clamor over government waste and the reluctance to approve new taxes, transportation programs must be planned and managed much more effectively than in the past. Existing programs should be reexamined in the light of today's environment to see if they are still relevant. New construction must be carefully balanced with the need to reconstruct and maintain the existing system. The methods of distributing revenues should be examined so that today's managers have sufficient flexibility to respond to changing requirements.

Transportation programs will increasingly be competing with other programs for the public dollar. The public must be convinced that their transportation systems are managed properly before additional funding will be authorized.

The fourth issue is urban policy. President Carter's urban policy and DOT's five-point policy objectives are designed to help restore the vitality of major cities through careful management of transportation grants. In this regard, there is a need in the states and in local areas to concentrate on five specific objectives:

1. Ensure that proposed projects are fully a part of a comprehensive plan for the region. This must show, through analysis, the project's overall favorable impact on the preservation of neighborhoods, particularly in the central city, and must ensure ample opportunity for joint implementation of urban development and transportation projects.
2. Increase efforts to conserve energy through ride-sharing and transit patronage. Every urban area must have an effective program, with priority consideration given to the types of facilities that give preference to high-occupancy use of vehicles. Energy impact analyses should be a part of the project planning efforts.
3. Provide equitable compensation for those persons adversely affected by urban highways. Urban transportation projects must be reviewed to ensure that they do not reduce existing housing stocks, particularly for elderly, minority, and low-income groups. Local communities advocating millions of dollars of transportation projects will have to be willing to provide programs that will salvage or replace housing eliminated by these projects and to create positive steps for job opportunities to mitigate adverse impacts.
4. Give serious consideration to no-build options supported by appropriate 3R and TSM proposals.
5. Analyze alternatives for all major highway and transit proposals. This will provide a comparison of the costs and effectiveness of each alternative.

The adequate consideration of urban issues by states is critical and a major part of the statewide planning function. It is as important a role for the state as is rural policy implementation.

The influence of all of these issues on the planning products is critical. Their impact is often dramatic, but the results of this analysis are what the decision maker wants and needs from the transportation planner.

Role of Planning in State Transportation Program

Jack Kinstlinger, Colorado State Department of Highways, Denver

I have been requested to share with you my views on what the state transportation manager can and should expect from a transportation planning program. At one time I was a transportation planner; now I am the director of a state transportation agency. Therefore, I have experienced both the intellectual and technical challenge of transportation planning and more recently the real-world environment in which transportation decisions are made or shaped largely by the outraged citizen, the demanding local official, the unsympathetic state legislator, the governor, and the federal official who wants you to expedite the program while at the same time restraining you with added regulations.

My expectations of transportation planning are less grandiose now, however, than they were when I was a planner and less grandiose than those discussed at the first conference on transportation planning held at Williamsburg, Virginia, in February 1974. According to the report of that conference, transportation systems were expected to shape land use, population, and economic development and to encourage desirable community patterns (1). Comprehensive land use planning was expected to be established on a statewide level and to be fully coordinated with transportation planning.

Since then, political, economic, and institutional realities have forced us to reduce our expectation. Long-range planning has fallen into question; events are moving so rapidly that it is difficult to predict the future over the next 5 years or much less the next 25 or 30 years. The ability of public policy to influence land use decisions has generally been a failure. Increasingly, there is a realization that public investments, including those in transportation, influence land use decisions marginally, if at all, and even local subdivision and zoning powers as currently exercised have little impact. Land use decisions are shaped largely by the private marketplace. In this era of deregulation and reduced governmental intervention, this situation is not likely to change in the near future.

Multimodal system planning, the darling of transpor-

tation planners over the last few decades, has been found useful only in our more complex metropolitan areas and within specific high-density corridors. However, even in these areas, such planning is often too costly, imperfect, and time-consuming to be effective. Frequently, transportation decisions are properly made on a link-by-link basis and on an individual mode basis. Increasingly, the challenge is how can we best preserve what we already have, rather than what new facilities or services are desirable.

Currently, I look to the transportation planner to accomplish several objectives:

1. Provide an early warning system to identify emerging issues and trends with which we will have to deal (In the Williamsburg conference report, this was defined as "the lookout role". It relates largely to those issues that cannot readily be controlled by government but must be accommodated through shifts in priorities, policies, and programs);
2. Provide sound policy analysis on those issues that can be influenced by government but where alternative directions are possible;
3. Support a technically sound programming and budgeting system wherein available resources are channeled and targeted to those projects and programs that best meet the objectives of the agency and the public; and
4. Conduct a continuing program of surveillance so that the manager is informed about how well the programs and the agency are performing and identify areas where further emphasis is required.

Several examples of how the Colorado State Department of Highways addressed these tasks are discussed below.

EARLY WARNING SYSTEM

The Colorado State Department of Highways has been working for a number of years with the Denver Regional Council of Governments and the Denver Transit Agency in formulating long-range highway and transit plans and short-range investment programs. The long-range planning element, in keeping with the philosophy of the Williamsburg conference and earlier planning concepts, was intended to be the framework within which short-term investments would be made. In traditional fashion, long-range (i.e., to the year 2000) land use, economic, and population forecasts were prepared and then highway and transit plans were sketched with the objective of meeting the resulting travel demands. As a result of recent financial analyses, this long-range planning exercise has taken on a new significance—not as a framework for investments but rather as an early warning signal concerning problems apparent in Denver's current and projected growth.

In performing the fiscal analysis for the long-range plan, trends in both construction cost inflation and reduced highway revenues were considered. The analysis indicated that—even with the use of modest inflation factors (11 percent per year through 1985 and 7 percent per year thereafter), a reasonably high transit modal share, a modest growth rate in vehicle kilometers of travel of 2 percent per year (compared to 6-7 percent annually as is currently experienced), and a doubling of highway congestion over that experienced currently during peak periods—expected state and federal highway funds would meet only about one-quarter of the cost of making the necessary highway improvements. Results of this analysis are pointing out to the public and its elected officials the real danger of rapid growth on the Denver regional transportation system that can be addressed in only one of two ways—either achieve a significant but unlikely increase in transportation funding or achieve significant reduction in travel through greater use of high-occupancy vehicles and better growth management.

A second example of transportation planning as an early warning system involves recent efforts on the part of the Colorado highway department to identify impacts from increasing coal, oil shale, and uranium mining activities now taking place on the west slope of Colorado and in neighboring Rocky Mountain states. As an example, coal mining in Colorado is expected to nearly triple between 1977 and 1985, and the number of 100-car coal trains moving within and through Colorado is expected to increase sevenfold by 1985—largely from traffic originating outside of and passing through Colorado.

After reviewing numerous publications, interviewing mining and power-generating companies, and visiting many local communities in western Colorado, our transportation planners have prepared projections of likely levels of activity in mining construction and operation and resulting movements of people and goods. As a result of these studies, we have identified likely impacts within the next several years, including deterioration of nearly 800 km (500 miles) of roads used to haul coal from mines to market or rail head and noise, safety, and traffic congestion problems created by the repeated movement of heavy trucks as well as unit coal trains through small communities, eventually creating the need for bypasses or overpasses where none now exist. The study revealed, for example, that currently 83 railroad-highway grade crossings have sufficient exposure factors to warrant grade separations, and by 1985 an additional 72 crossings will have such warrants. Against these expected needs—estimated into the hundreds of millions of dollars—there are limited funds designed to address the impact of energy resource extraction on transportation other than normal transportation dollars that are already overextended. Armed with these facts, a number of important steps have already been taken to allow Colorado to better cope with this problem.

First, Colorado's Governor Richard D. Lamm and Senator Gary Hart have been urging the U.S. Congress to appropriate energy impact funds to allow boom-town communities to better cope with increased needs in transportation as well as health, education, and other community services. Second, we have met with the railroads active in coal transportation and have received commitments to avoid routings of unit coal trains that will have the most damaging community impacts. Third, we have had some success with the state legislature in funding some of the more critical highway needs out of state mineral severance tax and oil shale royalty funds. Also, we are participating with the U.S. Department of Transportation and other federal agencies in a coal haul roads study and national energy transportation study with the hope that federal transportation dollars will become available to assist us in impacts caused by interstate energy transportation. Finally, the state legislature has authorized the department to evaluate the feasibility of constructing a rail line on Colorado's eastern plains that would divert coal traffic from the front-range urban areas and significantly reduce adverse impacts.

There are other areas where early warning activities are under way including the impact of rapid cost inflation on our construction program, erosion of our revenue base from increased vehicle fuel efficiency, probable decrease in travel resulting from the high cost and shortage of fuel supplies, as well as the impact of federal deregulation of private transportation carriers.

POLICY ANALYSIS

The department has been active in two related areas of policy analysis: the attempt to reduce transportation-related air pollution in the Denver region and transportation strategies designed to achieve energy conservation. Together with the Denver Regional Council of Governments, a land use-air quality sensitivity analysis was conducted to determine the impact on air quality from different development patterns and modal splits between private automobile and public transportation and highway levels of service. The analysis, recently completed, shows that more concentrated land use patterns and increased use of public transportation (a) will decrease only slightly the number of vehicle kilometers traveled and the amount of carbon monoxide pollution and (b) will have little impact on ozone pollution, a prevalent form of pollution in Denver. Interestingly, of all the options tested, the only significant air quality improvement was achieved by maintaining a high level of travel on public highways.

Working with other agencies, we participated in a state air quality implementation plan and a Colorado state energy conservation plan. Some of the results of these efforts are currently being implemented; they include adoption by the state legislature of a mandatory vehicle emissions inspection and maintenance system; efforts to increase bus ridership, bicycling, vanpooling and carpooling; increased efforts to enforce the 88-km/h (55-mph) speed limit; and a voluntary one-day-a-week no-drive day for vehicles registered in the Denver region. Other strategies, including regulating the supply and cost of parking spaces, converting existing freeway lanes to exclusive use by high-occupancy vehicles, and mandatory closing of retail service stations on an alternate-day basis in lieu of the federally proposed weekend station closings, are being studied for possible future implementation depending on the results of additional studies and future circumstances.

We have also been active in furthering control of access to state-owned highways. The highway commission late in 1977 adopted an innovative access control policy, establishing access controls on all roads under the department's jurisdiction and requiring promulgation of procedures for the exercise of these controls. The policy requires the development of access control plans in conjunction with the appropriate local jurisdiction for each highway on a priority basis specifying the functional access classification on the roadway, the location of intersections, constraints on future driveway locations, and other pertinent design criteria. The highway commission also stated that it would authorize the department to proceed into final design of any proposed limited-access highway interchange only when the existence of adequate local land use regulations for the area surrounding the proposed interchange had been determined.

The highway department is currently preparing a more detailed access control code, and the Colorado legislature is considering legislation that will significantly strengthen the state's ability to control access on state highways. For example, the draft legislation provides that local residential subdivisions must connect with local streets and roads, not directly onto state highways.

PROGRAMMING

A major function of the planner is to assist in the development of a priority program for investing available resources, especially in light of decreasing revenues and rapidly inflating construction and operating costs. The Colorado highway department only recently adopted and promulgated its first five-year program for highway improvements and equipment replacement. Increasingly, the program looks at measures designed to maintain existing facilities rather than to expand the highway system except for completion of essential gaps and improvements on the Interstate system. Repair and resurfacing, spot safety improvements, bridge replacements and repairs, construction of facilities to support high-occupancy vehicles, and better transportation system management are dominating the list of highway projects.

Priorities cannot always be determined on the basis of future needs. Revenues are hardly sufficient to accommodate current traffic demand and to correct current pavement deterioration, bridge deficiencies, and hazardous conditions.

The problem of programming has been compounded by inflation. For example, a recent analysis revealed that, under our normal Interstate apportionment and assuming an inflation factor of 11 percent annually through 1984 and 7 percent thereafter, it would take through the year 2004 to complete our remaining essential Interstate program—this despite the fact that Congress has mandated that all Interstate projects must be under contract by 1986.

The five-year program has become a valuable tool in allowing us to plan intelligently within the department in light of the multiyear life of so many of our improvement projects. It also allows us to negotiate openly with local government and private interests who are impacted by state highway improvements, and it allows us to communicate effectively with the legislature on which we depend for increased revenues. It also assures that investments are as cost-effective as possible considering such factors as surface condition, hazardous index, congestion, public acceptance and demand for improvements, and reasonable geographic distribution of investments.

In preparing the program there is a constant tension between completing a limited number of high-priority projects in the shortest time possible or distributing the available funds over a larger number of projects throughout the state and extending the completion dates, thereby satisfying the greatest number of requests for remedial action. Based on technical analysis alone, fewer projects would be undertaken, and such projects primarily would be located in the urban areas where traffic volumes are highest. Political realities, however, must also be brought into play, and a balance must be struck between technical analysis on the one hand and political realities as viewed by the state highway commission, legislature, and the governor on the other. The transportation planner has fully matured when he or she appreciates that the political arena makes as valuable a contribution to the programming effort as technical analysis.

SURVEILLANCE

Finally, the planner must continue to perform the traditional activities that allow the administrator to measure the performance of the system—surveys, counts, and inventories. Measures such as physical condition, accident history, travel time, occupancy or load factor, traffic type and volume, and level of service must continue to be monitored. These statistics are essential if we are to determine how the system is performing and whether in fact our investment of funds and effort result in an improvement or erosion of physical and travel conditions. They allow an identification of problem areas and prioritization of needs for purposes of designing the five-year program. Such measures, I have found, are essential also to support some of the newer management systems that we are implementing within the department. Our new management-by-objectives system requires

identification of goals and measurable objectives for individual units in the department, which, hopefully, will increase public support and understanding of the department's operation, achieve common direction within the department, and allow us to manage performance and products rather than activities. The successful implementation of the system requires intensive collection of information to support analysis of goals achievement. Some typical goals recently adopted for FY 1979-1980 by the highway division within the department include the following:

1. Minimize the degradation of the highway systems;
2. Reduce maintenance costs per kilometer by a certain predetermined percentage;
3. Reduce transportation-related accidents, injuries, and fatalities by a predetermined percentage;
4. Use more energy-conserving construction and maintenance methods and materials and reduce motor fuel consumed\per hour worked;
5. Increase the number of high-occupancy vehicles on the highway system;
6. Improve travel efficiency by reducing travel time between predetermined major community points; and
7. Reduce the period of time that the urban freeway system operates at less-than-tolerable levels of service.

It is evident that the system will be extremely data-hungry and will require the active and constructive participation of the planners in terms of providing the surveillance and data that undergird the measurement of objectives.

CONCLUSION

The planner's role in a transportation agency is probably more essential now than it has ever been before, but the function of a planner must be more sharply defined. In summary, it is to address specific issues and problem areas, to evaluate different policy options, to identify how existing and reasonably anticipated revenues can best be invested, and to help measure the effectiveness of the program.

REFERENCE

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Transportation Planning and Programming: A Legislator's Perspective

Louis R. Nickinello, Massachusetts House of Representatives, Natick

Legislators are people who are elected to represent their respective communities and who have different interests and different concerns. Sometimes these concerns are reflective of personal concerns; most of the time, they are reflective of the people who sent us to our respective state capitals. Trying to reflect those concerns through one collective voice is very often difficult at best. Trying to develop an expertise in fields that we heretofore knew nothing about is difficult at best, as is listening to the bureaucrats, as we legislators like to call them, and to the planners with expertise in a particular field.

These days, it seems, politicians are not held in great respect. But some of us still think that it is pretty good to be a politician—a legislator—and we are fighting to upgrade our image in the people's minds. Even people such as yourselves—planners, government officials, and so forth—see us as obstacles to overcome.

Most legislators know what people think about the legislative process—good and bad. We also know that there is an education process going on that, until now, has been one-sided and that is the point of my talk to you. We in the legislature resent you, whether you are bureaucrats or planners, because you do not educate us. You do not plug us in to the planning process before the process begins. You go to the public sector, to the citizens, but not to us.

Our beef as legislators is that we feel very much left out of the planning and decision-making processes, especially since the U.S. Congress wants to reach down to the local level to deal with the local community about transportation matters. As a result, the state and its legislators are being bypassed. Even when Congress speaks of state government, it is interpreted to refer only to the governor. When the governor says "yes," it is what state government is saying, regardless of whether the legislature in that state knows what is happening. However, it is the legislative branch that is later told it has to come up with money, because the governor of the state has obligated the legislature to do so.

Now, I ask, how would any of you feel after being placed constantly in that position?

I take great pride in being able to say that I am a partner in government with the people who elect me and that I have a right to be educated about and be a part of the process of planning. Thus, I am dismayed that the