	+ 127%
Right Bridge Shoulder Width	8 feet	10 feet	+ 25%

188 Gifford, 1988, pp 327-329.

189 This means that all vehicles could safely operate at 55 miles-per-hour under normal, free-flow traffic conditions.

190 Schaeffer Interview, 1992.

freeways.

Most of the design standard changes were intended to improve safety and, indeed, freeways are by far the safest roadways. In 1950 there were about 10 deaths per 100 million freeway miles of travel; by 1965 the fatality rate was cut in half to 5 per 100 million, and by 1980 it was halved again to about 2.5 per 100 million.[191] These improvements are dramatic and commendable, but they significantly increased the size and cost of freeways.

Other design changes, unrelated to safety, also increased the scale and cost of freeways. In contrast to many of the early expressway plans for cities, the first Division of Highways plans for urban freeways contained far fewer interchanges. This was in keeping with the rural, intercity highway philosophy of most state highway departments at the time which favored long-distance, high-speed trips over short, local trips. Numerous freeway interchanges encourage short trips, increase traffic merging and weaving, and slow vehicular throughput -- all of which inhibit the long-distance, high-speed travel favored by state highway departments.

Cities, however, pressured the California Division of Highways to increase the number of interchanges in urban areas to better integrate freeways with local street systems and to distribute traffic more evenly. In addition, cities also pushed the Division to add more street over- and under-crossings to allow a freer flow of traffic across freeway rights-of-way. In response, the Division reluctantly

[191] Pivetti Interview, 1992.

added additional interchanges and over- and under-crossings,[192] which substantially increased project costs. A single major freeway-to-freeway interchange, for example, can cost $100 million.

Finally, the slowing pace of new freeway development encouraged the upscaling of freeway designs as well. As it became apparent that the extensive freeway development plans during the 1950s might never be completed, engineers tried to design more and more capacity into the few remaining new routes. Design changes to improve traffic flow -- more lanes, more elaborate interchanges, separated weaving sections -- all increased traffic capacity and drove up costs further.[193]

Increasing Right-of-Way Costs

From the outset, the highway problem in cities has been largely a right-of-way problem. Virtually every early urban traffic study and transportation plan addressed the difficulty and expense of constructing or expanding urban roads in congested areas.[194] The problem is that freeways, particularly on the urban fringe, make adjacent land more accessible and hence more valuable. Increased accessibility encourages development which attracts traffic and further increases

---

192 Schaeffer Interview, 1992. The number of interchanges built were usually more than the Division wanted to build, but fewer than the number requested by the cities.

193 Schaeffer Interview, 1992.

194 See for example American Society of Planning Officials, 1940; Bartholomew, 1924; California Legislature, 1947; Dearing, 1941; Fairbank, 1937; Holley, 193?; Interregional Highway Committee, 1944; Labatut, *et. al.*, 1950; MacDonald, 1936; MacDonald, *et. al.*, 1944, McClintock, 1926; McClintock, 1932; McClintock, 1937; Olmstead, *et. al.*, 1924; Purcell, 1940a; Purcell, 1940b; Transportation Engineering Board, 1939; U.S. Bureau of Public Roads, 1939.

in land values. Eventually the adjacent development reaches a density where the freeway becomes chronically congested. Expanding the freeway, however, is extremely expensive because the additional right-of-way required for freeway widening is orders-of-magnitude more expensive than when the first freeway was built. As early as 1932, for example, studies showed that up to 94 percent of the cost of street widening was the purchase of additional right-of-way.[195]

In addition, right-of-way costs for freeways built in advance of urban expansion are significantly lower than freeways built in already developed areas. For this reason metropolitan expressway and freeway plans have always stressed the importance of advanced right-of-way acquisition as a cost containment strategy:

> When the acquirement of land is postponed, as usually it has been, until the very moment of need for construction purposes, it is often discovered that the land actually wanted cannot be obtained without long delay.[196]

> ...if the express highway network is to be constructed at all, decision and action on the initial section must be prompt, and for the future reasonably continuous in order to avoid prohibitive costs.[197]

The need to purchase right-of-way in advance of development is what could be termed the freeway planners' dilemma: metropolitan land values

---

[195] McClintock, 1932, p 33.

[196] Interregional Highway Committee, 1944, p 83.

[197] Transportation Engineering Board, 1939, p 19.

appreciate in anticipation of future freeway development, which drives up freeway right-of-way costs. Metropolitan freeways, in other words, become victims of their own success. Remember that, with the collapse of property tax and special assessment district financing for metropolitan highways during the Great Depression, freeway finance remained permanently divorced from property-based taxation. Thus, no mechanism existed for freeways to recover any of the appreciative effect that they had on suburban land values.

When plans were first made to construct the Junipero Serra Freeway in San Mateo County (south of San Francisco), developers purchased land along the route and built large residential housing developments on either side of the proposed freeway's right-of-way; future direct freeway access to San Francisco was used by the developers as an important selling point for the homes. When the Division of Highways eventually moved to purchase the right-of-way (which had been held vacant by the developers), the price paid for the land was nearly five times what had been originally budgeted when the route selection was announced.[198]

In the 1950s, Simi Valley, 40 miles northwest of downtown Los Angeles, was almost entirely agricultural. When the routing of the Simi Valley Freeway was adopted as part of the 1959 California Freeway Plan, residential development leapfrogged out to the Simi Valley which created serious traffic congestion problems on the two-lane highway crossing the Santa Susanna Pass into the San Fernando Valley. In response, the Division of Highways accelerated construction

[198] Pivetti Interview, 1992.

plans for the proposed freeway, but not before right-of-way costs into the newly developed valley had quadrupled in comparison with the original budget estimates.[199]

[199] Schaeffer Interview, 1992.

The right-of-way problem for freeways was primarily confined to urban and suburban areas; right-of-way costs were frequently less than 10 percent of total project costs in rural areas, and frequently over half of project costs in urban areas.[200] Because much of the freeway system was to be built in rapidly growing

Figure 22

[200] California Division of Highways, 1970, p 5.01.

metropolitan areas, California devoted a very high proportion of the state highway budget in the 1950s and 1960s to right-of-way acquisition (Figure 22). In 1974, for example 69 percent of Caltrans' right-of-way acquisition expenditures were in the Los Angeles, San Diego, and San Francisco metropolitan areas.[201]

[201] California Department of Transportation, 1975, pp 5-6.

Despite concerted efforts to secure freeway rights-of-way in advance of construction, right-of-way costs grew much faster than revenues. During the 1960s, right-of-way unit costs were increasing 7 percent per year statewide, and even faster in urban areas. Fully 26 percent of all freeway development cost

Figure 23

increases in California was due to increasing right-of-way costs.[202] As funding began to run short in the early 1960s, the state chose to expend dwindling resources to construct freeways on right-of-way already in hand. The first piece of the freeway program to be cut was advance right-of-way acquisition. Figure 23 shows that, beginning in 1964, California's right-of-way expenditures dropped from twice the national average per vehicle-mile of travel to slightly less than the national average in less than ten years. In doing so, the strategy of right-of-way cost containment was abandoned and future metropolitan freeway development was all but foreclosed.

Increasing Environmental Costs

Currently, construction crews are at work on the interchange between the Harbor and Century Freeways south of downtown Los Angeles. These two freeways -- one built during the 1950s and the other now under construction -- represent the polar extremes of community and environmental planning in metropolitan freeway development.

The Harbor Freeway connects the Pasadena Freeway[203] in downtown Los Angeles with Los Angeles Harbor in San Pedro twenty-three miles to the south. Construction was begun in the late 1940s and the main portion of the Harbor Freeway was opened to traffic in 1952.[204] Construction of the freeway required substantial clearing and relocation of homes and businesses, particularly just

[202] California Division of Highways, 1970, p 1.02.

[203] Formerly the Arroyo Seco Parkway.

[204] Brodsly, 1981, p 128.

south of downtown.[205] Once the routing and design of the freeway were finalized, a condemnation resolution was prepared and filed with the court to allow the Division of Highways to take private property in the freeway's path and compensate the owners through the powers of *eminent domain*. The condemnation resolution for the Harbor Freeway was approved by the court the day after it was filed by the state. The following day -- just two days after the resolution was filed -- every piece of property on the Harbor Freeway right-of-way was posted with a fifteen day notice to vacate. And less than three weeks after the filing of the condemnation resolution, the Division of Highways began clearing the condemned property in preparation for construction.[206]

In contrast to the experience of the Harbor Freeway, acquiring and clearing the land for the Century Freeway took nearly twenty years. The seventeen mile Century Freeway runs perpendicular to the Harbor Freeway from the Los Angeles International Airport in the west to the City of Norwalk in the east. The process of acquiring the right-of-way for the Century Freeway was nearly complete in 1972 when a coalition of area residents, environmentalists, and civil rights organizations filed suit against the state for failing to comply with environmental and relocation laws and regulations.[207] After nearly ten years of

[205] To minimize displacement and relocation costs, the Harbor Freeway was built on a narrow 120 foot-wide right-of-way. Some forty years later, the Harbor Freeway is in the process of a costly widening and reconstruction which required the acquisition of additional (and very expensive) right-of-way (Pivetti Interview, 1992).

[206] Pivetti Interview, 1992.

[207] The regulations cited in the suit were largely the product of recently enacted legislation: the National Environmental Policy Act of 1969, the California Environmental Quality Act of 1970, the Federal Highway Act of 1970, and the Uniform Relocation Assistance and Real Property Acquisition Policies

litigation, the parties of the suit agreed to a consent decree in 1981 whereby Caltrans would, among many other things, implement a $300 million program to rebuild, relocate, and rehabilitate over half of the residential dwellings cleared for the freeway; with this agreement, the state was not merely compensating owners for the taking of property, but was assuming responsibility for directly providing displaced residents with 3,700 homes and apartments.[208]

The Century Freeway is the extreme example of cost escalation from increased environmental requirements and public participation; the delays, legal costs, additional relocation expenses, and added design requirements are estimated to have increased the project cost from $502 million in 1977 to $2.5 billion in 1993.[209] On most earlier projects, however, the added environmental costs were a far smaller proportion of increased costs. Most of the cost increases attributable to the new environmental requirements during the 1970s were actually due to construction delays; the environmental documentation and approval process lengthened the time required to plan a new freeway which proved costly during periods of inflation.[210]

Summary of Rising Costs

In concert, these four factors -- rising construction and maintenance costs,

---

Act of 1970 (Zamora, 1989, p 1806).

[208] Heppenheimer, 1991, p 18.

[209] Zamora, 1989, p 1807. Even controlling for the effects of inflation, the cost of the Century Freeway increased 131 percent (to nearly $150 million per mile in 1990 dollars).

[210] Pivetti Interview, 1992.

the upscaling of designs, rapidly increasing land costs, and added environmental requirements and community participation -- combined to dramatically increase freeway costs between 1960 and 1980. During the 1960s, freeway development costs in California increased an average 8.2 percent per year, which was 3.5 times the average annual inflation rate of 2.4 percent.[211] In the 1970s, due in part to the much higher rates of inflation, costs rose even faster. State highway construction expenditures in California rose from $4.1 million per mile in 1970 to $16.7 million per mile in 1980; this was an average annual increase of 12.1 percent, which was well ahead of the average 1970s inflation rate of 8.7 percent.[212]

[211] Derived from California Division of Highways, 1970, p 1.04 and the Highway Database.

[212] Highway database.

And while inflation rates slowed in the 1980s, freeway construction costs,

Figure 24

particularly in urban areas, continued to rise. Figure 24 below shows the trend of urban freeway construction expenditures per new mile of urban freeway.[213] This figure reveals an extraordinary increase in urban freeway costs; freeway construction expenditures, in constant dollars, increased six-fold nationally and eight-fold in California during the 1980s. In addition to the cost escalation factors discussed above, these cost increases were due to the fact that very few urban freeway miles were added during the 1980s; the few freeway miles built in the 1980s tended to be small, expensive projects to close gaps in existing metropolitan freeway networks.[214]

Lagging Revenues

The increasing costs of freeway development would not necessarily have been problematic if revenues had grown proportionally. But revenues for freeway development have lagged behind increasing costs since the mid-1960s for three principal reasons:

1. Most highway tax instruments, particularly the gas tax, are not indexed to rising costs.

2. Densely populated states, like California, do not receive all of the federal highway revenues generated in those states.

3. Increasing vehicle fuel efficiency has caused gas tax revenues to lag behind the growth in vehicle travel.

---

[213] These data are not available for earlier years.

[214] Pivetti Interview, 1992.

Each of these is discussed in turn below.

Taxes Fail to Pace Increasing Costs

Most taxes, such as those on income, property, and sales, produce increasing revenues during periods of high inflation. This is not the case for motor fuel taxes, which increase or decrease only with the volume of fuel sold. To keep pace with rising costs, per gallon fuel taxes must be increased periodically. Periodic increases were the norm in California from the initiation of the fuel tax in 1923 through 1961.

Figure 25

Figure 25 shows the trend of both the federal and state gas taxes from 1923 to the present day. Between 1947 and 1963 the state gas tax was increased six times and the federal gas tax was increased three times, a total of nine tax increases during an era of relatively low inflation. After 1963, however, neither the state nor the federal gas tax was changed for almost twenty years until the federal tax was raised a nickel and the state tax two cents in 1982.[215]

[215] These gas tax increases were enacted during the last year of the Brown Administration in California.

Figure 26

Figure 26 compares the state gas tax in California to weighted average state gas tax between 1919 and 1992. This figure shows that, since 1970, the California tax has fallen well below the national average, particularly during the 1980s. Despite his stated pro-freeway policy stance, Governor Deukmejian steadfastly opposed legislative proposals to increase the gas tax during his two terms in office and the California gas tax fell to just 56 percent of the national average by 1990.

California voters approved a nickel increase in the state gas tax in 1990, with an additional penny increase each year for the following four years. Even with this substantial increase, however, the current 1992 state gas tax is still 17 percent below the weighted national average.

Gas tax revenues are split among freeways, other state highways, county roads, and local streets. Most of the additional revenues from the state and federal gas tax increases during the 1950s went to finance freeways, but all of the additional funds from the 1963 gas tax increase in California went to counties and local governments. In other words, the part of the gas tax that funds freeways in California did not change at all between 1961 and 1983 -- a twenty-two year span of very high inflation.[216]

[216] The largest state transportation tax measure in the 1970s excluded freeways as well. This measure, which is the subject of Part Three, extended the state sales tax to gasoline and specified that one-quarter cent of all state sales tax revenues be expended on public transit in metropolitan areas and transit or local streets and roads in rural areas.

The results of no gas tax increases in an era of rapidly increasing costs is

Figure 27

shown in Figure 27, which compares the small changes in the combined federal/state gas tax in California between 1960 and 1990 with the extraordinary increases in highway construction unit costs over the same period. This figure shows, in rather stark terms, that the rapid inflation of the 1970s caused the per gallon gas tax to fail as a reliable highway finance mechanism during that decade. Without some mechanism to index revenues to rising costs -- such as a special sales tax on fuel or a per gallon tax rate indexed to consumer or highway construction prices -- the gas tax would have required a substantial annual increase throughout the 1970s to maintain the 1960s pace of new freeway construction.

Rapidly increasing highway construction costs during the 1970s were not exclusive to California, and some states restructured the gas tax in the late 1970s and early 1980s in an attempt to link it more closely to rising costs. Eleven states[217] and the District of Columbia adopted some form of variable rate mechanism for the state gas tax between 1977 and 1985.[218] Eight of the twelve variable rate states replaced the per gallon gas tax with a special sales tax earmarked specifically for highway expenditures;[219] two states indexed the per gallon tax to the combined U.S. Highway Construction and Maintenance Cost Indices; one linked the per gallon tax to the Consumer Price Index; and one state

---

[217] Arizona, Indiana, Kansas, Kentucky, Massachusetts, Nebraska, New Mexico, Ohio, Rhode Island, Washington, and Wisconsin.

[218] Highway database.

[219] California applies the general state sales tax to motor fuels, but the funds are not earmarked for highway expenditures.

adjusted the per gallon tax to a combination of fuel sales prices and the highway cost index.[220]

The twelve states that adopted indexed gas taxes are similar in several respects. They tend to be states with an overall tax effort below the national average, lower than average per capita income and vehicle travel, and little or no petroleum industry,[221] characteristics not common to California. While the indexed fuel taxes have increased highway revenues in proportion to rising costs, the frequent tax rate increases have proven unpopular with voters. Thus, despite their obvious advantages, four of the twelve states -- Arizona, Indiana, New Mexico, and Washington -- have repealed their indexed taxes and returned to a standard per gallon tax.[222] The unpopularity of "automatic tax increases" has discouraged other states, such as California, from adopting indexed fuel taxes; no new indexed state gas taxes have been adopted since 1985.

Rural Bias of the Federal Highway Program

The rural, intercity emphasis of the federal highway program means that federal highway taxes are disproportionally collected in urban areas and disproportionally expended in rural areas. Thus, relatively urbanized states with high levels of vehicle use -- such as California -- contribute far more in federal highway user revenues than they receive in federal highway appropriations. Largely rural states like Montana, on the other hand, receive far more in federal

220 Bowman and Mikesell, 1985.

221 Bowman and Mikesell, 1985.

222 Highway database.

highway funds than highway users in the state contribute in federal taxes.

Interstate 94 in Montana is one of the loneliest stretches of highway on the Interstate system. Built to the same high standard of all Interstate freeways, I-94 between Billings and the North Dakota border is fully access limited, completely grade separated, and, in good weather, can safely accommodate over 180,000 automobiles per day. Ninety-nine percent of the capacity in that stretch of Montana goes unused, however, because I-94 averages less than 2,500 vehicles per day in both directions.[223] Since the Highway Trust Fund was created in 1956, highway users in Montana have paid $1.0 billion into the fund, while the state has received $2.6 billion in federal highway appropriations over the same period.[224]

California, on the other hand, is by far the largest "donor" state to the federal highway program. Over the years, California has received about $0.89 in federal highway appropriations for every $1.00 in federal taxes paid by highway users in the state, a differential that amounted to $2.7 billion between 1956 and 1990.[225] This differential is larger than the entire 35-year cost of the federal highway program in Montana.[226]

While the proportion of federal highway taxes "donated" by California to

---

[223] Boyer and Savageau, 1989, p 145. A large metropolitan freeway, such as the San Diego Freeway in Los Angeles, has about 2.5 times the capacity of I-94, but carries over 100 times more daily traffic.

[224] Highway database.

[225] Highway database.

[226] This includes all federal highway funds, not just the Interstate program.

other states has declined somewhat over the years,[227] California has still benefitted the least of all states from its participation in the federal highway program. The result is that California has contributed more per dollar of federal highway appropriations than any other state in the Union.

The Vehicle Travel/Fuel Use Gap

[227] In the early years of the Highway Trust Fund, California received about $0.65 for every dollar of federal highway taxes paid (Hebert, 1975a, p I-20).

Figure 28

Figure 28 compares the growth of vehicle travel in California and the U.S. since 1950. This figure shows several interesting things. First, vehicle travel both in California and around the country has more than tripled since 1960; second, the growth of vehicle travel in California exceeded the national average until the late 1960s when California dropped below the fifty-state average; and third, the growth in vehicle travel in California exceeded the national trend in the early 1980s and continues to grow at an increasing rate.

These trends in vehicle travel contrast sharply with the trends in motor

Figure 29

Figure 30

fuel consumption shown in Figures 29 and 30. During the 1950s when state and federal freeway financing was established, motor fuel consumption was increasing at an annual rate of just under 5 percent nationally, and about 5.5 percent per year in California. In the 1970s, two fuel shortages broke the long post-World War Two pattern of increased fuel consumption, and gas tax revenues fell accordingly. But, while motor fuel tax revenues declined as a result of the fuel shocks, these declines were matched -- in the short term -- by corresponding declines in travel.

Perhaps the most significant effect of these fuel shortages was to prompt the mandate of the federal Energy Policy and Conservation Act of 1975 that the fuel efficiency of each automobile company's fleet of new cars increase from 14.2

Figure 31

miles per gallon in 1974 to 27.5 miles per gallon in 1985.[228] Figure 31 compares the fleet mileage average of California with the rest of the country from 1944 to 1990. The figure shows that California's vehicle fleet fuel efficiency has improved more than the nation as a whole; by 1990, the vehicle fleet in California averaged about a mile and a half more per gallon than the fifty-state average.

[228] Meyer and Gomez-Ibanez, 1981, pp 138-139.

As a result of these federally mandated fuel economy improvements, the growth of fuel consumption tapered off considerably during the 1980s; and, because the California vehicle fleet is more fuel efficient than the national

Figure 32

Figure 33

average, the divergence of actual fuel consumption from early freeway finance projections has been more pronounced in California. Figure 32 compares the difference between actual motor fuel consumption during the 1970s and 1980s and the levels of fuel consumption projected for these decades by the Bureau of Public Roads in 1955 and the California Division of Highways in 1958. The figure shows that the compound effect of these projections resulted in significant overestimates of fuel consumption during the 1980s; by 1990, actual fuel use in California was about half of the 1959 projections.

The trends of vehicle travel and fuel use are combined to show a widening

Figure 34

gap between vehicle travel and fuel use nationally (Figure 33) and in California (Figure 34). Because vehicle fuel efficiency is higher in California, the gap between vehicle travel and fuel use is wider in California. This vehicle travel/fuel use gap has serious implications for highway finance. It means that the gas tax is no longer pacing the growth in vehicle travel. It further means that just as freeway costs were skyrocketing during the 1970s, gas tax revenues, which comprised about half of all highway revenues, began to falter.

Conclusion

These, then, are the components of the cost/revenue squeeze in freeway finance. Inflating construction unit costs, upscaling of freeway designs, rapidly increasing right-of-way costs, increased maintenance load, and expanded environmental costs have been squeezed by revenue sources not indexed with inflation. Further, California's status as a "donor state" in federal highway finance, and the growing vehicle travel/fuel use gap have combined to slow freeway development nationally and virtually halt it in California.

CONCLUSION

This chapter has shown that California stopped building freeways, not because of state policy decisions in the mid-1970s, but because the freeway program began running out of money in the 1960s. This occurred because the highway finance program established during the 1950s to fund ambitious plans for freeways could pace neither the rapid escalation of freeway costs nor the growth in vehicle travel.

The first urban freeway projects that displaced homes and businesses provoked controversy and local opposition.[229] And as metropolitan freeway development expanded in the 1960s, the level of popular opposition to specific freeway projects increased. By the early 1970s in California, the state Transportation Commission was periodically deleting controversial route segments from the state freeway plan.[230] It is unlikely, however, that the deletion of controversial freeway segments -- such as the Beverly Hills Freeway in Los Angeles or Pacific Coast Freeway in San Francisco -- ultimately prevented their construction. Only 7 percent of the unconstructed freeway routes that remained in the California Freeway System plan in 1975 were actually built by 1990.[231]

The important effect of the public policy shifts away from freeway development in the 1970s was to direct new transportation funding to public transit. While these new public transit subsidies were far smaller than what would have been needed to appreciably revive freeway construction in California, they did divert legislative attention (and largesse) from restructuring highway finance. Freeways were left to make do on a finance package that appeared generous in the 1950s, but proved to be inadequate just a few years later.

The freeway consensus that appeared so secure in the 1950s, had largely evaporated by the 1970s. As one senior Caltrans official put it:

---

[229] See Zettel and Shuldiner, 1959.

[230] See Hebert, 1973a for an overview of the route deletions.

[231] Highway database.

> Other than the construction industry, there just wasn't a political constituency for freeways in the 1970s. As a state department, Caltrans couldn't lobby the legislature for more funds. So, unlike public transit...there just wasn't any political pressure...for more highway funds.[232]

Observed another Caltrans engineer:

> So many miles of freeways were built in the 1960s that, to the average commuter, the system seemed more than adequate. In the 1970s, automobility was higher and congestion was lower in California than at any time in this century. The public didn't push for more freeway funding because, in the 1970s, they just didn't see the need.[233]

In June 1990, the voters of California agreed to raise the state gas tax nine cents per gallon by 1994 to support new freeway construction and improved road maintenance. The day after the election, the *Los Angeles Times* declared that,

> California voters, often trend-setters for the nation, have sent a new message with their decision to double the state gasoline taxes -- they now are willing to raise certain taxes to remedy a critical problem.[234]

While voter intent might be clear, it is unlikely, given the magnitude of the cost/revenue squeeze in freeway finance, that a nine-cent per gallon increase in the state gas tax will "remedy" the "critical problem" of urban traffic congestion in California. The additional funds will be used to close some gaps in the existing

---

[232] Schaeffer Interview, 1992.

[233] Pivetti Interview, 1992.

[234] Ellis and Redburn, 1990, p I-1.

freeway system and to expand the capacity of some aging freeways, but no major new freeway projects are on the horizon in California.

The argument that finance led planning in stopping freeway development in California may seem like an academic distinction, but it is an important one. If freeway development were curtailed by a policy shift in the 1970s, then it could be restored with another policy shift -- such as a gas tax increase -- in the 1990s. If, however, metropolitan freeway finance was structurally problematic independent of popular opposition to freeways, then the option of turning to freeway development to reduce metropolitan traffic congestion may be foreclosed.

PART THREE

FINANCE AND THE PLANNING OF PUBLIC TRANSIT SINCE 1970

In February 1970 I called a halt to virtually all highway construction in the Greater Boston area. I did so in the firm belief that for too long Massachusetts and the nation had been wedded to a one-dimensional transportation policy which relied solely upon construction of more and more expressways.

...in 1972 I committed Massachusetts to a new course; almost $2 billion of capital construction for mass transit and a full scale effort to change federal policy that oversubsidized roads at the expense of transit.

-- Francis W. Sargent
Governor of the Commonwealth of Massachusetts
1974

Changes to our transportation system will be incremental. There will not be any new ten-lane freeways. We have to build to make our present system work efficiently...we have to develop transit systems that do that...

-- Donald E. Burns
Secretary of Business and Transportation
State of California

March 1975

OVERVIEW

Just as urban freeways were primarily shaped by the political compromises made to secure funding in the 1940s and 1950s, so too was urban public transit in California primarily shaped by the financial subsidy programs negotiated during the 1960s and 1970s. Two of the most salient characteristics of modern public transit systems -- over-capitalization and declining productivity -- are the direct result of federal transit funding programs negotiated to (ironically) limit the federal role of urban public transit. In California, the extensive development of lightly-patronized suburban public transit in the 1970s and 1980s is the direct result of planning efforts made to secure operating subsidies for central city public transit in Los Angeles and San Francisco. In other words, the negotiation of the financial "cart" continued to lead the planning and policy "horse" with the shift in planning focus from urban freeways to public transit in the 1960s and 1970s.

Federal support of public transit began in earnest with the passage of the Urban Mass Transportation Act of 1964, and expanded dramatically over the next fifteen years from an initial outlay of $100 million to $1.3 billion annually in 1979.[235] For the first ten years of the Urban Mass Transportation Administration (UMTA) programs, federal transit grants were for capital purposes only; funds could be used for the public acquisition of transit operators, the rehabilitation of rolling stock, right-of-way and facilities, and the purchase of new equipment, but federal funds could not be used to support transit operations.[236] This "capital-

---

[235] Both figures are in 1990 dollars (Meyer and Gomez-Ibanez, 1981, p 43).

[236] Meyer and Gomez-Ibanez, 1981, p 47.

only" policy was motivated by the desire to avoid ongoing federal support of what was considered by Washington to be a local responsibility for public transportation; it was hoped that one or just a few shots of federal investment would improve the quality of capital equipment and facilities and halt the rapid decline of transit ridership in every metropolitan area.

In the 1970s, a series of legislative actions signaled a limited shift in federal urban transportation priorities from freeways to public transit. In 1970 Congress modified the Interstate Freeway program to allow funding transit capital facilities such as bus pull-outs and transit stations to be included in urban freeway projects.[237] More significantly, the Interstate program was further modified in 1973 to allow cities, with the concurrence of the Secretary of Transportation, to trade Interstate Freeway funding for public transit capital funding (for such things as rail lines or busways) in the same corridor.[238] In 1974, the UMTA Act was modified to permit federal transit subsidies to fund operations[239] (though the focus of the federal program remained transit capital). Federal support of transit operations peaked in 1979 and declined rapidly in the 1980s. Between 1979 and 1987, federal operating assistance was cut 48.7 percent in current dollars; considering the effects of inflation, the drop was nearly 70 percent in just eight years.[240] The federal public transit finance program today is similar in both scale

[237] Schwartz, 1976, p 450.

[238] Schwartz, 1976, p 451.

[239] Meyer and Gomez-Ibanez, 1981, p 47.

[240] U.S. Department of Transportation, 1989.

and structure to the program in 1975; the majority of funds are earmarked for capital (particularly rail systems), with a minority of funds supporting operations.

Table 6

Inflation-Adjusted National Trends in Public Transit Operating Revenues (in billions of 1984 dollars)

Source of Funds	1979		1987		% Change: 1979 to 1987
	Amount	Percent	Amount	Percent	
Fares	$ 3,218,000,000	37%	$ 4,315,000,000	36%	- 34%
Federal	$ 2,657,000,000	31%	$ 810,000,000	7%	- 70%
State and Local	$ 2,752,000,000	32%	$ 6,794,000,000	57%	+ 147%
Total	$ 8,627,000,000	100%	$11,919,000,000	100%	+ 38%

Source: American Public Transit Association, 1991.

Table 6 is a testimony both to the Reagan Administration's commitment to federalism in general and distaste for transit operating assistance in particular. While inflation-adjusted passenger fare revenues and total revenues have grown in concert since 1979, there has been a dramatic shift in operating subsidies from the federal government to states and localities.

California has mirrored the national trend toward state and local funding, and the burden of supporting public transit operations in California has been borne largely by the state's Transportation Development Act (TDA). In the ten years from fiscal year 1978-79 to fiscal year 1988-89, inflation-adjusted federal

support of transit operations in California dropped 55.7 percent, while TDA funding of transit operations increased 32.7 percent in real dollars. Federal funds now account for only 6.1 percent of all transit operating revenues in California, compared to a 24.4 percent share for the TDA. During fiscal year 1988-89, nearly $500 million in operating funds were allocated to California public transit operators, making the TDA by far the largest source of operating subsidies in the state[241] and the largest non-federal public transit funding program in the country.[242] Even when funding for transit capital (where the TDA plays a comparatively small role) is included, TDA funds accounted for 20.9 percent of all California transit revenues in fiscal year 1988-89, compared to 19.7 percent for all federal transit funding programs.[243]

Beyond the sheer magnitude of TDA funding, however, the particular regulations by which TDA funds are allocated have uniquely shaped -- and one could argue distorted -- the provision of public transit in California. The TDA has been a boon for suburban transit in California, particularly in affluent counties with low levels of transit ridership. The strict expenditure formulas of the TDA require that funds (which come from the sales tax) be expended in the same county where they are collected. Even within counties, TDA allocations to transit operators are made on the basis of population and not ridership, a method which strongly favors lightly patronized suburban transit operators.

---

241 California Office of the Controller, 1990.

242 Mills Interview, 1990.

243 California Office of the Controller, 1990.

Several authors have noted the role transit subsidies have played in the expansion of suburban public transit.[244] Subsidies have helped keep fares low, and encouraged the growth of flat fares and unlimited ride passes which favor long-distance, suburban commuters.[245] Wachs observed that the growing number of suburban representatives on transit boards and commissions consistently demand increased transit service in the areas they represent:

> ...effectively representing their constituencies, who do contribute a growing proportion of transit subsidy support, their advocacy results in systematic shifts of transit service toward relatively expensive and highly subsidized peak hour runs between suburbs and downtown, and toward relatively lightly used suburban local services.[246]

The experience of the TDA, the largest and one of the oldest state transit subsidy programs in the U.S., is an especially clear example of how finance has led transit planning. In California, the suburbanization of transit service is pronounced, politically driven, and primarily the result of the TDA. This part of the dissertation examines the TDA's effect on public transit in California and argues that the compromises necessary to secure the Act's passage have created a politically popular but uneconomic funding program. The first section traces the political debate and subsequent compromises that preceded the passage of the TDA in 1971, compromises that appealed to the partisan, rural, and suburban

---

[244] Pucher, 1982; Wachs, 1985.

[245] Cervero *et. al.*, 1980.

[246] Wachs, 1985.

interests in the state. A case study of the San Francisco Bay Area is then used to show how the TDA allocation regulations dramatically underfund heavily patronized central city transit service in favor of lightly patronized suburban operations. The result is a proliferation of new, well-funded, and expanding suburban transit operators that attract few patrons while older, central city transit operators, in spite of heavy ridership, are forced to cut service because of funding shortfalls. The chapter concludes by arguing that in the name of equity, the TDA is decidedly unfair; the suburban bias ensures that all Californians get a "fair share" of public transit, whether or not they use it.

ANTECEDENTS TO THE TDA

California's long-term financial commitment to public transportation was born out of the unique social and political conditions in California of the early 1970s:

- The major urban transit operators in California (particularly the Southern California Rapid Transit District) were in financial distress and in need of operating subsidies;
- There was broad public concern with air pollution and support for government efforts to improve air quality by reducing dependence on the private automobile; and
- The opportunity existed to extend the state sales tax to gasoline and create a substantial new funding source for transportation.

These conditions, discussed in turn below, combined in 1971 to motivate the passage of the Mills-Alquist-Deddeh Transportation Development Act (TDA). The TDA extended the sales tax collected by the state to gasoline and earmarked

4.2 percent of sales tax revenues from all sales (1/4 cent of the 6 cent state sales tax) for public transportation, community transit services (for the elderly and disabled), and bicycle and pedestrian facilities;[247] the focus of the TDA, however, is public transit, which received 83.5 percent of the funds allocated for the 1988-89 fiscal year.[248]

Funding Shortfalls

The financial distress of California's large transit operators was uniquely shaped by the early years of federal transit subsidies. Federal involvement with public transit began in 1961 with the passage of the Urban Mass Transportation Act, but federal financial support of transit did not begin in earnest until 1964. For the first thirteen years of the rapidly expanding UMTA program, however, federal transit funds could only be used for the purchase of rolling stock and capital equipment; UMTA funds could not be used to support transit operations. This left transit operators around the country, the Southern California Rapid Transit District among them, without the financial resources to operate an expanding fleet of new, federally financed buses.[249] Up to 1974, the federal government clearly saw transit operating subsidies as the responsibility of states and localities.[250] In California, that responsibility was assumed primarily by the TDA.

---

247 Under certain conditions (discussed below) TDA funds can be used for streets and roads.

248 California Office of the Controller, 1990.

249 Bauer Interview, 1990.

250 Meyer and Gomez-Ibanez, 1981.

Air Pollution

Public concern with air pollution grew as urban air quality declined significantly in the post-war years, particularly in the Los Angeles air basin where vehicle travel increased 268 percent between 1950 and 1970[251] and the early standards of the federal Clean Air Act of 1970 were exceeded over 200 days per year. The foci of early (and most subsequent) air quality regulations were on stationary sources of pollution and emission control devices on new cars. On the demand-side, the revival of public transit became the *cause celebre*; conventional wisdom held that clean, efficient urban transit was needed in California to lure people out of their cars and create a balanced transportation system.[252]

New Fund Source

Finally, a financial opportunity existed because the state sales tax, which applied to diesel fuels, did not include gasoline. Extending an existing tax (the sales tax) to a heavily taxed commodity (gasoline) to finance transportation (public transit) was a politically palatable proposal.[253] Turning a palatable proposal into reality, however, required a number of strategic compromises by the Act's legislative authors to appeal to the state's Republican, rural, and suburban interests; compromises that made the TDA heavily biased toward California's more affluent suburbs and against the state's financially strapped central cities.

---

[251] Southern California Association of Governments, 1983.

[252] Hein Interview, 1990.

[253] Bauer Interview, 1990; Mills Interview, 1990.

TDA AND THE ART OF COMPROMISE[254]

The primary obstacle facing the Democratic triumvirate sponsoring the TDA was a conservative Republican governor (Ronald Reagan) opposed to new taxes. When first approached with the TDA, Governor Reagan wanted the proposal put before the voters. Knowing that it was unlikely that voters statewide would support a measure so clearly intended for central city transit users, Legislators Mills, Alquist, and Deddeh sought to modify the transit sales tax proposal to both satisfy the governor and avoid a plebiscite.

The first step was to technically designate the 1/4 cent of the sales tax for the TDA as a "local tax" instead of a state tax. At the time, California had a uniform five percent sales tax in all fifty-eight counties (4 percent state, and 1 percent local). When the sales tax was extended to gasoline by the TDA, the state/local split of sales tax was also changed to 3.75 percent state and 1.25 percent local. The additional 0.25 percent local tax, however, was not very local; expenditure of these funds was made subject to state statutes and code of the TDA.

To further assuage the governor, each of California's fifty-eight county boards of supervisors voted whether to extend the sales tax to gasoline and accept an additional 0.25 percent of the sales tax for TDA expenditures. The vote,

---

254 This section was informed primarily by interviews with Art Bauer and Associates Principal Art Bauer, Orange County Transit District Legislative Liaison Mary Elizabeth Briden, State Senator Wadi Deddeh, Metropolitan Transportation Commission Deputy Executive Director William Hein, and Metropolitan Transit Development Board Chairman Jim Mills.

however, did not offer the county supervisors much of a choice. At the time, the California Franchise Tax Board required that the sales tax be uniform in all counties (this has since been changed to allow special county sales taxes for transportation); if a county did not agree to the uniform state sales tax (which was a nickel at the time), then that county forfeited all state collected sales tax revenues. The county supervisors were thus given a choice whether to extend the sales tax to gasoline and accept an additional 0.25 percent local funds for the TDA, or forgo all local sales tax revenues. Given this choice, it is not surprising that the counties all voted for the TDA and thus satisfied Governor Reagan's desire for a local vote.

Rural and suburban counties, however, were not simply strongarmed into supporting a transit funding program for the central cities. The TDA was fashioned to appeal to the interests of rural and suburban counties. The appeal to rural interests was straightforward; small counties would be permitted to use some of their TDA funds for road projects. Counties with 1970 populations below 500,000 can use TDA funds for streets and roads if the presiding transportation planning agency determines that there are no "unmet transit needs that are reasonable to meet."[255] Such determinations are nearly automatic in rural counties and about half of TDA funds collected in these counties (but less than fifteen percent of TDA funds statewide) are used for streets and roads purposes.

More important than the rural streets and roads concession, however, are

[255] California Department of Transportation, 1989, pp 78-79. The "unmet needs process" was actually added to the TDA later as administrative code [Cal PUC section 99401.5] because many rural counties were not funding public transit and using all of their TDA funds for streets and roads.

the strict return-to-source provisions in the Act. To make the TDA a "local tax," the Act creates a "Local Transportation Fund" (LTF) for TDA funds generated in each county;[256] because the LTF is a local fund, TDA funds generated in rural and suburban counties cannot be moved across county lines for use by transit operators in urban counties.

The Act further restricts the movement of funds by requiring that revenues be apportioned to transit operators within counties on the basis of service area population only.[257] This means that transit operators are limited (1) to TDA funds generated in the county or counties they serve, and (2) to a share of TDA funds proportional to the ratio of their service area population to the total county population.

While these return-to-source provisions appealed to the Republican governor and the parochial interests of the county supervisors, they also locked a suburban bias into the TDA in perpetuity. This bias exists because TDA funds are strictly allocated on a per capita basis, but per capita transit ridership varies greatly from city to suburb. Transit use is highest in central city areas where parking is restricted, fewer people have access to automobiles, and employment and population densities are highest; TDA funds, however, do not vary with

---

256 California Department of Transportation, 1989, p 20.

257 California Department of Transportation, 1989, pp 53-54. The state's largest county, Los Angeles, is an exception. The apportionment rules for LA County were amended in 1980 to dovetail with the passage of a county transportation sales tax which, among other things, was intended to hold down transit fares. TDA funds are apportioned to LA County transit operators using a formula that gives 50 percent weight to the ratio of fare revenue to operating cost ratio and 50 percent weight to the operator's share of county-wide transit route mileage.

transit ridership. The result is an extraordinary windfall for transit operators in suburban areas with low per capital levels of ridership; a windfall that is made clear in the case study of the San Francisco Bay Area below.

THE TDA IN THE SAN FRANCISCO BAY AREA[258]

With a population in excess of five million, the nine-county San Francisco Bay Area is the nation's fourth largest metropolitan area. Seventeen major public transit operators[259] and dozens of smaller public and private operators carry over 1.5 million passengers per day on a fleet of almost 4,000 vehicles.

The Bay Area is unique in both the large number of public transit operators and the absence of a single dominant system. Though the San Francisco Municipal Railway, the oldest publicly owned transit system in the U.S., comes close; Muni serves less than 15 percent of the region's population, but carries over half the transit users.

---

[258] The financial and operating data cited in this section were derived from published reports of the Metropolitan Transportation Commission (which are referenced in the bibliography) and from unpublished public files maintained by the Commission.

[259] Operators are defined here as public bus companies with at least 750 general public boardings per weekday.

Table 7

Public Transit in the San Francisco Bay Area (Fiscal Year 1987-88)

	Annual Ridership		Total Operating Costs		Fare Revenues	
	Number	Share	Amount ($)	Share	Amount ($)	Share
Central City Operators						
SF Muni	245,053,000	55.1%	$236,913,100	31.5%	$71,287,000	29.7%
AC Transit	61,308,000	13.8%	$122,310,000	16.2%	$44,278,000	18.4%
Trunk-Line Rail Operators						
BART	61,737,800	13.9%	$167,775,000	22.3%	$78,474,400	32.7%
CalTrain	5,595,900	1.3%	$25,883,100	3.4%	$9,119,300	3.8%
Large Suburban Operators						
Santa Clara	35,200,000	7.9%	$103,348,400	13.7%	$11,307,300	4.7%
SamTrans	18,048,100	4.1%	$34,543,400	4.6%	$7,797,500	3.2%
Golden Gate	8,784,200	2.0%	$37,187,200	4.9%	$13,669,100	5.7%
Small Suburban Operators						
CCCTA	3,724,600	0.8%	$10,670,200	1.4%	$1,718,600	0.7%
Vallejo	1,498,000	0.3%	$2,118,500	0.3%	$578,300	0.2%
Santa Rosa	1,267,000	0.3%	$2,261,100	0.3%	$502,700	0.2%
Sonoma Co	771,500	0.2%	$2,714,800	0.4%	$551,600	0.2%
TriDelta	460,700	0.1%	$1,734,400	0.2%	$170,100	0.1%
Napa Vine	439,400	0.1%	$741,000	0.1%	$130,000	0.1%
Wheels	395,200	0.1%	$2,180,900	0.3%	$125,900	0.1%
Union City	393,500	0.1%	$1,064,700	0.1%	$145,200	0.1%
Fairfield	271,400	0.1%	$635,800	0.1%	$113,700	0.0%
WestCAT	194,100	0.0%	$925,100	0.1%	$87,500	0.0%
Total	445,142,400	100%	$753,006,700	100%	$240,056,200	100%

Table 7 separates the Bay Area's seventeen transit operators by type. The

two central city operators serve the densely settled cities and inner-ring suburbs of San Francisco, Oakland, Berkeley, Richmond, and Hayward. The trunk-line rail operators provide commuter rail service to the five southern Bay Area counties. The large suburban operators serve the extensively developed suburbs of San Mateo, Santa Clara, and Marin Counties. Finally, the small suburban operators provide service in the rapidly-developing, far-flung suburbs of Sonoma, Napa, Solano, and eastern Contra Costa and Alameda Counties.

Nearly $1 billion is spent each year by these seventeen Bay Area transit operators, about $750 million of which goes to operations. $240 million in fares is collected each year; the remaining 68.1 percent of operating costs and 100.0 percent of capital costs are paid with subsidies. All told, in excess of $700 million in transit subsidies are expended in the San Francisco Bay Area each year.

At first glance, the TDA appears to have only a moderate role in the Bay

Table 8

San Francisco Bay Area Public Transit Subsidies
(Fiscal Year 1987-88)

	TDA		Federal		Other State & Local		Total
Type	Amount	Pct	Amount	Pct	Amount	Pct	Amount
Operations	$125,751,544	24.0%	$30,677,850	5.9%	$367,773,139	70.2%	$524,202,533
Capital	$3,525,086	2.0%	$136,444,206	77.0%	$37,328,808	21.1%	$177,298,100
Total	$129,276,630	18.4%	$167,122,056	23.8%	$405,101,947	57.7%	$701,500,633

Note: The vast majority of other operating subsidies in FY 1987-88 came from the BART sales tax ($121,904,000), the San Francisco general fund ($115,656,000), and the Santa Clara County transportation sales tax ($56,585,000).

Sources: Metropolitan Transportation Commission, 1989a.

Area. The regional aggregation of subsidies in Table 8, however, tends to underrepresent the impact of the TDA in three respects: (1) TDA funds are used primarily for transit operations and play only a small role in capital expenditures; (2) the two trunk-line rail systems -- BART and CalTrain -- receive virtually no TDA funds; the TDA's major role is in local transit;[260] and (3) the sheer magnitude of San Francisco Muni, which receives less than fifteen percent of its revenues from TDA funds, tends to wash out the effect of the Act on the other operators.

Figures 35 and 36 show that the impact of the TDA, however, is far from uniform. Figure 35 shows TDA funds as a proportion of each operator's total operating subsidies and Figure 36 the proportion of total operating costs covered by TDA funds. We can see in Figure 35 that for eleven of the fifteen operators, TDA funds comprise at least half of all operating subsidies. Figure 36 shows that for all but two operators, at least a third of all operating costs are funded by the TDA.

[260] For the purposes of the discussion that follows, these two non-TDA rail operators are excluded from the analysis.

Figure 36

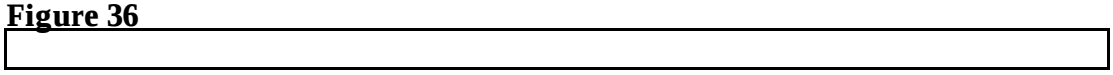

Figure 37

The transit operators listed in the figures above are arranged left to right by the number of passengers carried. Given this, one could surmise that the big operators simply have a larger pool of financial resources from which to draw, and are thus less dependent on the TDA. This is, however, not the case. While the larger operators do draw on a wider range of financial resources, they do so out of necessity rather than privilege.

We can demonstrate this point by differentiating dedicated transit funding externally supplied to operators by federal, state, and regional agencies, from discretionary funds that operators must secure locally. For Figure 37 below, all operating revenues are defined as either external or local. External revenues -- federal, state (including TDA), and regional subsidies -- are dedicated funds allocated on a formula basis. Local revenues -- fares, charter revenues, municipal general funds, local property taxes, and local sales taxes -- require a local commitment to transit and can vary quite significantly from year to year. Local revenues require an active financial commitment to public transit at the local level, but external funds are "free" -- they are available regardless of the local commitment to transit.

Figure 38

The issue of local commitment is fairly straightforward. In high transit-use areas like San Francisco, localities have little choice but to devote substantial local resources to transit. In low transit-use areas, the services can exist almost entirely on external support -- primarily TDA funds.

Beyond the gross ridership figures in Table 7, the service effectiveness of each operator is shown in Figure 38 using the traditional measure of total passengers per revenue vehicle hour of service.

Figure 39

We can see here that the larger operators do not have more riders simply because they have more buses. Ridership per vehicle hour follows a predictable pattern of decay from densely settled San Francisco to the sprawling suburbs. This pattern is even more sharply contrasted in Figure 39 below which shows per capita transit ridership for each operator's service area.

Figure 40

Figure 39 is especially important. Remember that TDA funds are apportioned to each operator on the basis of population, not ridership. Figure 39 tells us that each dollar of TDA subsidy supports three transit riders in Livermore, and 329 in San Francisco.

This pattern of TDA apportionments holds within counties as well (Table 9). In Contra Costa County, for example, four operators -- AC Transit, the County Connection, TriDelta, and WestCAT -- divide the annual TDA apportionment on the basis of service area population. AC Transit, which serves the largest Black and low-income areas in the county, has cut service each of the past four years to avert a deficit. In each of those years, the County Connection and TriDelta accrued surpluses of TDA funds; the excess funds were added to reserves that now number in the millions for each operator.[261]

[261] Demographic transit ridership information is limited, but fragmentary evidence suggests that the suburban bias of the TDA favors anglo transit riders over non-anglo patrons. Combining the TDA revenues, ridership, and ethnic composition of adjacent AC Transit (65.5 percent non-anglo ridership) and the County Connection (39.5 percent non-anglo ridership) shows that the TDA subsidy per anglo passenger to be $0.79, compared to $0.71 for non-anglo riders. This difference is probably underestimated because of the significant size difference between these two transit operators; demographic data for similarly sized central city and suburban operators would probably reveal an ethnic bias much greater than the 12 percent found here.

This inverse relationship between service effectiveness and TDA funding

Table 9

Ridership, Fares, and TDA Funds in Contra Costa County (Fiscal Year 1987-88)

Operator	Annual Passengers	Share of Passen-gers	Fare Revenues	Share of Fares	TDA Apprtnmnt	Share of TDA	TDA Apprtnmnt per Passenger
AC Transit	6,297,432	58.8%	$3,661,952	64.9%	$2,939,055	20.5%	$0.47
County Connection (CCCTA)	3,788,700	35.4%	$1,736,000	30.8%	$8,002,325	55.7%	$2.11
TriDelta (ECCTA)	427,700	4.0%	$166,100	2.9%	$2,390,046	16.6%	$5.59
WestCAT (WCCCTA)	189,000	1.8%	$75,500	1.3%	$1,034,661	7.2%	$5.47
Total	10,702,832	100.0%	$5,639,552	100.0%	$14,366,087	100.0%	$1.34

Notes: The County Connection and TriDelta did not use all of their apportioned TDA funds in FY 1987-88. The AC Transit figures are for the Contra Costa portion of AC's service area only.

Source: Metropolitan Transportation Commission, 1989a

is shown clearly in Figure 40 which shows that the TDA's return-to-source provision allows for very high levels of transit funding in low-density, auto-dependent suburban areas. With funding available, these areas put service on the streets that goes largely unused. The paradoxical effect of TDA funding on Bay Area public transit operations is summarized in Table 10.

Figure 41

Table 10

The Countervailing Patterns of TDA Funding and Service Effectiveness (Fiscal Year 1987-88)

Operator	Annual Pax per Capita	Pax per Vhcl-Hour	Pct of Oprtns Funded by TDA	TDA Subsidy per Pax
Central City Operators				
San Francisco Muni	329.2	78.2	13.8%	$0.13
AC Transit	56.5	32.5	33.2%	$0.66
Average	192.8	55.3	23.5%	$0.40
Large Suburban Operators				
Santa Clara County Transit	24.8	25.5	33.2%	$0.97
SamTrans	27.8	30.1	33.1%	$0.63
Golden Gate Transit	28.3	24.6	18.3%	$0.78
Average	27.0	26.7	28.2%	$0.79
Small Suburban Operators				
County Connection (CCCTA)	8.5	15.7	70.0%	$2.01
Vallejo Transit	14.0	25.8	54.3%	$0.77
Santa Rosa CityBus	9.9	20.9	51.6%	$0.92
Sonoma County Transit	6.2	15.1	71.7%	$2.52
TriDelta (ECCTA)	3.3	10.3	88.2%	$3.32
Napa VINE	7.5	18.6	40.3%	$0.68
Wheels (LAVTA)	3.0	8.3	92.0%	$5.08
Union City Flea	7.9	15.3	82.1%	$2.22
Fairfield Transit	3.0	15.4	49.8%	$1.17
WestCAT (WCCCTA)	3.8	6.5	88.1%	$4.20
Average	6.7	15.2	68.8%	$2.29

Notes: Bridge Tolls provide 60.5% of Golden Gate Transit's subsidies. Vallejo, Santa Rosa, Sonoma, Napa, and Fairfield are in counties that spend TDA funds on streets and roads.

The clear majority of the region's transit patrons on San Francisco's Muni pay an $0.85 fare and receive a TDA subsidy of $0.13 per ride, while passengers in one of the area's newest suburbs pay $0.60 to board a LAVTA bus and receive a $5.08 TDA subsidy per ride. In the absence of the TDA, the heavily patronized Muni, which receives an annual city general fund contribution nearly four times its TDA apportionment ($164.37 per capita per year), would continue to operate. On the other hand, it is likely that suburban operators such as Wheels (LAVTA), TriDelta (ECCTA), WestCAT (WCCCTA), and the Union City Flea would not exist were not 80+ percent of their costs covered by the TDA.

CONCLUSION

When recommending improvements to federal transit subsidy programs, most authors have called for more flexible, performance-based programs that target benefits to the transit user, not the transit operator.[262] The TDA is clearly in need of reform; as currently structured, it is a politically popular, financially wasteful transit subsidy program.

The likelihood, however, of restructuring the TDA is slim. Wachs notes that calls to restructure transit subsidy programs on efficiency and effectiveness grounds do not address the political considerations of subsidy programs and usually fall on deaf ears.[263] Indeed, the motivations to include rural and

[262] Cervero, *et. al.*, 1980; Cervero, 1987; Pickrell, 1983; Pucher, 1982; Wachs, 1989; Wachs and Ortner, 1979.

[263] Wachs, 1985.

suburban funding guarantees in the TDA have not diminished in the nearly twenty years since its passage; if anything, statewide politics have grown more parochial since 1971.

> While the preamble of the TDA seems unambiguous,
>
> > The Legislature hereby finds and declares that it is in the interest of the State that funds available for transit development be fully expended to ~~meet the transit needs that exist in California~~ (emphasis added),[264]

it is clear that "transit needs" are defined quite differently in economic and political realms. This chapter has argued that the TDA is not economic; in the name of fairness, the TDA pours millions of dollars each year into underutilized suburban transit systems around the state, systems that might not exist without TDA funding. In politics, however, the TDA works. In the past, rural and suburban legislators have opposed the shifting of TDA funds across county lines on fairness grounds, and will likely continue to do so.

Just as the eventual development of urban freeways was shaped primarily by the process of securing funding, so too has public transit in California been shaped by the politics of transit subsidies. After twenty years, the planning motivation for the TDA -- to provide operating subsidies for financially strapped central city transit operators -- has been submerged by the larger impacts of the program. And, while one can argue that a minimum level of transit service should be provided in all parts of metropolitan areas, this examination of California's Transportation Development Act has shown that ubiquitous

[264] California Department of Transportation, 1989, p 21.

metropolitan transit service is an expensive proposition.

CONCLUSION

This dissertation has presented three case studies of finance directing transportation planning and policy in California. In each case, the politics of finance limited the planning process and bounded public policy. Early plans for urban expressways were transformed by the funding process into metropolitan freeways designed and built by state highway departments; a financial squeeze in the 1960s curtailed freeway development before a much-publicized policy shift in the 1970s could do so; and plans to improve central city public transit were transformed by funding politics into a program that greatly expanded suburban public transit.

The "science" of planning has improved with the years; transportation modelling is increasingly sophisticated, cost-benefit analyses are more precise, and alternatives analyses and environmental reviews are more comprehensive. But increasing technical sophistication has not given transportation planners more autonomy or authority. In fact, recent evidence suggests that the role of transportation planners as impartial and expert arbiters of public investment decisions may well be diminishing with time.

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 was the first major piece of federal transportation legislation in the post- (or nearly post-) Interstate era. The ISTEA sets national transportation policy and finance through 1997. In addition to redesignating the Urban Mass Transportation Administration as the Federal Transit Administration and allowing states and regions some additional flexibility in the use of federal highway and transit funds,[265] ISTEA includes language specifying the routing of the third subway line to be constructed along Wilshire Boulevard in Los Angeles.

[265] United State Department of Transportation, 1991.

Wilshire Boulevard, which runs seventeen miles from downtown Los Angeles to the Pacific Ocean, is one of the most densely developed corridors in the western U.S. The Wilshire corridor is fairly unique among sunbelt cities in that high density commercial and medium density residential development

Figure 42

stretches along its entire length, making it perhaps the only travel corridor in southern California where rail transit can be plausibly justified. The ISTEA, however, requires that the Wilshire Boulevard subway bypass the densely developed mid-Wilshire area by looping one mile to the south through a much less densely developed area before turning north again and rejoining Wilshire Boulevard four miles to the east (Figure 41). The Wilshire subway routing specifications were included in the ISTEA at the behest of Congressional Representatives Julian Dixon and Henry Waxman of Los Angeles. The reason for the route diversion, according to Dixon and Waxman, is to avoid the danger of tunneling the subway in the methane gas saturated soil in the mid-Wilshire area.[266]

While this route diversion might be justified on safety grounds, it would seem peculiar to include such specifics in multi-year national transportation policy and finance legislation. Presumably transportation planners and engineers confront such routing and safety issues on a regular basis, without the guidance of federal legislation. In fact, recent soil tests show that the soil under the ISTEA-mandated diversion loop contains the same levels of methane gas as the soil under the direct Wilshire Boulevard route. Further, a variety of geoengineers have concluded that neither route poses a substantial risk because methods for safely tunneling in methane-rich soil are well-established.[267]

In spite of the findings that the southern loop would involve the same

---

[266] Stein, 1992, p B-8.

[267] Maugh II, 1992, p B-8.

tunneling risk as the direct Wilshire Boulevard route, neither Dixon nor Waxman has been willing to reconsider the subway routing requirements in the ISTEA. Thus, local transportation planners have no choice but to route the subway as specified by the ISTEA, in spite of estimates that the loop south of Wilshire will cost 53 percent more to build and attract 48 percent fewer riders than if the line remained on Wilshire Boulevard.[268] The curious intransigence of Dixon and Waxman in this matter is largely explained, however, by the geography of their respective districts. Henry Waxman has been mildly opposed, though not hostile, to the project, and the Wilshire Boulevard-only route would keep the subway entirely within his district. Julian Dixon, on the other hand, is a senior member of the House Appropriations Committee and a strong proponent of the subway; the loop south of Wilshire would bring the subway into the northern portion of his district. In other words, tunneling safety has been used as a rationale to gerrymander the Wilshire subway line into an influential Congress member's district.

Throughout the debate over the routing of the Wilshire subway line, the agency nominally responsible for planning the line -- the Los Angeles Transportation Commission (LACTC) -- has been eager to defend the route favored by Dixon and Waxman. Despite their own data showing the loop south of Wilshire to be more expensive and less productive than the Wilshire-only route, the LACTC has resisted pressure from local groups to advocate the Wilshire Boulevard route on the grounds that the appearance of local indecision

[268] Stein, 1992, p B-1.

over the route may be used by federal officials as an excuse to withdraw all federal funding for the project.[269] Such a calculus leaves little role for planning; in this case, what gets built and even where it is built is entirely dictated by funding.

Part Two showed that state and federal revenues for transportation in California, particularly highways, declined significantly in real terms during the 1970s and remained low throughout the 1980s. Since voters rolled back property taxes with the passage of Proposition 13 in 1976, anti-tax sentiment has remained strong in California. Fearful of raising voter ire by increasing transportation taxes, nervous politicians turned to the ballot box for voter approval of new transportation revenues. While these new revenue programs have increased expenditures on transportation in recent years, they are perhaps the most extreme example to date of finance leading planning. Extreme because many of the new revenues come from sources wholly or largely unrelated to transportation and are tied to detailed project lists that leave as little discretion as possible to planning.

At the state level, California voters approved two general obligation transportation bond measures in 1990 to finance a variety of passenger rail projects around the state. The use of bond financing for transportation infrastructure breaks a long tradition in California of financing with user taxes and fees. The smaller of the two successful measures ($1 billion) was put on the ballot by the state legislature, the other ($2 billion) was placed on the ballot by a coalition of rail advocates, environmental groups, and transit proponents

[269] Stein, 1992, p B-8.

independent of the legislature.

Both of these measures are, in effect, "sunshine porkbarreling." Like the various "sunshine laws" designed to bring politics into the open, the direct democracy of the initiative process avoids the specter of back room deal making. But porkbarreling is not eliminated, it is just put on the ballot. Each of the bond measures was adroitly crafted to apportion projects among a variety of voter constituencies around the state. But in creating voter-approved project lists, existing transportation planning processes are essentially bypassed to prevent planners or the politically powerful from subsequently altering the intent of the bond measure sponsors. For example, the $2 billion bond measure includes the following language:

> Section 99640: $11,000,000 shall be allocated... for...intercity passenger rail...connecting the City of Santa Cruz with the Watsonville Junction.[270]

This kind of specificity sets planning process into stone. If Monterey Bay area planners were to decide, for example, that express bus service in a new bus lane between Santa Cruz and job centers in San Jose and the Silicon Valley would attract more riders at far less cost than rail service between Santa Cruz and the small agricultural center of Watsonville, an amendment of the measure by the state legislature would be required to use the rail bond funds for that purpose.

---

[270] Secretary of State, 1990, p 71.

Sunshine porkbarreling has occurred on the local level as well. Between 1984 and 1990, nineteen counties (all but one of which is associated with a metropolitan area) containing 83 percent of California's population have adopted

Table 11

Transportation Sales Taxes in California

County	1989 Pop	Tax Rate	Effective Date	Region
Imperial	118,000	0.50%	Apr '90	Colorado Desert
Fresno	635,000	0.50%	Jul '87	Fresno
Madera	86,000	0.50%	Oct '90	Fresno
Los Angeles	8,710,000	1.00%	Apr '91	Los Angeles
Orange	2,301,000	0.50%	Apr '91	Los Angeles
San Bernadino	1,379,000	0.50%	Apr '90	Los Angeles
Riverside	1,063,000	0.50%	Jul '89	Los Angeles
Monterey	353,000	0.50%	Apr '90	Monterey Bay
Santa Cruz	233,000	1.00%	Apr '91	Monterey Bay
San Benito	36,000	0.50%	Jan '89	Monterey Bay
Sacramento	1,007,000	0.50%	Apr '89	Sacramento / Stockton
San Joaquin	465,000	0.50%	Apr '91	Sacramento / Stockton
San Diego	2,460,000	1.00%	Jan '89	San Diego
Santa Clara	1,455,000	1.00%	Apr '85	San Francisco Bay
Alameda	1,262,000	1.00%	Apr '87	San Francisco Bay
Contra Costa	790,000	1.00%	Apr '89	San Francisco Bay
San Francisco	727,000	1.00%	Apr '90	San Francisco Bay
San Mateo	637,000	1.00%	Jan '89	San Francisco Bay
Santa Barbara	350,000	0.50%	Apr '90	Santa Barbara
Sub-Total	24,067,000	0.84%		Weighted Average Sales Tax

Notes: 82.8% of Californians live in counties with transportation sales taxes. Some counties have adopted transportation sales taxes and then later increased the tax; the "Effective Date" is the most recent increase of the tax.

Sources: California Board of Equalization, 1991; California Department of Commerce, 1991.

voter-approved sales tax increases of one-half to one percent for transportation (see Table 11).

Like the statewide bond measures, these sales tax measures have presented voters with detailed project lists to be built with the new tax revenues; the more specific the project list, the more popular the measure. For example, voters in suburban Contra Costa County in the San Francisco Bay Area approved a half-percent sales tax increase for transportation[271] in November 1988 after they rejected a similar proposal just two years earlier. One significant difference between the two measures was the diversity and specificity of the projects to be funded. The failed 1986 measure was almost entirely devoted to highway projects and did not provide a particularly detailed account of the projects to be funded.[272] By contrast, the successful 1988 measure proposed to fund projects appealing to a much wider constituency.[273] Comparing the two measures, Zell concluded:

> What made the difference? This time around, the voters were looking at a detailed list of transportation projects and programs...[274]

The popularity of detailed project lists with voters implies a fundamental

---

[271] This new sales tax is in addition to the existing one-half percent county sales tax to support the Bay Area Rapid Transit District (BART) rail transit system.

[272] Borenstein, 1986, p 1-A; Wing, 1986, p 1-A.

[273] The projects to be funded include new freeway construction, freeway improvements, rail transit extensions, bicycle trails, and elderly and handicapped transit service. At least 90.3 percent of the anticipated twenty-year revenue stream of $807 million will go the construction and maintenance of capital facilities.

[274] Zell, 1989, p 6.

mistrust of planning and the planning process, though the use of project lists to secure funding for transportation is hardly new. In 1956, the Bureau of Public Roads bypassed urban transportation planning to hastily produce maps of the Interstate freeways to be built in metropolitan areas in an effort to garner the votes of urban Congress members. In recent years, this pattern of limiting subsequent planning discretion at the point of financial commitment has been continued on California ballots. In both the 1950s and the 1990s, holders of the purse strings chose to fund tangible project lists, rather than trust planning to produce a favorable outcome.

The lack of faith in the objectivity and rationality of planning should hardly be surprising. Given that the politics of finance has largely determined transportation planning outcomes for decades, there is little reason for Congress members or voters to think of transportation planning as an apolitical process. This is not to dismiss the sophisticated models, precise cost-benefit analyses, and comprehensive environmental reviews prepared by planners as irrelevant. These models, analyses, and reviews can and do affect outcomes, but only within the bounds established by the funding process.

The limited role for transportation planning is a reflection, in part, of the difficulty of resolving immensely complex and largely relative questions. If the preceding sections have revealed a failure of the rational planning model to create efficient and effective urban transportation systems, it is largely because rational, objective planning of any kind is such an elusive goal. But more importantly, planning is limited because planning "rationality" and political "rationality" are very different. The causes of porkbarrel politics, which helped

motivate the creation of professional planning in the Progressive Era, have not diminished with time. Building a four-lane, access-limited, grade-separated freeway across rural Montana and looping a subway off a high-density corridor into lower-density residential area in Los Angeles are not rational planning decisions, but they were and are politically rational decisions made to secure funding for urban freeways and public transit.

Nearly fifty years ago, the New Deal-era Interregional Highway Committee presented an idealized vision of transportation planning in cities:

> By careful and complete functional studies of the city organism, it may be possible to devise a rational plan of future land use that will assign more or less specific areas to each of the principal classes of use -- residential, cultural, business, industrial, etc. Having planned such rational distributions of land use, it may be possible to obtain the public consent necessary to the establishment of legal controls, land authorities, and other devices and machinery that will assure an actual development over a period of years in conformity with the plan. In such case, the planning of city streets, the interregional routes and other express ways, and all other urban facilities would take the forms and locations necessary to serve the intended land uses, and these facilities would be provided in essential time relationship to the development of the entire plan, and in a manner to bring about its undistorted realization.[275]

This examination of the influence of finance on transportation planning has shown that such visions of urban transportation planning have yet to be realized. In fact, the pattern of successful transportation funding programs suggests that

[275] Interregional Highway Committee, 1944, p 70.

the most successful transportation plans are those that leave as little discretion as possible to planners.

APPENDIX

Data were compiled from a variety of sources into a single database for this research. The primary sources for this database were the annual statistical reports of the Federal Highway Administration and the California Department of Transportation. A detailed accounting of the sources for each data group is listed below.

Costs and Prices

1. California Freeway System Cost Projections.

   Zettel, Richard M. (1959). "Appendix B. The California Freeway Program: An Economic and Fiscal Analysis." Joint Interim Committee on Highway Problems, California Legislature. Sacramento: California State Printing Office.

2. Price and Cost Indices.

   A. Consumer Prices:

   U.S. Bureau of the Census (1976). *Historical Statistics of the United States: Colonial Times to 1970, Part 1, Department of Commerce.* Washington, D.C.: U.S. Government Printing Office.

   U.S. Bureau of the Census (1992). *Statistical Abstract of the United States: 1992*, Department of Commerce. Washington, D.C.: U.S. Government Printing Office.

   B. California Highway Construction Costs:

   California Department of Public Works (1963 to 1973). "Statistical Reports of the Department of Public Works Pertaining to the Division of Highways," Business and Transportation Agency. Sacramento: California Department of Public Works.

   California Department of Transportation (1974 to 1983). "State Highway Program: Financial Statements and Statistical Reports," Caltrans. Sacramento: California Department of Transportation.

California Department of Transportation (1983 to 1991). "Annual Financial Statements and Miscellaneous Statistical Reports," Caltrans. Sacramento: California Department of Transportation.

C. National Highway Construction Costs:

U.S. Federal Highway Administration (1946 to 1991). *Highway Statistics: 19--*, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Table PT-1.

D. Highway Maintenance Costs:

U.S. Federal Highway Administration (1946 to 1991). *Highway Statistics: 19--*, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Table PT-5.

Highway Taxes and Tax Rates

3. ~~Highway User Tax Rates: 1919 to 1990~~.

U.S. Federal Highway Administration (1946 to 1991). *Highway Statistics: 19--*, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Tables G-205 and MF-201.

U.S. Federal Highway Administration (1986). *Highway Statistics: Summary to 1985*, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Table MF-205.

4. ~~Transportation Sales Taxes in California~~.

California State Board of Equalization (1991). "California City and County Sales and Use Tax Rate," pamphlet 71, LDA. Sacramento: California State Board of Equalization. April.

California Department of Commerce (1991). *California Fact Book: 1991*. Sacramento: California State Printing Office.

Highway Revenues

5. Highway and Freeway Revenues: 1917 to 1990.

U.S. Federal Highway Administration (1946 to 1991). *Highway Statistics: 19--*, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Tables E-4 (1946 to 1951), E-7 (1952 to 1981), E-8 (1952 to 1981), E-9 (1982-1990), F-1, FE-201 (1986 to 1990), SF-1, and SF-3.

U.S. Federal Highway Administration (1986). *Highway Statistics: Summary to 1985*, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Table FE-205.

Highway Expenditures

6. Local Highway Expenditures: 1921 to 1950.

U.S. Federal Highway Administration (1986). *Highway Statistics: Summary to 1985*, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Tables LF-201 and UF-201.

7. Highway and Freeway Expenditures: 1945 to 1990.

U.S. Federal Highway Administration (1946 to 1991). *Highway Statistics: 19--*, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Tables F-2, HF-2, SF-2, SF-4, SF-4(1), SF-12, and SF-12(A).

Population Trends

8. National, State, Urban, and Rural Population: 1940 to 1990.

U.S. Bureau of the Census (1976). *Historical Statistics of the United States: Colonial Times to 1970, Part 1, Department of Commerce.* Washington, D.C.: U.S. Government Printing Office.

U.S. Bureau of the Census (1992). *Statistical Abstract of the United States: 1992*, Department of Commerce. Washington, D.C.: U.S. Government

Printing Office.

Fay, J., S. Fay, and F. Boehm (1991). *California Almanac.* Santa Barbara: Pacific Data Resources. Table 1.1.

Vehicle Travel

9. Vehicle Travel: 1944 to 1990.

A. 1945 to 1966:

U.S. Federal Highway Administration (1946 to 1967). *Highway Statistics: 19--*, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Table VM-1.

B. 1967 to 1990:

U.S. Federal Highway Administration (1968 to 1991). *Highway Statistics: 19--*, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Table VM-2.

Fuel Use

10. Motor Vehicle Fuel Consumption: 1919 to 1990.

A. 1919 to 1945:

U.S. Federal Highway Administration (1947). *Highway Statistics: Summary to 1945*, Public Roads Administration. Washington, D.C.: U.S. Government Printing Office. Table G-223.

B. 1946 to 1949:

U.S. Federal Highway Administration (1947 to 1950). *Highway Statistics: 19--*, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Table G-2.

C. 1950 to 1985:

U.S. Federal Highway Administration (1986). *Highway Statistics: Summary to 1985*, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Table MF-202.

D. 1986 to 1990:

U.S. Federal Highway Administration (1987 to 1991). *Highway Statistics: 19--*, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Table MF-2.

Freeway Mileage

11. Freeway and Expressway Route Mileage: 1945 to 1990.

A. California, 1939 to 1957:

Zettel, Richard and Paul Shuldiner (1959). "Freeway Location Conflicts in California." Institute of Transportation and Traffic Engineering, University of California, Berkeley. p 13.

B. California, 1958 to 1961:

Jones, David W. (1989). *California's Freeway Era in Historical Perspective*, California Department of Transportation. Berkeley: University of California Institute of Transportation Studies. Estimated from p 28.

C. California, 1962 to 1972:

California Department of Public Works (1963 to 1973). "Statistical Reports of the Department of Public Works Pertaining to the Division of Highways," Business and Transportation Agency. Sacramento: California Department of Public Works. Table "State Highway Mileage by Type."

D. California, 1973 to 1982:

California Department of Transportation (1974 to 1983). "State Highway Program: Financial Statements and Statistical Reports," Caltrans. Sacramento: California Department of Transportation. Table "State Highway Mileage by Type."

E. California, 1983 to 1990:

California Department of Transportation (1983 to 1991). "Annual Financial Statements and Miscellaneous Statistical Reports," Caltrans. Sacramento: California Department of Transportation. Table "State Highway Mileage by Type."

F. National, 1956 to 1979:

U.S. Federal Highway Administration (1957 to 1980). *Highway Statistics: 19*--, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Table FM-11.

G. National, 1980 to 1990:

U.S. Federal Highway Administration (1981 to 1991). *Highway Statistics: 19*--, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office. Table HM-20.

REFERENCES

American Society of Planning Officials (1940). "Highways and Transportation in Relation to Each Other and to Other Planned Development," Highway and Transportation Committee. Washington, D.C.: American Society of Planning Officials. July.

Anderson, Walt (1977). "What Lies Beyond Diamond Lanes?" Adriana Gianturco interview in *Los Angeles Times*, 17 July, p VIII-3.

Automotive Safety Foundation (1944). "The Role of the Federal Government in Highway Development," Senate Committee on Post-War Economic Policy and Planning, 78th Congress, 2nd Session. Washington, D.C.: U.S. Government Printing Office.

Automotive Safety Foundation (1946). "Engineering Facts and a Future Highway Program: 1946," Joint Fact-Finding Committee on Highways, Streets, and Bridges, California Legislature. Sacramento.

Bartholomew, Harland (1924). "Alleviation and Remedy of Street Congestion," *Engineering News-Record*, 92:18, pp 766-767.

Borenstein, Daniel (1986). "What Went Wrong with Measure C: Backers Look at Future of Tax Idea," *West County Times*, 6 November, pp 1-A and 3-A.

Bowman, John and John Mikesell (1985). "Recent Changes in State Gasoline Taxation: An Analysis of Structure and Rates," *National Tax Journal*, 36:2, pp 163-182.

Boyer, Richard and David Savageau (1989). *Places Rated Almanac*. New York: Prentice Hall.

Brodsly, David (1981). *L.A. Freeway: An Appreciative Essay*. Berkeley: University of California Press.

Buel, Ronald A. (1972). *Dead End: The Automobile in Mass Transportation*. Baltimore: Penguin Books.

Burby, John (1971). *The Great American Motion Sickness; or, Why You Can't Get There From Here*. Boston: Little, Brown.

California Department of Commerce (1991). *California Fact Book: 1991*. Sacramento: California State Printing Office.

California Department of Public Works (1963 to 1973). "Statistical Reports of the Department of Public Works Pertaining to the Division of Highways," Business and Transportation Agency. Sacramento: California Department of Public Works.

California Department of Public Works (1969). "The California Freeway and Expressway System: 1968 Progress and Problems," California Business and Transportation Agency. Sacramento: California State Printing Office. March.

California Department of Transportation (1974 to 1983). "State Highway Program: Financial Statements and Statistical Reports," Caltrans. Sacramento: California Department of Transportation.

California Department of Transportation (1974 to 1986). "Right of Way Annual Report," Division of Right of Way. Sacramento: California Department of Transportation.

California Department of Transportation (1975). "The Highway Program in Crisis: How Did We Get Where We Are Today?" Highway Planning and Research Division. Sacramento: California Department of Transportation. 31 July.

California Department of Transportation (1983 to 1991). "Annual Financial Statements and Miscellaneous Statistical Reports," Caltrans. Sacramento: California Department of Transportation.

California Department of Transportation (1987). "Report on the Status of the Highway Program," Division of Highways--Program Development. Sacramento: California State Printing Office.

California Department of Transportation (1989). *Transportation Development Act: Statutes and Administrative Code for 1988*. Division of Mass Transportation. Sacramento: California Department of Transportation.

California Division of Highways (1958). "The California Freeway System," report to the Joint Interim Committee on Highway Problems, California Legislature. Sacramento: California State Printing Office.

California Division of Highways (1960). "California Land Economic Studies," Division of Right of Way. Sacramento: California Division of Highways.

California Division of Highways (1964). "Section 256 Report: Review of California Freeway and Expressway System and Entire State Highway System and Recommendations of Revisions to the Systems." Sacramento: California Division of Highways. December.

California Division of Highways (1970). "Spiraling Costs: A Report of the Causes and Effects of Increasing Highway Project Costs and on Recommended Courses of Action." Sacramento: California Division of Highways.

California Legislature (1947). *California's Highway Problem*. Joint Fact-Finding Committee on Highway Streets and Bridges, California Legislature, 57th Session. Sacramento: California State Printing Office. January.

California Office of the Controller (1980). *Financial Transactions Concerning Transit Operators and Non-Transit Claimants Under the Transportation Development Act: 1978-79 Annual Report*. Sacramento: California State Printing Office.

California Office of the Controller (1990). *Financial Transactions Concerning Transit Operators and Non-Transit Claimants Under the Transportation Development Act: 1988-89 Annual Report*. Sacramento: California State Printing Office.

California State Automobile Association (1986). "Commentary," *Motorland*, Septmeber / October, p 5.

California State Board of Equalization (1991). "California City and County Sales and Use Tax Rate," pamphlet 71, LDA. Sacramento: California State Board of Equalization. April.

Carll, Richard and Tillo Kuhn (1962). "Economic Considerations in the Geographic Distributions of Highway User Tax Revenues," Institute of Transportation and Traffic Engineering Research Report 33. Berkeley: University of California.

Cervero, R., M. Wachs, R. Berlin, and R. Gephart (1980). "Efficiency and Equity Implications of Alternative Transit Fare Policies," Department of Transportation Report CA-11-0019. Washington, D.C.: Urban Mass Transportation Administration.

Cervero, Robert (1987). "Alternatives for Producing and Financing Transportation Services and Improvements in California," Institute of Urban and Regional Development Working Paper 466. Berkeley: University of California Institute of Urban and Regional Development. April.

Chamber of Commerce of the United States (1953). "A Dynamic Highway Policy for the Future," National Conference on Highway Financing. Washington, D.C.: Chamber of Commerce of the United States, December 10-11.

Clark, A.C. (1955). "Criteria for Selection of Additional Interstate System Routes at Urban Areas," circular memorandum to Division and District Engineers, U.S. Bureau of Public Roads, Department of Commerce. 9 June.

Committee for Economic Development (1956). "Modernizing the Nation's Highways: A Statement on National Policy," Research and Policy Committee. New York: Committee for Economic Development. January.

Congressional Quarterly (1964). *Congress and the Nation: A Review of Government and Politics, Volume I.* Washington, D.C.: Congressional Quarterly Service.

Congressional Quarterly (1969). *Congress and the Nation: A Review of Government and Politics, Volume II.* Washington, D.C.: Congressional Quarterly Service.

Congressional Quarterly (1973). *Congress and the Nation: A Review of Government and Politics, Volume III.* Washington, D.C.: Congressional Quarterly Service.

Congressional Quarterly (1977). *Congress and the Nation: A Review of Government and Politics, Volume IV.* Washington, D.C.: Congressional Quarterly Service.

Congressional Quarterly (1981). *Congress and the Nation: A Review of Government and Politics, Volume V.* Washington, D.C.: Congressional Quarterly Service.

Congressional Quarterly (1985). *Congress and the Nation: A Review of Government and Politics, Volume VI.* Washington, D.C.: Congressional Quarterly Service.

Congressional Quarterly (1989). *Congress and the Nation: A Review of Government and Politics, Volume VII.* Washington, D.C.: Congressional Quarterly Service.

Dearing, Charles L. (1941). *American Highway Policy*. Washington, D.C.: The Brookings Institution.

DiMento, J., J. Baker, D. van Hengel, D. Hestermann, and B. Nordenstam (1991). "Court Intervention, the Consent Decree, and the Century Freeway," Final Report CA\CN\92-01. Irvine: University of California Public Policy Research Organization. 13 September.

Eisenhower, Dwight D. (1955). "National Highway Program: Message of the President of the United States Relative to a National Highway Program," House Document 93, 84th Congress, 1st Session. Washington, D.C.: U.S. Government Printing Office.

Ellis, Virginia and Tom Redburn (1990). "Prop. 111 Victory Eases Calif. Anti-Tax Stance," *Los Angeles Times*, 9 June, pp A1 and A29.

Enns, J.H. (1974). "The Response of State Highway Expenditures and Revenues to Federal Grants-In-Aid," the Rand Corporation Report R-1233-FF. Santa Monica: Rand Corporation. February.

Fairbank, H.S. (1937). "Objects and Methods of the State-wide Highway Planning Surveys," *American Highways*, 16:1, January.

Fay, J., S. Fay, and F. Boehm (1991). *California Almanac*. Santa Barbara: Pacific Data Resources.

Forbes, C.E. and P.H. Talbot (1974). "Improving the Cost Effectiveness of the Highway Program: New Planning and Design Approaches in California," presentation at meeting of the Association of American State Highway and Transportation Officials. Sacramento: California Department of Transportation, November 20.

Foster, Mark S. (1981). *From Streetcar to Superhighway: American City Planners and Urban Transportation, 1900-1940*. Philadelphia: Temple University Press.

Friedlander, Ann F. (1965). *The Interstate Highway System: A Study in Public Investment*. Amsterdam: North-Holland Publishing Company.

Gianturco, Adriana (1976). "Diamond Lanes: No 'Plot' Against Public," *Los Angeles Times*, 24 June, p II-7.

Gifford, Jonathan L. (1984). "The Innovation of the Interstate Highway System," *Transportation Research A*, 18A:4, pp 319-332.

Gifford, Jonathan L. (1991). "Historical Antecedents and Development Impacts of Highways of National Significance: The Conflict Between Technical and Political Criteria," paper presented at the Transportation Research Board Annual Meeting. January.

Gillam, Jerry (1976). "Senate Fight Looms on New Caltrans Chief: Critics Say Brown Appointee is Lacking in Experience, Biased Against Freeways," *San Francisco Chronicle*, 28 March, pp 1 and 16.

Godfrey, John (1990). "Highway Robbery, Mistrust, and the Federal Highway Trust Fund," *Tax Notes*, May 14, pp 765-766.

Goodman, Robert (1971). *After the Planners*. New York: Simon and Shuster.

Heppenheimer, T.A. (1991). "The Rise of the Interstates," *American Heritage of Invention and Technology*, 7:2, Fall, pp 8-18.

Hebert, Richard (1972). *Highways to Nowhere: The Politics of City Transportation*. Indianapolis: Bobbs-Merrill.

Hebert, Ray (1972a). "Cure Seen for Central City's Traffic Woes," *Los Angeles Times*, 24 January, pp II-1 and II-4.

Hebert, Ray (1972b). "Economist Turns Critic, Asks Review of Freeway Planning," *Los Angeles Times*, 14 March, pp I-1 and I-23.

Hebert, Ray (1973a). "Southland's Freeway Program Slowly Dying: Freewheeling Days of '60 Building Gone; Three Routes Killed," *Los Angeles Times*, 11 March, pp I-3, I-8-I-9.

Hebert, Ray (1973b). "State's Role in U.S. Highway Plan Stalls," *Los Angeles Times*, 23 November, II-1 and II-8.

Hebert, Ray (1975a). "State Shelving New Freeway, Will Aid Transit," *Los Angeles Times*, 27 March, pp I-1 and I-20.

Hebert, Ray (1975b). "Freeways to Nowhere: Construction at a Standstill," *Los Angeles Times*, 14 September, pp II-1 and II-6.

Hebert, Ray (1976). "The Diamond Lanes Seem Here to Stay," *Los Angeles Times*, 1

June, pp I-1 and I-3.

Hebert, Ray (1977). "Ms. Gianturco: She's Still the Driver at Caltrans," *Los Angeles Times*, 4 March, pp I-1 and I-20.

Hill, Stuart and Christos Brianas (1966). "Grand Oaks: A Study of Freeway Effects on Moderate Price Homes," Right of Way Research and Development. Sacramento: California Division of Highways. April.

Holley, H.F. (193?). "The Relation of Grade Crossing Elimination to Traffic Development." Los Angeles: Automobile Club of Southern California.

Interregional Highway Committee (1944). *Interregional Highways*. House Document 379, 78th Congress, 2nd Session. Washington, D.C.: U.S. Government Printing Office.

Jones, David W. (1989). *California's Freeway Era in Historical Perspective*, California Department of Transportation. Berkeley: University of California Institute of Transportation Studies.

Jones, David and Brian Taylor (1987). "Mission and Mix: A Study of the Changing Tasks and Staffing Requirements of the California Department of Transportation," Institute of Transportation Studies Research Report UCB-ITS-RR-87-8. Berkeley: University of California.

Kelly, Ben (1971). *The Pavers and the Paved*. New York: Donald W. Brown, Incorporated.

Labatut, Jean and Wheaton Lane, Editors (1950). *Highways in Our National Life: A Symposium*. Princeton: Princeton University Press.

Lave, Charles (1989). "Measuring Productivity Declines of U.S. Bus Transit Systems," Graduate School of Public Policy Working Paper 167. Berkeley: University of California Graduate School of Public Policy. May.

Leavitt, Helen (1970). *Superhighway-Superhoax*. Garden City, New York: Doubleday and Company.

Liebert, Larry (1976a). "Environmentalist: New State Highway Boss," *San Francisco Chronicle*, 12 March, p 6.

Liebert, Larry (1976b). "Construction Funds Added: A State Agency's Pro-Freeway Revolt," *San Francisco Chronicle*, 22 October, p 12.

Los Angeles Times (1972). "Clear the Streets," Editorial, *Los Angeles Times*, 25 January, p II-6.

Los Angeles Times (1974a). "Gas Crisis Cuts Road-Building: Tax Revenues Off Sharply," *Los Angeles Times*, 25 February, p I-9.

Los Angeles Times (1974b). "Ruling Gives State More Road Funds," *Los Angeles Times*, 4 September, p II-6.

Los Angeles Times (1975a). "400-500 Miles of Freeways May Be Cut," *Los Angeles Times*, 11 February, p I-3.

Los Angeles Times (1975b). "Will $2 Billion Help?," Editorial, *Los Angeles Times*, 13 February, p II-6.

Los Angeles Times (1975c). "Gas Tax Voted Down by Assembly Panel," *Los Angeles Times*, 30 August, pp I-1 and I-22.

Los Angeles Times (1975d). "City Will Aid Bus-Car Pool Freeway Plans," *Los Angeles Times*, 5 September, pp II-8.

Los Angeles Times (1975e). "More and More States Feeling Highway Pinch," *Los Angeles Times*, 14 September, p II-6.

Los Angeles Times (1976a). "Collier to Fight Approval of New Caltrans Chief," *Los Angeles Times*, 15 March, p II-5.

Los Angeles Times (1976b). "A Total Flop," Editorial, *Los Angeles Times*, 11 June, p II-6.

Los Angeles Times (1976c). "Dishonesty With Diamonds," Editorial, *Los Angeles Times*, 16 June, p II-6.

Los Angeles Times (1976d). "State Highway Plan: Less Building," *Los Angeles Times*, 15 July, p II-6.

Los Angeles Times (1977a). "From [happy face] to [sad face]," Editorial, *Los Angeles Times*, 12 April, p II-4.

Los Angeles Times (1977b). "$500 Million Road Building Boost Proposed," *Los Angeles Times*, 8 May, pp I-3 and I-23.

Lupo, A., F. Colcord, and E.P. Fowler (1971). *Rights of Way: The Politics of Transportation in Boston and the U.S. City*. Boston: Little, Brown and Company.

MacDonald, Thomas H. and H. S. Fairbank (1926). "The Development of Improved Highways: A Brief History of the Growth of the Highway System of the United States," *Roads and Streets*, August, pp 71-77.

MacDonald, Thomas H. (1936). "Roads We Should Have," address to the Annual Meeting of the Councillors of the American Automobile Association, pp 66-72.

MacDonald, T., G. Kennedy, B. Graves, C. Purcell, and F. Delano (1944). "Oklahoma: Tulsa Metropolitan Traffic Survey," State-Wide Highway Planning Survey, Oklahoma State Highway Commission.

MacDonald, Thomas H. (194?). "Federal Aid from the National Viewpoint," *American Association of State Highway Officials*, pp 24-41.

MacDonald, Thomas H. (1954). "The Engineer's Relation to Highway Transportation," Sixth Salzberg Memorial Lecture. College Station: Texas A&M University.

Martinez, Al (1973). "Freeways: The 'Dream' That Came True," *Los Angeles Times*, 11 March, pp I-1, I-3, and I-14.

Maugh II, Thomas H. (1992). "Gas Explosions in Tunnels Easily Avoided, Experts Say," *Los Angeles Times*, 1 April, pp B-1 and B-8.

McClintock, Miller (1926). "Report and Recommendations of the Metropolitan Traffic Survey." Chicago: Street and Traffic Committee of the Chicago Association of Commerce.

McClintock, Miller (1932). "Limited Ways for the Greater Chicago Traffic Area." Chicago: Committee of Traffic and Public Safety, City Council of the City of Chicago.

McClintock, Miller (1937). "Report on the San Francisco Citywide Traffic Survey." San Francisco: Department of Public Works, City and County of San Francisco.

Metropolitan Transportation Commission (1989a). "1988 Annual Report." Oakland: Metropolitan Transportation Commission.

Metropolitan Transportation Commission (1989b). "Transit Productivity and Coordination Evaluation: 1989 Report." Oakland: Metropolitan Transportation Commission.

Metropolitan Transportation Engineering Board (1958). "Proposed Freeway and Expressway System for Los Angeles, Orange, and Ventura Counties," report to the California Department of Public Works. Los Angeles: Metropolitan Transportation Engineering Board.

Meyer, John and Jose Gomez-Ibanez (1981). *Autos, Transit, and Cities*. Cambridge: Harvard University Press.

Moe, James A. (1973). "California Needs to Keep On Building Freeways (Despite Everything, Says Transportation Boss)," *Los Angeles Times*, 17 December, p II-7.

Mowbry, A.Q. (1969). *Road to Ruin*. Philadelphia and New York: J.B. Lippincott Company.

Olmstead, F., H. Bartholomew, and C. Cheney (1924). "A Major Traffic Street Plan for Los Angeles." Los Angeles: Committee on Los Angeles Plan of Major Highways, Traffic Commission of the City and County of Los Angeles. May.

Netzer, Dick (1992). "Do We Really Need a National Infrastructure Policy?" *Journal of the American Planning Association*, 58:2, Spring, pp 139-143.

Patton, Don (1986a). "Transportation Series, Part One," *Motorland*, California State Automobile Association, September / October, pp 28-31 and 55.

Patton, Don (1986b). "Transportation Report, Part Two," *Motorland*, California State Automobile Association, November / December, pp 14-17.

Patton, Don (1987). "Transportation Report, Part III," *Motorland*, California State Automobile Association, January / February, pp 36-37 and 69.

Pickrell, Don (1983). "The Causes of Rising Transit Operating Deficits," University Research and Training Program Report MA-11-0037. Washington, D.C.: U.S. Urban Mass Transportation Administration. July.

Pucher, John (1982). "Redesigning Federal Transit Subsidies to Control Costs and to Increase the Effectiveness of the Transit Program," University Research and Training Program Report NJ-11-0011. Washington, D.C.: U.S. Urban Mass Transportation Administration. December.

Purcell, C. H. (1940a). "California Highway Program Requires More Federal Aid for Projects Within Cities," *California Highways and Public Works.* May.

Purcell, C. H. (1940b). "California Highway Program Requires More Federal Aid," *California Highways and Public Works.* June.

Putman, Stephan H. (1980). "Urban Metropolitan Impacts of Highway Systems," in Norman Glickman, Editor, *The Urban Impacts of Federal Policies.* Baltimore: Johns Hopkins University Press. pp 376-397.

Robinson, John (1971). *Highways and Our Environment*. New York: McGraw-Hill Book Company.

Rose, Mark H. (1979). *Interstate: Express Highway Politics 1941-1956.* Lawrence: The Regents Press of Kansas.

Salomone, William G. (1990). "On the Road to Mediation: Resolving Public Highway Construction Disputes," *The Arbitration Journal*, 45:1, March, pp 3-14.

San Francisco Chronicle (1976). "Highway Lady," Editorial, *San Francisco Chronicle*, 15 March, p 36.

San Francisco Chronicle (1986). "The Traffic Mess," Editorial, *San Francisco Chronicle*, 31 August, p P1.

Schneider, Kenneth R. (1971). *Autokind versus Mankind: An Analysis of Tyranny, A Proposal for Rebellion, A Plan for Reconstruction*. New York: Norton.

Schwartz, Gary T. (1976). "Urban Freeways and the Interstate System," *Southern California Law Review*, 49:3, March, pp 406-513.

Secretary of State (1990). "California Ballot Pamphlet: Primary Election," State of California. Sacramento: California State Printing Office.

Seely, Bruce E. (1987). *Building the American Highway System: Engineers as Policy*

Makers. Philadelphia: Temple University Press.

Smith, Wilbur and Associates (1961). *Future Highways and Urban Growth.* New Haven: Automobile Manufacturers Association.

Snell, Ronald K. (1991). "State and Local Highway Finance: Where Does the Money Come From and Why Isn't There Enough?" Legislative Finance Paper 78. Washington, D.C.: National Conference of State Legislatures. August.

Southern California Association of Governments (1983). "Regional Transportation Plan: Draft Environmental Impact Report." Los Angeles: Southern California Association of Governments.

Stammer, Larry (1977). "Assembly GOP Leader Urges Brown to Fire Ms. Gianturco," *Los Angeles Times*, 3 February, p 18.

Stein, Mark A. (1992). "Group Attacks Diversion of Subway Route," *Los Angeles Times*, 1 April, pp B-1 and B-8.

Thackery, Ted (1973). "Californians Still Like Freeways--With Restraints," *Los Angeles Times*, 11 March, pp I-3 and I-15.

Transportation Engineering Board (1939). "A Transit Program for the Los Angeles Metropolitan Area." Los Angeles: Transportation Engineering Board. December.

Trull, Edna (1937). "Borrowing for Highways," Municipal Service Department, Dun and Bradstreet, Incorporated. New York: Dunn and Bradstreet, Incorporated.

Turner, Francis C. (1976). "The Future of the Highway Program," *Traffic Quarterly*, 30:1, January, pp 5-22.

U.S. Bureau of the Census (1976). *Historical Statistics of the United States: Colonial Times to 1970, Part 1, Department of Commerce.* Washington, D.C.: U.S. Government Printing Office.

U.S. Bureau of the Census (1992). *Statistical Abstract of the United States: 1992*, Department of Commerce. Washington, D.C.: U.S. Government Printing Office.

U.S. Bureau of Public Roads (1939). *Toll Roads and Free Roads,* House Document

272, 76th Congress, 1st Session. Washington, D.C.: U.S. Government Printing Office.

U.S. Bureau of Public Roads (1955a). "Needs of the Highway Systems, 1955-1984," House Document 120, 84th Congress, 1st Session. Washington, D.C.: U.S. Government Printing Office. May.

U.S. Bureau of Public Roads (1955b). "General Location of National System of Interstate Highways: Including All Additional Routes at Urban Areas Designated in September 1955," U.S. Department of Commerce. Washington, D.C.: U.S. Government Printing Office.

U.S. Bureau of Public Roads (1964). "A Quarter Century of Financing Municipal Highways: 1937-1961," U.S. Department of Commerce. Washington, D.C.: U.S. Government Printing Office.

U.S. Bureau of Public Roads (1966). "Freeways to Urban Development: A New Concept for Joint Development." Washington, D.C.: U.S. Government Printing Office.

U.S. Congressional Budget Office (1978). "Highway Assistance Programs: A Historical Perspective," Background Paper, Congress of the United States. Washington, D.C.: U.S. Government Printing Office.

U.S. Department of Transportation (1989). *National Transportation Statistics: Annual Report*. Research and Special Program Administration. Washington, D.C.: U.S. Government Printing Office. August.

U.S. Department of Transportation (1991). "Intermodal Surface Transportation Efficiency Act of 1991: A Summary." Washington, D.C.: U.S. Government Printing Office.

U.S. Federal Highway Administration (1946 to 1991). *Highway Statistics: 19--*, Department of Transportation. Washington, D.C.: U.S. Government Printing Office.

U.S. Federal Highway Administration (1947). *Highway Statistics: Summary to 1945*, Public Roads Administration. Washington, D.C.: U.S. Government Printing Office.

U.S. Federal Highway Administration (1986). *Highway Statistics: Summary to*

1985, Department of Transportation. Washington, D.C.: U.S. Government Printing Office.

U.S. House Public Works Committee (1955). "Needs of the Highway Systems, 1955-84," House Document 120, 84th Congress, 1st Session. Washington, D.C.: U.S. Government Printing Office. March.

U.S. House Public Works and Transportation Committee (1977). "A Revised Estimate of the Cost of Completing the National System of Interstate and Defense Highways," House Document 95-11, 95th Congress, 1st Session. Washington, D.C.: U.S. Government Printing Office. May.

U.S. House Public Works and Transportation Committee (1979). "A Revised Estimate of the Cost of Completing the National System of Interstate and Defense Highways," House Document 96-14, 96th Congress, 1st Session. Washington, D.C.: U.S. Government Printing Office. August.

U.S. Senate Special Committee on Post-War Economic Policy and Planning (1944). "The Role of the Federal Government in Highway Development: An Analysis of Needs and Proposals for Post-War Action," U.S. Senate, 78th Congress, 2nd Session. Washington, D.C.: U.S. Government Printing Office.

Wachs, Martin (1985). "The Politicization of Transit Subsidy Policy in America," in *Transportation and Mobility in an Era of Transition*, Studies in Regional Science and Economics: 13, G. Jansen, P. Nijbamp, and C. Riujgrok, editors. Amsterdam: North Holland Publishing Company. pp 353-366.

Wachs, Martin (1989). "U.S. Transit Subsidy Policy: In Need of Reform," in *Science*, 244, 30 June, pp 1545-1549.

Wachs, Martin and James Ortner (1979). "Capital Grants and Recurring Subsidies: A Dilemma in American Transportation Policy," *Transportation*, 8:1, March, pp 3-19.

Weiner, Edward (1988). *Urban Transportation Planning in the United States: An Historical Overview*, 3rd Edition. DOT-T-88-26, Technology Sharing Program, U.S. Department of Transportation. Washington, D.C.: U.S. Government Printing Office, September.

Wing, Betsy (1986). "What Went Wrong with Measure C: Big Money May have Killed Support," *West County Times*, 6 November, pp 1-A and 2-A.

Zamora, Anthony N.R. (1989). "The Century Freeway Consent Decree," *Southern California Law Review*, 62, pp 1805-1844.

Zell, Eric S. (1989). "A Vote Winning Combination: Contra Costa County Links Transportation Tax to Growth Management," *Urban Land*, June 1989, pp 6-10.

Zettel, Richard M. (1946). "An Analysis of Taxation for Highway Purposes in California: 1895-1946," Joint Fact-Finding Committee on Highways, Streets, and Bridges, California Legislature. Sacramento: California State Printing Office. October.

Zettel, Richard M. (1947a). "An Analysis of Senate Bill Number 5," Joint Fact-Finding Committee on Highways, California Legislature. Sacramento: California State Printing Office.

Zettel, Richard M. (1947b). "Financial Analysis of the Collier-Burns Highway Act of 1947," Joint Fact-Finding Committee on Highways, California Legislature. Sacramento: California State Printing Office.

Zettel, Richard M. (1953). "Financing California's Highways: Part I -- Highway Investment and Pricing," Joint Fact-Finding Committee on Highways, California Legislature. Sacramento: California State Printing Office.

Zettel, Richard M. (1955). "Federal Aid to Highways." Washington, D.C.: Study Committee on Federal Aid to Highways, Commission on Intergovernmental Relations. June.

Zettel, Richard M. (1959). "Appendix B. The California Freeway Program: An Economic and Fiscal Analysis." Joint Interim Committee on Highway Problems, California Legislature. Sacramento: California State Printing Office.

Zettel, Richard M. (1979). "State Transportation Financing in the 1970s: Theory and Practice," Institute of Transportation Studies Research Report UCB-ITS-RR-79-3. Berkeley: University of California.

Zettel, Richard M. (1980a). "An Appraisal of the Outlook for County Road and City Street Financing in California in the 1980s," Senate Transportation Committee, California Legislature. Sacramento: California State Printing Office. March.

Zettel, Richard M. (1980b). "Highway Cost Allocation and Tax Recovery in California," Senate Transportation Committee, California Legislature. Sacramento: California State Printing Office. February.

Zettel, Richard and Paul Shuldiner (1959). "Freeway Location Conflicts in California." Institute of Transportation and Traffic Engineering, University of California, Berkeley.

Interviews

Alexander, Gene. Office Chief, Division of Highways, California Department of Transportation. Sacramento, California, 14 May 1992 (telephone).

Bauer, Arthur. Principal, Arthur Bauer and Associates. Sacramento, California, 27 July 1990 (telephone) and 4 March 1992 (in person).

Mary Elizabeth Briden, Legislative Liaison, Orange County Transit District, Garden Grove, 31 July 1990 (telephone).

Wadi Deddeh, Senator, State of California, Chula Vista, 26 November 1990 (telephone).

William Hein, Deputy Executive Director, Metropolitan Transportation Commission, Oakland, 27 March 1990 (in person).

Jim Mills, Chairman, Metropolitan Transit Development Board, San Diego, 6 December 1990 (telephone).

Pivetti, Charles. Highway System Engineer, California Department of Transportation. Sacramento, California, 4 March 1992 (in person).

Schaeffer, William. Retired Deputy Director, California Department of Transportation. Sacramento, California, 4 March 1992 (in person) and 14 May 1992 (telephone).