

THE STATE HIGHWAY DEPARTMENT'S PROBLEMS IN THE DESIGN AND CONSTRUCTION OF URBAN HIGHWAYS

Douglas B. Fugate, Virginia Department of Highways

•THE CHALLENGES of planning and constructing urban highways are formidable indeed. City dwelling has always been in many respects a source of mixed blessing. Because the city is and will remain the center of employment, commerce, and culture, it attracts throngs of people who take advantage of its resources.

Some 300 years ago, William Penn, who knew much about the cities of his time, wrote, "The country life is to be preferred, for there we see the works of God, but in cities little else but the works of men." Somewhat later Lord Byron wrote, "I live not in myself, but I become portion of that around me; and to me high mountains are a feeling, but the hum of human cities torture."

The majority of Americans living in and around cities today presumably do not regard the urban hum as "torture." However, we all are aware of the awesome problems confronting the cities and those who are responsible for governing them and for providing essential public services. There simply is no way to mistake those problems.

The excellent report (1), *The Freeway in the City*, states that it is important to capture certain amenities that make the city a decent, satisfying place in which to live. The report describes the most basic of these as ecological, i. e., "the simple biological requirements which urban dwellers have every right to insist upon. Among these are a series of new freedoms—freedom from excessive noise, freedom from air pollution, freedom from physical danger." In addition, the report states, "There are the cultural and recreational amenities which the urban center must provide—open space, views, parks, playgrounds, cultural institutions, and an environment for commercial activity which makes downtown an exciting and colorful place to be."

What is needed so urgently in urban areas today is a broad, overall kind of community planning that sets objectives such as these and with which street and highway planning can be coordinated. The economic vitality of any city depends very much on freedom of mobility for those who live, work, and visit there; efficient, reliable transportation facilities are among the most fundamental of essential public services in a city.

In some of the Nation's great urban centers, such as the Washington metropolitan region, there is a growing need for rail rapid transit to help ensure this efficiency in mobility. In most cities, bus rapid transit is a more economically feasible approach.

It is a serious mistake to believe that any transit system—rail or bus—is going to cure all urban transportation needs, for in most instances one net effect of a rapid transit system will be to generate additional automobile trips in the area. One transportation system complements the other; it is not a matter of choosing one over the other. It all must be planned and coordinated carefully at the local level and between the local and state government. Transportation planning ought to be conducted against the background of total community planning.

Highway planning, whether it is done at city hall or at the state capitol, simply cannot be achieved successfully in the modern urban area without regard to other phases of urban development. One of the most perplexing problems in many urban areas occurs when the traffic capacity of existing and often recently completed streets is burdened unbearably as a result of huge and unexpected new land uses. Land use is controlled, and properly so, by local governments, and they naturally are heavily influenced in their decisions by the tax revenue that will accrue from, for example, a zon-

ing change to permit a major commercial or industrial complex. Too frequently, not enough consideration is given to the impact that such large traffic generators will have on the street network serving the area.

As a highway administrator faced daily with needs for which there are no funds, I can understand the plight of municipal governments confronted with an identical problem. We must find an improved method of relating total land use planning more effectively to street and highway planning and of making the system work more satisfactorily in rapidly expanding metropolitan areas than it has in the past.

Conflicts are developing increasingly between the desires of those who live along the path of a new urban highway or along an existing traffic artery planned for major improvement and those who use or will use that facility. It is becoming steadily more necessary to seek compromises based, to the extent possible, on consideration of the wishes of both groups.

In most instances, the time required to bring a project from initial planning stages to completion extends beyond the terms of office of elected local officials. A change in municipal administration often means a change in priorities and plans, and this not only tends to delay, frustrate, and complicate a project but also raises difficult questions about the future of that project.

We have just experienced such a situation in one of our major Virginia cities. For some time, both local and state studies have pointed to the need to replace an existing, inadequate bridge on a primary route extension in that city. In the mid-60's, at the city's request, the highway department, working closely with city administrative staff people, began developing plans for replacing and financing the bridge. It was agreed that the project would be built under Virginia's normal urban highway construction program, with 15 percent of the cost to be provided by the city and 85 percent by the state. At the city's request, the highway department began the necessary right-of-way acquisition, and more than \$400,000 was invested in right-of-way acquisition and engineering planning. The city council, with some new members, balked at completing agreement necessary to get the project under way, although the city itself initiated the request for the bridge replacement and has been a partner in developing the plans. The highway commission is hopeful, of course, that the council will reconsider its position so that the project may proceed. Highway funds and engineering time are far too scarce to be spent to this extent on a project that is not built.

State and local governments must accept the role of full partnership in highway planning. This partnership means avoidance of unnecessary delays in reaching agreements on projects. It means a shared responsibility for informing local citizens of the need for specific projects. It means a firm position to withstand extreme local pressures for design changes that could result in reduced capacity for the completed facility.

The current emphasis on environmental considerations has underscored the importance of this partnership to find ways to blend the highway into the area through which it passes, of giving citizens through the public hearing process and in prehearing discussions a voice in decisions, and of minimizing pollution of all types during and after construction.

Right-of-way acquisition for urban projects always has been a difficult phase of highway development because it almost invariably means displacement and relocation of people and businesses. This raises human problems that are not easily solved. Provisions for assisting those displaced have become more realistic in recent years, but finding new homes and business sites remains a responsibility demanding the best cooperation between the state and the local governments.

After state and local agencies have done their best in planning and design work, the construction stage itself presents a completely new set of requirements, most obvious of which is minimizing public inconvenience during construction. Travel patterns are interrupted or altered, noise and dust are generated, and public and private utilities often must be relocated or adjusted in some other manner. There are often temporary financial losses that result from construction of highway projects in business areas.

Consequently, projects on which construction time is drawn out unnecessarily bring criticism from the public, and this is quite natural. For this reason, a great amount of attention is being directed at present to finding ways not only to minimize public in-

convenience generally but also to complete urban projects in the shortest possible time. Establishment of relatively short construction time allowances will result in somewhat higher costs, but reasonable additional costs are a wise investment in public convenience and goodwill.

All of this is quite difficult to attain when we recognize that the broad range of factors inherent in most urban construction projects by their very nature dictates a sequence of operations considerably less than efficient when compared to the sequence under which a rural project can be built. From the time a project is programmed to the time of the field inspection stage, when plans are perhaps 50 percent completed, little of tangible value can be achieved to ensure a smooth construction operation, for during this period geometrics, alignments, and grades are being established.

As early as possible, however, an accurate, dependable, and realistic schedule should be developed for each project. In this regard, scheduling such as this must be undertaken jointly by the highway department and the municipality. The schedule should include the approximate date for the project to be advertised for construction bids and for the award of the contract, allowance for construction time, methods for handling traffic, adjustment of utilities, and any other factors that tend to control completion time for the project.

It is important that citizens be informed of work schedules, progress, and specific details that alter in some way their normal travel or business patterns. The public is entitled to this kind of information, and it is a responsibility to be shared by the highway department, by the local government, and, after award of a contract, by the contractor himself. This is simply sound public relations.

A basic element of this preconstruction scheduling is a determination as to the best methods of maintaining traffic movement while the project is under way. Will traffic movement be served through construction? Is a detour around the site possible and desirable? How many lanes and what quality of riding surface will be provided for temporary traffic maintenance? These are among the questions to be settled, and the answers should be based very largely on the choices that will cause the least interference for motorists.

Just outside of Washington in northern Virginia, the Shirley Highway, which is a part of Interstate 95, is being reconstructed. In this area, the highway serves 100,000 vehicles per day and more, and there is no suitable detour. Consequently, traffic is continuing to move through the construction site, and the contractors, who were told in advance what would be required of them, are doing a magnificent job of working around the traffic flows.

As was true in this instance, plans must provide a clear indication of the method to be followed in handling traffic, or of the detours, and this information ought to be based on the judgment of traffic engineers. It is essential that these requirements be made clear by the highway department to the prospective bidders on a project, because they naturally would have an influence on the contractors' cost evaluation and subsequent bid.

Similarly, careful advance attention must be given to questions concerning adjustments and relocation of public and private utility lines, and it is imperative that designers have accurate information on the precise locations of these facilities. Unfortunately, most underground utilities, such as water, gas, and sewer lines, cannot be avoided in a major urban construction project and must be maintained continuously during construction of the highway. Generally, it is difficult to make these adjustments prior to actual construction work. This means that the utility company and the contractor must coordinate their work carefully to perform this phase at the most advantageous time, and it does indeed present difficult problems.

There are, of course, a substantial number of other questions that the state highway department and the municipality must decide in planning, scheduling, and constructing urban highway projects. The following are a number of questions that are considered:

1. Should a major project be divided into two or more segments, with intermediate completion dates for each segment?

2. Can projects be completed within a single construction season, and what steps are required to achieve this?
3. What provisions are needed for vehicular and pedestrian traffic during the winter on projects extending beyond one construction season?
4. Can pavement design characteristics be simplified by reducing the number of different types of materials?
5. Is it feasible to eliminate subgrade stabilization and use one type of material for the base?
6. To what extent may precast units be used?
7. How can one best provide for borrow and waste material, a problem that is becoming increasingly difficult in urban areas?

I would emphasize that in most of these areas the final solutions are not yet in hand. Although substantial gains have been made in urban highway planning and construction techniques, there remains a great need for creative and innovative thinking.

REFERENCE

1. Rapuano, M., Halprin, L., Kavanagh, L., Powell, H. R., Roche, K., Rockwell, M. L., Simonds, J. O., and Springer, M. R. *The Freeway in the City*. U.S. Govt. Print. Office, 1968, 141 pp.

INFORMAL DISCUSSION

Robert G. Bartlett

With regard to the design of a highway based on estimated land use and traffic projection, we are all well aware that in the United States the zoning or the control of land use is basically at the municipal level. This is a problem when the state plans the major facilities but has no jurisdiction over the land use development of a given region. Do you think that the state has a legitimate role in the zoning of land use to make maximum utility of these major investments?

Douglas B. Fugate

From the standpoint of the planner, this would be the perfect solution. However, I certainly think that local government is the place where this control should be. In Virginia there is never a thought of going to state zoning control. The answer lies in a liaison between state and local governments. This can be achieved through greater participation of the municipalities in planning transportation arteries, in maintaining the zoning as it is, or, if there is a change, in taking the highway facility into consideration before making a change.

Robert G. Bartlett

John McCue, how would you answer the same question with regard to the state plans?

John J. McCue

We feel that the closer the government is to the people, the greater is the thrust of the community. Therefore, the zoning controls should probably still be maintained at the local level. However, I do believe that there should be much more coordination among local, state, and federal governments because each is involved in projects that make a marked impression on any urban area. A large urban area that has the foresight to develop a master land use plan lays a good foundation for various levels of government to know essentially what will go on in that community.

Douglas B. Fugate

When the provisions of the 1970 Federal-Aid Highway Act were considered, there was some sentiment in Congress for requiring that once the planning process had been accomplished the locality would have to conform to the plan at the risk of losing federal aid. Unless there is better cooperation between state and local governments in carrying out the provisions of the planning process, the local government may risk losing federal financial support. We cannot use federal financing if the municipality changes zoning without regard to the transportation facility that has been built with federal funds.