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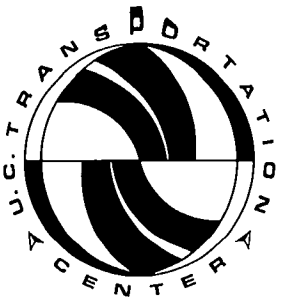

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Elizabeth Deakin

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The University of California
Transportation Center

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Transportation and Land Use Planning In California: Problems and Opportunities for Improved Performance

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ABSTRACT

Traffic congestion is a growing problem in California, and its effects are being felt throughout the state in reduced amenity, productivity, and profitability. Two reasons for congestion increases are the shortage of public funds for transportation and the lack of coordination of land use planning and development decisions with available and planned transportation capacity. This paper examines current and anticipated trends and practices in transportation and land development and discusses some strategies that the state could consider to improve decisions and outcomes.

Financing problems plague both highway and transit programs at a time when overall demand for transportation is rapidly growing and patterns of demand are shifting. Development trends are likely to increase the pressures on the transportation systems, both in established and new-growth areas. Yet little coordination between transportation and land use plans, programs, and investments is apparent. This lack of coordination results from the institutional division of responsibilities for transportation and land use and weaknesses in state law concerning consistency in planning and implementation, as well as lack of funds to deliver needed transportation facilities and services and local governments' strong desires for development. While a number of local governments are utilizing development exactions and impact fees to finance transportation improvements and are implementing transportation systems management and TSM-oriented site design requirements, these strategies are rarely sufficient to resolve traffic problems over the longer run. Some local governments are considering policies that tie permitted land development to existing and planned transportation capacity. Yet for many, this poses a dilemma: without the funds to improve transportation, greater coordination often would mean downzoning or other limitations on much-desired development.

What is needed are a set of strategies that can enhance local governments' willingness to match development with needed transportation improvements, while allowing for reasonable and necessary growth. Such strategies might entail new requirements for transportation plans and investment programs at the local level, tied to reasonable standards for transportation levels of service; coordination of these local plans and programs with regional and state transportation plans and programs; strengthened requirements for consistency between land use and circulation elements of General Plans, and between General Plans and subdivision, zoning, and transportation investment programs; and additional financing for transportation, as an incentive to comply with the other strategies. While such an approach could be met with local government concerns about home rule and taxpayer resistance to increased fuel taxes, the prospects for substantially better transportation and the benefits it would bring the state could be sufficient to overcome such barriers.

I. Introduction

A. Transportation Problems in California

For many years, expansion and improvements in the quality of transportation systems were a hallmark of the California scene. But over the past 15 years the situation has changed. Only a few hundred lane-miles of new highway are being added each year; maintenance now claims a major share of California's highway expenditures (5). Difficulties in financing transit systems are particularly acute now that the federal government is reducing its assistance, and raise questions about the future mobility of those who are dependent on public transportation as well as the health of the cities where transit is a critical travel mode.

At the same time, the demands for transportation have continued to grow. Increases in population, in the number of households per capita, in real income, and in total and per capita employment all translate into a scaling up of transport demand. Shifts to a service economy, suburbanization of both housing and jobs, rapid growth in small towns beyond the suburban fringe, and increased trade with Pacific Rim nations have affected not only the magnitude but the pattern of demand for transportation. Taken together, these broad demographic, economic and spatial changes are exerting heavy pressures on the state's transport systems.

As travel volumes grow faster than capacity, congestion is becoming acute. Clogged intersections, arterials, freeway ramps, and even mainline freeway sections are forcing commuters to spend inordinate amounts of time getting to work. Truck and rail shipments are being delayed. Traffic spilling over onto local streets is a source of community conflict.

Other continuing concerns about California's transport systems are exacerbated by congestion. Air pollution problems, in large part a function of auto use, have yet to be resolved in the state's major metropolitan areas (3) and are worsened when traffic moves at a crawl. Fuel consumption also increases in stop-and-go traffic. On highways alone, there were over 220,000 accidents in 1985, involving nearly 323,000 injuries and over 4400 fatalities (7);

heavy traffic not only increases the chances for accidents but interferes with prompt motorist assistance.

In short, congestion's effects are being felt throughout the state, in reduced amenity, productivity, and profitability. Business executives have grown increasingly concerned about the costs of declining accessibility, while citizens are questioning the growth policies that, in their eyes, lead to congestion. Dissatisfaction with the transportation system is mounting, and there is a rising clamor for remedies that will bring the transportation system back to its former status as a contributor to the quality of life and a facilitator of economic growth.

B. Land Use and Transportation Planning as a Critical Concern

While funding shortages, improper pricing, and institutional problems all contribute to the congestion mess (17), increasingly there is recognition that many traffic problems are the result of inadequate coordination of transportation and land use planning and decision-making, especially in fast-growing suburban areas1 and in small towns at or beyond the metropolitan fringe. One diagnosis is that state, regional, and local government officials have been derelict in their responsibilities, neither providing enough transportation facilities and services to adequately support population growth and economic development, nor controlling land uses and densities to levels that can be accommodated by available and anticipated transportation capacities. For example, local governments have used existing mainline freeway capacity as suburban "Main Streets" instead of building local arterials and collectors; consequently, there are few alternative routes and an overconcentration of very short trips on facilities designed to serve regional through-traffic. In addition, this argument goes, there

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1. It should be noted that there are many kinds of suburbs, ranging from older communities that developed around streetcar lines in the early years of the century , to small towns encompassed by metropolitan expansion, to the newer housing subdivision-plus-shopping center suburbs. In addition, outlying districts of major cities often exhibit "suburban" characteristics--low densities, scattered development, and the like. The comments in this paper apply to these suburban-like city areas as well.

has been a failure to devise realistic, effective commute alternatives for suburban conditions, with limited and ineffective conventional transit services being deployed rather than aggressively pursuing subscription buses, carpooling and vanpooling programs, alternative work hours, and the like. At the same time, most local governments have actively pursued development, especially commercial development that offers a boost to the local tax base, and have been willing to change their land use plans and zoning to accommodate unanticipated development opportunities.

Recent and expected growth trends provide reason for concern that traffic conditions will continue to deteriorate unless action is taken soon. The rapid growth in suburban employment is of particular note because of commute trips' role in peak period congestion. The 1980 Census revealed that over 40 percent of all commute trips took place wholly within the suburbs, and another 7 percent were reverse, city-to-suburbs commutes. In comparison, 33 percent of commute trips were made wholly within central cities; only 20 percent were from suburb to central city (27). Evidence from more recent studies indicates that the share of trips destined for suburban places is increasing (9). Suburban development of new office centers has outstripped downtown office growth, and the ratio of suburban to downtown retail development is even greater. By the end of the century, it is likely that suburban-destined work trips for both office and retail employment will exceed central city-destined trips in many areas of California.

Large numbers of these trips will be made to developments yet to be built. Thus, there is still time to make planning decisions that will help avoid severe traffic problems in developing areas. At the same time, existing areas are clamoring for relief from traffic, and strategies for better coordinating land use and transportation could help manage traffic problems there too. The task is to identify appropriate strategies.

C. Purpose of This Paper

What can California do to help assure that its transportation systems provide flexible, responsive, efficient service in light of current and emerging trends? In particular, what and how much

would coordination of land use decisions with transportation planning and delivery contribute to a state transportation strategy? This paper explores those questions. The paper provides a brief review of California's urban and metropolitan transportation problems and its land use and development trends, then examines current practice in transportation and land use planning and decision-making in the state. The focus is primarily on local government practices, although state, regional, and private sector roles also are considered. Then, strategies for improving practice are presented, and implementation barriers and possible ways to overcome them are identified. Brief concluding comments are put forth.

II. Strategies for Transportation and Land Use Planning

A. The Current Situation in California

Strategies for improved transportation and land use planning must be considered in context. Thus it is useful to consider California's transportation systems, its land use and development trends, and its land use and transportation planning practices.

1. Patterns and Trends in Transportation

An understanding of California's transportation systems and the issues they raise must begin with the recognition of the dominance of motor vehicle transport. In California, as in most other parts of the country, autos account for 85-90 percent of all local person trips; heavy-duty trucks carry nearly a third of the state's total freight tonnage and, considering the surface modes only, are involved in the movement of some 98 percent of California-produced commodities (5, 8). Total annual traffic statewide climbed from 160 billion vehicle-miles in 1981 to 208 billion vehicle-miles in 1985, an increase of nearly 30 percent, and it is estimated that total annual traffic will be up an additional 30 percent by 1995 (with trucks responsible for 5-6 percent of all VMT and about 10 percent of the VMT on the state highway system (4)). Auto ownership also continues to grow. In 1984 some 14 million autos and light trucks were owned by Californians

(with about 83 percent used for household transportation); these vehicles travelled 152 billion vehicle miles in urban areas alone (7).

California currently ranks 49th in per capita spending for all street and highway purposes (4), and growth in traffic has outstripped increases in capacity by a factor of nearly 5 to 1 over the past twenty years, leading to increasingly frequent and severe traffic problems. Caltrans reports that over one-third of its urban Interstate and freeway miles are heavily congested for some period of the day, nearly every day of the year (29); local streets and roads also are increasingly congested. And the percentage of streets and highways with traffic problems is growing fast.

With few new highways being planned, transportation agencies are increasingly trying out other methods of handling traffic. Spot widenings and interchange improvements are being made, and initiatives to improve traffic flow through better signal timing, access control, accident removal, and the like are underway. Efforts to increase passenger throughput via provision of high occupancy vehicle lanes and incentives for transit use and ride-sharing also have been undertaken. In general, however, these improvements have been able to provide only partial traffic relief and are often of temporary benefit, as new traffic growth uses up the increment of capacity they provide (12).

Maintenance of existing facilities also has proven problematic. One estimate has it that we need to spend some $914 million a year to repair, rehabilitate, or replace deficient roads and bridges; the current annual rate of public expenditures is about three-quarters of that amount. California motorists, however, spend an extra $1.69 billion a year in driving costs (wasted fuel, excessive tire wear, and added vehicle repairs) as a result of poorly maintained roads (24).

While highways remain the workhorse of the transportation system, transit also is critical in the state's urban areas, and most California cities have experienced modest increases in transit utilization over the past two decades. Nevertheless, California's transit systems have continued to face severe revenue shortfalls.

Operating deficits for the state's five largest publicly owned bus systems more than doubled between 1979 and 1983, jumping from $264 million to $591 million (9). Moreover, most operators have not been able to attract a large ridership despite improvements to both capital equipment and services. Even for the journey to work, the trip purpose for which transit is generally believed to be most suited, the 1980 Census showed that transit captured only 16.4 percent of the workers in San Francisco-Oakland, 7 percent in Los Angeles-Long Beach, 3.5 percent in Sacramento, and 3.3 percent in San Diego (27).

Areawide data mask the importance and popularity of transit in many central business districts--as many as three-quarters of the workers in some districts of San Francisco commute by transit, for example. Also, transit service is critically important to the state's low income, elderly, and disabled populations; cutbacks in transit service and increasing fares could threaten their mobility. Yet heavy peak period use of the services by commuters, and much lighter off-peak use by transit dependents, further add to transit's financial woes by creating patterns of demand that fit poorly with eight hour workdays for drivers or efficient vehicle utilization.

Despite financial difficulties, transit continues to be a political favorite, and new rail transit systems are being built in Sacramento, San Jose, and Los Angeles and are proposed in numerous other locations. Proponents justify these rail starts and expansions on the grounds that they will shape land uses more effectively than buses, and by attracting substantial ridership will reduce traffic, energy, and air pollution problems. Many transportation experts are more cautious, noting the poor ridership results of recently developed systems elsewhere in the U.S., most local governments' reluctance to insist on high density development near transit or to restrict auto-dependent sprawl, and the difficulty of serving the increasingly important suburb-to-suburb travel patterns with conventional transit (14).

Perhaps the most notable change in local travel behavior over the past two decade has been the growth in carpooling, which currently ranges from 15 tpercent to 25 percent of urban work

trips in most areas. Many carpools are family-based; some are formed with the encouragement and assistance of public agencies and private employers. However, agency assisted pooling has not proven to be a self-seeding or even a self-sustaining phenomenon; continuing marketing efforts and rideshare matching assistance are necessary to maintain ridesharing levels (13).

Taxis, shuttles, and subscription buses also carry a number of urban trips, especially in specialized markets such as airports and hotels and for special user groups such as the elderly and disabled. Proponents argue that these services could be more widely used to serve commuters, both in thin suburban markets and in denser markets needing a high peak-to-base ratio of service. Nevertheless, they are unlikely to make a big difference in overall mode choices or traffic levels; rather their potential lies in improving service quality, variety, and flexibility, possibly with some cost savings as well (11).

2. Patterns and Trends in Land Use and Development

Land use and development patterns are major determinants of the demand for transportation. In turn, land use and development patterns reflect changes in the economy and in population characteristics, as well as government policy. While there are differences among regions of the state, some factors that deserve note include the following.

First, land development patterns reflect the nature of employment. Manufacturing has been healthier in California than in many other parts of the country, largely because of the state's higher rates of creation and expansion of firms and its burgeoning population (18). Nevertheless, services have grown faster than any other sector of the economy over the past two decades. Service sector growth has important implications for land development, often requiring not only space but specialized infrastructure (such as telecommunications) and amenities. In addition, the service industries are more "footloose" than earlier industries, allowing them a wider range of choices of location (28).

Continued population growth, and changes in population and household characteristics, also will influence development patterns.

Since World War II, the nation's population center has shifted toward the rapidly growing West and South, with much of those regions' population increases due to immigration (20, 23). In California, growth through immigration is expected to remain high. Yet birth rates have been declining, and the changing age structure is reflected in increasing rates of household formation. Household composition also is changing, with increases in the formation of single person and single parent households, in the number of households composed of unrelated adults, and in the share of married couples with no children at home (25). The implications of these trends development levels and patterns are not fully clear, although some argue that housing sales will increase, while the market will be for smaller single family units (18).

Another important matter is increased labor force participation. A higher percentage of the adult population is in the work force than in past decades, and this trend is expected to continue (28). Of particular note is the growth in the number of working women, including married women and women with children, over half of whom are now working part- or full-time. Multiple worker households raise as-yet-unresolved issues about the choice of housing with respect to job location; what is clear is that jobs-housing relationships will be much more complex than in the past.

Finally, slowly increasing real incomes are expected over the next 15 years (18). To the extent that these increases translate into more disposable income, location and housing choices, as well as demand for consumer goods and services, also will expand. Yet income gains are not likely to be evenly shared, and many may find it increasingly difficult to find suitable housing near their places of employment. Even among moderate income households, incomes are unlikely to increase as fast as housing costs, and thus tradeoffs between longer commutes and affordable housing (or more house for the money) seem likely to figure prominently in future.

The patterns of these changes also deserve note. While development and revitalization of older urban cores have continued in many areas, a stronger trend has been toward suburban and exurban growth--in housing, industrial parks, retail centers, and office

complexes. In addition, increasing numbers of commuters live beyond the traditional metropolitan boundaries and work in suburban job centers, and some have left the major metropolitan areas altogether for jobs and housing in rural or semi-rural areas (9).

Taken together, these land use patterns suggest a significant scaling up of transportation activity, in both urban and suburban areas. Such a trend seems ominous in light of the transportation conditions discussed earlier. Suburban and exurban development may pose especially acute problems for transportation professionals. In many cases, large scale developments are putting a strain on street and freeway systems designed for much lower levels of activity, and creating demand for major infrastructure additions. Traffic problems often arise practically overnight, giving citizens and businesses little time to adjust. Furthermore, the low density, scattered site pattern that characterizes much suburban development, at both the home and the job end of the trip, makes solutions that have provided partial relief in central cities--such as transit--less practical and cost-effective.

3. Transportation and Land Use Planning

In view of mounting concerns about transportation and the widespread recognition of the role land use decisions play in traffic levels, it is perhaps surprising to find that efforts to coordinate land use and transportation are sporadic and partial at best. Yet government policy and organization almost assures that this will be the case.

Several factors have contributed to this situation (15). First, whereas land use planning is almost entirely a local responsibility, state and regional agencies are major actors in transportation planning and implementation. State agencies have long played dominant roles in the provision of interjurisdictional roads (freeways and other arterials), while regional transit agencies have been the providers of transit services. There has been a strong tendency to rely on these other organizations for planning and implementation of all but relatively small scale road facilities. Thus local transportation responsibilities have been focused on only a limited subset of transportation, namely the streets

and parking under local control. And while funding and investment programs for transportation are developed at the state and regional levels, few local governments have long-term investment programs for transportation.

Second, local governmental responsibilities for land use and transportation traditionally have been divided, with land use assigned to the planning department and transportation assigned to engineering. Many planners have had little training in transportation and have been satisfied to leave what they view as a technically based matter to another department. Many engineers are similarly unskilled in land use planning and lack interest in the policy issues it entails. Land use and transportation activities thus have tended to proceed along separate paths, reflecting differences in the training of the respective staffs as well as differences in scope of responsibility. Often there is little coordination between the two.

Third, traditional notions of public responsibilities for transportation have served to limit the scope of local transportation planning activities even further. Transportation has been viewed as a public utility to be provided on demand, not something to which access should be restricted or conditioned. While it has commonly been agreed that local government has a legitimate role in guiding private development decisions (or at least, in deciding whether or not to accommodate private sector development requests), local government's role in transportation, in contrast, has been seen as providing the public facilities needed to assure safe, fast, efficient movement. Particularly among the engineering profession, there has been concern about the legitimacy of managing demand or denying requests for service.

Together, the reliance on state and regional agencies for implementation of major highway and arterial facilities and transit services, the separation of land use planning and transportation planning functions, and concerns about the legitimacy of managing transportation demand or limiting access have meant that many local governments have played partial and limited roles in guiding transportation development or coordinating it with land development.

The general picture in California is that at the local government level, transportation planning has literally fallen between the cracks, with no one taking a comprehensive planning for transportation.

B. Impacts of Current Practices

One result of not planning for transportation comprehensively has been that the amount of development that would be permitted under adopted land use plans and zoning is frequently not consistent with available and planned transportation capacity--or has never been checked for consistency in any detail. This statement may seem odd in light of state requirements for internal consistency between land use and circulation elements in General Plans; consistency between General Plans and implementation mechanisms such as zoning (with the notable exception of charter cities, except Los Angeles); and so on (22). Yet there are several reasons for this situation.

First, many local planning documents are so general as to make it very difficult to say how much development, and what kind, would be allowed, at a level of specificity appropriate to a transportation analysis. The same is true of some zoning, where the range of permitted uses is extremely broad. At the same time, many jurisdictions have not established standards for what constitutes an acceptable level of service for their transportation systems. Consistency in these cases can have only a very general meaning.

Even when plans are clear about the kinds and amounts of development that would be allowed, consistency in implementation could face practical problems. For example, whether such development levels would indeed materialize often is questionable. In most communities, land use plans and regulations set forth the community's long term aspirations for physical development and the housing opportunities, jobs, and tax revenues that development would imply. But because land development is overwhelmingly a private sector initiative, communities have relatively little ability to assure that their plans will be realized. Many local governments have plans and zoning that would permit development

far in excess of what market forces are likely to generate, at least over a 10-20 year planning horizon. Others operate with conservative plans and zoning but repeatedly approve developers' requests for plan and zoning amendments; indeed, much of the activity of the typical planning department involves dealing with requests for plan amendments, rezonings, and other exceptions to or modifications of the community's plans and regulations, in order to permit development that differs from that envisioned in the planning instruments. Coordinating transportation capacity with planned land uses in either type of situation could lead to a miscalculation of transportation needs.

The impermanence of land use plans and regulations also raises practical questions for consistency in transportation implementation. Because land use plans and regulations can change so often --multiple amendments are permitted up to four times a year in California--continual revisions to transportation investment plans also might be needed to maintain consistency. While for small transportation matters this might not pose much of a problem, major transportation facilities can take 10 years or more to plan and implement, making such repeated plan and program revisions costly and difficult to accomplish.

The lack of coordination between transportation and land use plans and programs was perhaps of less consequence when the funds were available to deliver transport facilities and services to meet, or even anticipate, demand. Then, land use plans and zoning might permit development at levels that would swamp available and planned transportation facilities; but there was a reasonable expectation that transportation officials would simply revise their plans to assure that adequate facilities would be provided, and capacity expansions would soon be forthcoming. With both highway departments and transit agencies adopting a "can do" posture, these expectations and attitudes were not as unreasonable as they might seem at first glance.

Today, however, traffic volumes are growing much faster than state and regional transportation agencies can deliver projects, and the ability of state and regional agencies to "build their way out" of congestion problems has come into question. Faced with

citizen outrage over traffic problems, many local governments are being forced to shoulder an increasing share of the responsibility for transportation and land use consistency, if indirectly.

Greater attention is being given to the analysis of new developments' traffic impacts (spurred on by environmental impact reporting requirements). Most of the analysis that gets done, however, is aimed at individual development projects, and site impact studies, used to determine the effects of a proposed development on community facilities and services and to determine needed exactions and impact fees, are the main mechanism for resolving incompatibilities between land use and transportation plans. But these project-by-project analyses omit many important concerns. Cumulative impacts, for example, are not easily addressed via project level analyses and exactions. In addition, most mitigation strategies devised in response to individual development projects focus only on local infrastructure; there usually is no parallel set of mitigations for impacts on facilities under state and regional control, or even for impacts that occur in neighboring jurisdictions (16).

An increasing number of local governments are recognizing the shortcomings of these project-by-project analyses, and there has been growing use of subarea planning approaches to overcome some of these problems. Usually, the land use plan for the area at buildout (or estimated development in some planning year, 10-20 years in the future) is analyzed with respect to a set of alternative transportation facilities and services. Perhaps not surprisingly, many such analyses have shown that the kinds of transportation projects that could be implemented under current financing could not handle the amount of development proposed (15). Thus many local governments are now struggling to deal with transportation needs through a combination of local financing, transportation systems management, and coordinated land use/transportation strategies, including revised land use plans.

C. Current Attempts at Managing Transportation/Land Use Problems

A variety of measures can be undertaken at the local government level to help manage transportation/land use problems. Approaches

receiving considerable attention at the present time are listed in Table 1. They include:

- Increasingly comprehensive (and costly) requirements that developers and/or employers help provide or pay for the transportation facilities and services they necessitate, via exactions and impact fees and, occasionally, benefit assessment districts (3). This approach puts emphasis on financing from other-than-traditional sources for continued capacity and operations improvements to meet expected demand.

- Policies that call for the implementation of transportation system management (TSM) measures, especially demand-modifying measures such as ridesharing, flextime, and transit user subsidies, either through incorporation into the conditions of approval for new development projects or through special purpose TSM ordinances (15). This approach emphasizes reductions in auto travel, especially peak hour auto travel, rather than its continued accommodation.

- Site design requirements that aim to create environments conducive to travel by transit, ridesharing, bicycles, and walking.

- Policies that tie development location, density, and/or timing to transportation capacity and mode choices, through general plan provisions, subdivision regulations, and zoning (15).

While all of these approaches have merit, it should be noted that they also have decided limitations. Exactions and fees, as noted earlier, tend to be site oriented; they are much harder to fashion so that they address areawide concerns. Moreover, only in areas with very healthy economies are substantial exactions and fees a practical idea. TSM has proven useful in reducing auto use but rarely can obtain more than a 5-8 percent reduction from the traffic volumes that would have occurred without any intervention (13). Site design requirements can support TSM policies, but may be undermined by the lack of parallel planning at the other end of the trip. Finally, coordination of development with transportation capacity and service levels could require considerable reductions in development levels unless the plans, programs, and funds are available to improve transportation--and as noted earlier, these items are in decidedly short supply at the present time. Altogether, these approaches are at best partial responses to congestion

concerns, and many local officials are increasingly anxious to find alternatives that take a "bigger picture."

II. Strategies for Improving Transportation and Land Use Planning

A. Desirable Outcomes

In light of the above discussion, what actions should the state consider to improve transportation and land use planning and decisions? Several desirable outcomes can be identified:

- State, regional, and local governments and agencies should be held accountable for the safe, efficient, and cost-effective operation of the transportation facilities and services under their control.

- Greater cooperation and coordination of efforts among various levels of government and the private sector should take place, in recognition of the mutual interests of all parties in sound transportation systems and the linkages and tradeoffs between public and private investment in transportation and the economic development of the state.

- More efficient management and operation of existing facilities and services should be assured; emphasis should be on making the best possible use of in-place investments and resources before proceeding with additional deployment. Utilizing the full range of resources, both public and private, will be critical in this regard.

- Investments should meet the criteria of economic efficiency and cost-effectiveness. One useful approach is to place great emphasis on user willingness to pay and other market tests (such as sale of bonds) as ways of gauging the appropriateness of proposed investments. User fees also can help bring price into line with costs, so that there are clearer signals to guide consumption and production of transportation services.

- Transportation facilities and services should be equitable, both socially and economically. In some cases this may mean that subsidies and cross-subsidies will be needed; in other cases, that they should be eliminated. Transition strategies permitting opportunities for adjustment to new conditions may be needed as well.

- Environmental protection and enhancement should be assured in transportation project selection and design. Careful analysis of projects with respect to these considerations should be a basic component of any initiative.

- Procedures should be established to assure that transportation and land development plans and programs will be sufficiently flexible to adjust to market shifts and changes in factor prices (especially, energy prices), and to accommodate new technologies that may become available.

Success in achieving these outcomes will depend, however, on two conditions being met:

- First, new financing sources and/or mechanisms must be secured; and
- Second, institutional arrangements for their implementation must be developed.

Specific strategies that might be pursued at this time are outlined below.

B. Strategies

1. Local Transportation Plans and Investment Programs Should Be Required

Three topics deserving focused attention are 1) greater emphasis on maintenance of existing infrastructure to protect past investments, 2) more systematic implementation of operations and management techniques to make the best possible use of existing facilities (including, where appropriate, TSM measures to manage demand, such as ridesharing promotion and incentives), and 3) systematic development of new facilities, at both the state and at the local/subregional/regional levels, to accommodate reasonable and necessary growth and development.

To encourage adequate maintenance of California's streets and highways, maintenance programs should be developed, based on a capital budgeting process which considers life cycle costs of facilities as well as their function and usage levels and prioritizes and schedules maintenance expenditures accordingly. (A requirement that priority be given to streets and highways identified as arterials and major collectors in local General Plans would be desirable.) Along similar lines, operations and management

programs, including, where supported by local interests, demand management strategies, should be developed for all facilities, corridors, districts, or services of major importance.

These two programs together would help assure that past investments in transportation are preserved and utilized fully. With a clear picture of what can be accomplished with existing facilities, a program for investment in new facilities could then be prepared.

Maintenance of existing streets and highways and their efficient operation and management are strongly connected to the need for new facilities development, but current practices sometimes overlook potential tradeoffs. An improved procedure would encourage maintenance, operations and management, and new investment in streets and highways to be considered together, with priority given to facilities deemed to be of major importance. Integration of the maintenance, operations and management, and new capital improvement programs into a single plan would facilitate assessment of the overall efficiency and effectiveness of proposed expenditures.

Incorporation of demand management strategies in the operations plan would permit ridesharing and certain relatively low-cost paratransit and transit options to be included in the investment package. Coordination with major operating and capital investment plans and programs for these other modes also would be important, and integration of such plans and programs into a multi-modal investment package would be desirable. Such a broad action is not essential to this strategy, however; separate actions concerning transit and paratransit could be taken.

2. Regional or Areawide Plans and Programs Should Be Developed

Since transportation facilities and services often cross jurisdictional boundaries, and traffic flows between facilities and jurisdictions at will, some mechanism for interjurisdictional coordination is needed. Development of a regional transportation plan, or one sponsored by a coalition of local governments and agencies in a subregion, would have special merit in urban areas. Such a regional or areawide plan would be cooperatively developed, based on the local plans and programs, and could be used to identify

important existing or needed multijurisdictional facilities not on the state highway system. Regional or subregional planning and funding of such facilities may be critical to congestion management.

In turn, the regional plans would be coordinated with state transportation plans and programs, much as is currently done. The difference would lie in the greater comprehensiveness of the regional plans.

3. Requirements for Consistency between Land Use and Circulation Elements of the General Plan, and between General Plans and Local Implementation Mechanisms, Should be Strengthened

A major issue is how land use plans should be tied to these transportation plans and programs. State law already requires consistency between the land use and circulation elements of local governments' General Plans, and between the plans and implementation mechanisms such as zoning, at least for general law governments; but (as discussed earlier) these requirements do not assure that the development levels permitted can be accommodated by available and planned transportation facilities and services. Strengthening consistency requirements could lead to better coordination of land use and transportation planning and could help assure that adequate facilities are available when needed.

The matter is complicated by the fact that local land use plans and zoning may not be realistic from a market perspective; gearing transportation investments to such instruments could lead to mismatches. Nevertheless, it could be an improvement over current practice, in which mismatches prevail; and a strong consistency requirement could be coupled with analysis requirements that would help make plans more reliable.

At a minimum, stronger requirements for coordination of transportation plans with local land development plans, including standards for the levels of service that will be considered acceptable and requirements for explicit consideration of the levels of service that will prevail over a horizon of, say, 20-25 years, seem warranted. To the extent that local transportation plans incorporate transit and paratransit as well as streets and highways, consistency requirements should apply to all modes.

4. Additional Financing for Transportation Should be Provided as an Incentive to Assure that the Other Strategies are Followed

Regardless of the efficiencies that might be gained through life cycle capital budgeting, prioritization of investments, increased emphasis on operations and management as first-order strategies, and greater land use-transportation planning coordination and consistency, it is clear that existing funding for transportation is insufficient. More money surely will be needed to finance the total maintenance, operations and management, and new investment packages likely to emerge, even for highest priority items only. An increase in the fuel tax, referenced to the proposed investment packages and subjected to voter approval, would be an appropriate way to fund the needed improvements and willingness to pay such a tax would be a good test of support for the proposals. Voter approved revenue bonds are another financing option that might be used in conjunction with a fuel tax increase.

To provide for interjurisdictional coordination, the tax would probably need to be levied at the regional or areawide level, with pass-throughs to localities. Both state and local efforts to increase funds would be needed.

Another option deserving additional consideration is the more flexible use of funds for multi-modal transportation improvements--e.g., bus service and carpool programs as well as street and highway projects. Such use of funds may raise questions about equity, especially when direct user fees such as fuel taxes are considered. On the other hand, in some instances a case can be made that road users benefit (because there is less congestion, for example) when other modes are supported. One way of testing public willingness to pay for multi-modal projects would be to subject the full plan of transportation expenditures, along with the proposed funding mechanisms, to a citizen vote. Should multi-modal funding be permitted, the inclusion of fundable items in the plans and programs discussed earlier should be a requirement.

Although some local governments have already begun to do life cycle budgeting for their infrastructure and to develop operations and management plans to better handle traffic, others will need an

incentive to begin systematic maintenance and operations/management efforts. In addition, most local governments will require considerable encouragement to take responsibility for the development of new facilities (arterials, parkways, etc.) and the evaluation of highway/transit/paratransit tradeoffs. Tying the availability of increased fuel tax funding to local commitments to sound maintenance, operations and management, and new facilities plans consistent with planned land development may provide such an incentive. It also would have the advantage of avoiding a new round of categorical grants, which too often have become "policy fossils" after a few years, distorting priorities and investments.

C. Barriers

A number of barriers to the strategies listed above are likely. They include local government concerns about interference with home rule and taxpayer resistance to increased taxes, the latter exacerbated by uncertainties about future federal and state transportation finance. In addition, concerns about institutional capabilities to carry out the strategies' planning and programming requirements would need to be considered.

1. Local Prerogatives

Local governments in California jealously guard local control, and frequently resist state attempts to limit their authority or direct their actions. Whether the strategies proposed here would be seen as negative or positive would depend, in part, on whether benefits seen as being available to all jurisdictions and are judged sufficiently large to justify the added requirements, and whether the funding incentive is attractive enough. If the package is perceived as permitting reasonable development, offering protection from irresponsible actions on the part of other local governments and agencies, providing for a substantial measure of autonomy and flexibility, and correcting a significant portion of the state's congestion problems, support is likely. If it is viewed as a lot of red tape with no clear local benefit, and perhaps disbenefit, opposition is inevitable--and will occur even if the strategies were enacted into law.

State policies concerning the housing element of the General Plan, and related implementation requirements, provide a precedent for state action. The transportation requirements would be of comparable detail, and there would be the added incentive of funding.

2. Taxpayer Resistance and Other Funding Uncertainties

Voter resistance to increased taxes has been prevalent in California in recent years, and attempts to raise taxes to pay for improved transportation have met with mixed results. Whether the proposed strategies would be successful, then, would depend on the amount of support they receive from responsible agencies, local governments, and knowledgeable interest groups such as the auto clubs, the trucking industry, and development interests. Since the amount of funding needed to make a dent in California's congestion problems would be substantial (i.e., a fuel tax of perhaps 20-25 cents would be needed), a considerable public education effort would be needed. Moreover, voters would have to be convinced that the results would be effective and would promote responsible growth and economic development.

Uncertainties about whether current sources of funding for transportation will be available in the future also could be an issue. For example, estimates of the nation's annual highway investment needs through the end of the century range as high as $44 billion per year, versus current yearly expenditures of less than $15 billion (30). In light of these massive needs forecasts, a number of interest groups have been exploring options for the future of the federal-aid highway program (1). Alternatives include status quo funding with a restriction of the federal role to the Interstates and a few major primary routes; a reduction in federal fuel tax, a focus on Interstate maintenance, and turnback of most other highway programs to the states; and restructuring of federal-aid programs into two categories, rural and urban, with a substantial increase in funding to support new regionally-oriented systems (2, 10). The choice of direction will undoubtedly influence state and local options as well, and thus the feasibility and need for additional funds for the strategies discussed here.

Policies that could significantly alter the amounts, sources, and rules on the use of funds to finance transit capital and operating costs are also being debated. Adoption of proposals to substantially reduce the federal role in urban transit, for example, would radically change the context in which public transit operates. Public agencies' abilities to expand transit service into new markets, and even to maintain existing service levels, would probably be sharply restricted, absent the development of alternative sources of funds; even planning procedures would likely change, since today much activity is oriented toward compliance with federal rules and successful competition according to federal investment criteria (10, 19). Yet a number of interest groups advocating continued federal involvement in transit recognize the desirability of restructuring the federal role. Some have proposed a rethinking of formulas, capital grant procedures, and matching funds requirements; others have suggested limiting the federal role to capital investments only; still others have proposed a unitary urban transportation fund for which transit and highway projects both would be eligible (21). The outcome of these debates could define the range of possibilities for urban transportation for years to come.

3. Staffing Problems

Low levels of local government staffing for transportation and land use planning could make the development of adequate plans and programs difficult. Table 2 presents findings from telephone interviews with planning and engineering departments in California cities and towns (15). The table clearly reveals that transportation planning receives relatively little attention in city planning departments--and also indicates that perhaps less transportation work is done in engineering departments than is commonly assumed. Overall, most planning departments estimated that transportation activities accounted for 10-15 percent or less of the total planning staff's level of effort, while many engineering departments reported that it was barely possible to keep up with immediate transportation safety and enforcement needs (signal repairs, signing, curb painting, accident investigation,

etc.) with their available transportation engineering staff. Many jurisdictions reported that they had cut back on once-routine data gathering efforts and increasingly relied on studies conducted for development applications to obtain updated traffic counts and parking surveys. Only a handful reported that they had staff with training or experience in such matters as ridesharing or parking management strategies, and a number said that they now conducted work on such matters as circulation plan updates only when specifically directed (and funded) to do so.

These findings indicate that local governments would either have to rely on consultants or expand their staff capabilities in order to carry out the additional responsibilities implied in the suggested strategies. Unless funds were provided for this, neither option seems likely; and unfunded requirements would almost certainly be a source of local government opposition to the proposals.

State agency assistance--from Caltrans, the Office of Planning and Research, and perhaps others--would be another way to help develop local transportation-land use capabilities.

IV. Concluding Comments

This paper has briefly outlined a few strategies that the state might wish to consider in its search for ways to help alleviate traffic congestion. The strategies obviously would need considerable more development; and other strategies also could be devised. Nevertheless, a few key points seem worth stressing.

- First, additional funds will be needed if California's transportation problems are to be managed effectively. Current funding simply cannot be stretched far enough to do the job.

- Second, while current efforts emphasizing developer exactions, transportation systems management, and TSM-sensitive site design are helpful and appropriate, they are insufficient to make a substantial difference to any but the relatively minor congestion problems.

- Third, current land use and transportation planning and coordination requirements are weak. Since the state writes the rule book on these matters, it must take some responsi-

bility for the results, and make changes in the rules when needed. Changes which provide additional funds as an incentive to the development of local and regional transportation plans and programs, consistent with local land use plans and one another, could significantly improve the current and emerging traffic situation.

- Finally, a process for responsible decision-making with sufficient flexibility to respond to currently unforeseen problems and opportunities should be sought.

Table 1. Transportation/Land Use Strategies to Alleviate Congestion

A. Increase capacity

- o increase funding so that more facilities and services can be delivered
  - increase state funding: bonds, sales tax, gas tax, tolls and fares, license fees
  - develop local funding sources: special districts, fees, local taxes
  - develop private sector funding sources (exactions, in-lieu fees, benefit assessments)
  - improve methods of allocating available funds
  - advocacy with federal, state and regional agencies for discretionary funds

- o faster delivery of new facilities
  - accelerate construction of all "funded" projects (increase public agency staff capabilities; contract out; use more efficient construction management strategies, use new technologies)

B. Improve traffic flow

- o traffic engineering strategies
  - preferential treatment for HOVs
  - traffic signal timing
  - on-street parking management
  - corridor management and route guidance
  - accident clearance

- o work rescheduling policies
  - flextime
  - staggered work hours

Table 1. (cont.)

C. Encourage use of alternative commute modes/ auto trip reduction

o provision, promotion, subsidy by public agencies and developers and/or employers

- transit
- ridesharing
- bicycling
- walking

o improvements in transit level of service

- express services
- timed transfers
- more direct routes
- denser networks - reduced access time
- park-and-ride
- increased frequency
- preferential treatment: express lanes, signal preemption

o parking management policies

- control of supply and location
- pricing policies to reduce/remove subsidies to SOVs
- preferential allocation, location, and price for HOVs

o land use strategies

- match land development to transportation capacity
- restrict traffic-intensive uses
- conditional zoning and point systems
- jobs/housing balance
- annual development quotas, caps
- restrict annexations, public service expansions
- mixed use development
- on-site/near-site services
- clustering of buildings
- density increases/bonuses in areas served by transit
- exactions for transit, pedestrian, bike facilities
- on site convenience stores, banking facilities, etc.
- delivery services, automatic payroll deposits, etc.

o other trip reduction strategies

- telecommunications substitutes for travel
- work-at-home options

Table 2. Staffing Levels for Transportation in California Planning and Engineering Departments

	Percent of each population category:			
	10-50K	50-120K	120-250K	>250K
Transportation planners:				
0	82	62	50	29
.5	12	17	25	14
1+	6	21	25	57
	100	100	100	100
# responses	34	24	4	7
Transportation engineers:				
contract out	66	39	--	--
CE, not TE	30	18	15	--
1	4	38	40	--
2+	--	5	45	100
	100	100	100	100
# responses	54	37	3	6
# cities in CA	179	65	10	7

Notes: Based on interviews conducted in 1985 and 1986 with 100 transportation engineering divisions and 69 planning departments in California cities. City sizes are as of 1980 Census.

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