

communities which have no or inadequate technical staffs. Other challenging matters in the field of coordination confronting most states are: the need for uniformity and upgrading in accounting, planning, programming, research, and application of standards.

By no means is the engineering study the end result. It is an essential stepping stone to the adoption and achievement of a sound long-range highway program charted to best serve the highway transportation needs of all the people of a State. Other steps are writing the program into the laws of the State so that

it may be fully carried out. Periodic review and revision of the program should be made at say 10-year intervals. Meanwhile, the highway planning surveys of the Public Roads Administration and the States must continue to measure road usage, needs and technical advances. The full force of facts, technology and of cooperation between peoples and governments must be applied if there is to be rapid and satisfying progress in the provision of safe, economical and efficient highway transportation.

COORDINATION OF HIGHWAY AND CITY PLANNING

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SYNOPSIS

Major highway construction in an urban metropolitan area should be a planned unit in a well-balanced highway network which is both a terminal system for long distance traffic and an important part of a local transportation system. This requires three stages of highway planning: layout of an urban network; location and design of individual sections; and location and design of terminal and parking facilities.

Each part of the system should be designed to be useful for many years in the future. Therefore, standard measurements and descriptions of existing traffic and travel habits can not be a satisfactory base for planning. Cities are changing rapidly—expanding into the countryside with factories, homes, and shopping centers; growing or declining in population and industry; deteriorating in large areas as “blight” spreads; rebuilding and redeveloping new neighborhoods of housing or new industrial areas in formerly blighted districts. People of various income groups move and dominant centers of business shift as the city changes.

In determining highway needs prospective and planned changes in the amount and distribution of housing, employment, shopping, schools, and other major land uses should be considered together with possible changes in transportation habits.

Urban highways should be located and designed to influence city growth and development along desired lines and to fit in with other proposed public improvements. Major urban problems, such as central congestion, may be only intensified by centralized transportation facilities without appropriate land use controls.

Highway planning is an important part of comprehensive metropolitan city planning. It shares many of the same problems and needs, much of the same knowledge of trends. Because of conflicting local jurisdictions in metropolitan areas outside city boundaries, the best method of coordinated planning in most places is through voluntary committees including Federal, state, and local officials and using freely advice and participation of non-official agencies and interested citizens.

From the point of view of the highway official, highway planning seeks to develop a system which will enable traffic to move as easily, quickly and directly as possible, with

a minimum of friction and hazard, within limitations of economy and political feasibility. Considerations of major importance include: travel volume and desire lines, topog-

raphy, cost of construction and maintenance, directness of route, and relation to the land use pattern. The highway official must juggle and balance demands for highway facilities (usually far outstripping his available funds and manpower) against maintenance requirements in various sections of his jurisdiction.

During most of the period of extensive highway building in this country, major attention has been given to rural and interurban construction. But every transportation system has two requirements: line, or right of way and terminals. It is when his routes come into cities that the highway official meets particularly tough and complex problems. He is concerned with routes through the urban area, and also with the network of feeders to collect and distribute his traffic in various parts of the city. He finds his long distance routes intensively used for intraurban traffic. Here he meets and shares the concerns of the city planner.

From the point of view of between-city or into-city traffic the entire urban metropolitan network is a terminal system. It collects and distributes the long distance traffic and provides terminal facilities at its destination. However, in large cities the other function of the urban highway network is, volume-wise, much more important: facilitating movement among parts of the metropolitan area itself. Therefore, in urban highway planning the needs of both kinds of traffic must be taken into account.

Urban highway planning must consist of three parts, the second and third depending largely on the soundness of the first:

1. The design of a major highway network for the entire metropolitan area for general location and capacity. In this stage final specific locations are not fixed.
2. Specific route analyses and designs for individual sections of the system as they come near to decisions for financing and construction.
3. Planning for terminal facilities: truck and bus terminals, off-street loading and unloading and automobile parking.

PLANNING A METROPOLITAN SYSTEM

To begin with, one must assume that a good State highway engineer, when he works in a metropolitan region, wants to know how each

project will fit into a general objective—an eventual, workable system of highways for the region. He knows that each project is built for a long period of service. He is aware that he cannot adequately judge the future need for capacity, character of design, or location of an individual project without some appreciation of the probable effect of future highways in the system: how much traffic they may be expected to dump into the project in question—and where—and to what extent they may relieve the future load on it.

An unfortunate example of a project decision without reference to an eventual system of express highways, of which it will be a most important link, is a multimillion dollar street widening now under construction in Philadelphia. In my opinion, and in the opinion of a number of highway engineers and planners with whom I have discussed it, this expensive project will prove entirely inadequate to meet the eventual demands that will be placed upon it. It should be explained that this project was inherited by the present Pennsylvania Highway Department from the preceding administration.

Of course, no public official can commit future administrations to a long time program of construction; but if he does not plan his work in relation to what he thinks their problems will be, and what he thinks they *may* agree will be needed facilities, he can, by his short-sightedness, severely handicap their future work. And he will be remembered as a man without vision.

A major task of the highway planner, then, is comprehensive layout of a desirable pattern of highways for each metropolitan region. The relative responsibility of Federal, State and local officials in this undertaking constitutes a separate problem. For the moment it is understood that each has a need for the plan.

Any plan for future development represents the best judgement of the designers that it will satisfy what they believe to be present and future needs. If people still had faith in a Merlin this would be easy; but no crystal ball nor willow rod, nor even a dream book will be enough here. The planner knows he cannot foretell the future precisely—although he knows there will be great changes in the form and structure of the city—but he has a number of tools which can help him judge trends

and qualify the hunches he must inevitably play. The important thing is for the planner to understand as much as he can of the many factors in possible and probable change, so that if he must jump at conclusions his jump will be no longer than necessary.

Even in the interpretation of present needs there is wide room for argument, as any legislator knows.

If the understanding of human needs is no exact science, how can the conscientious highway designer make the best possible score? The answer to this question lies in the considerations which should enter into a good metropolitan highway network plan.

URBAN HIGHWAY PLANNING CONSIDERATIONS

In a large city, a plan for a metropolitan highway system, as for any element of a comprehensive development plan, is necessarily at broad scale, without much attention to detail, and somewhat diagrammatic. It deals with major highways, not with local access streets—with the parts which have significance to the total metropolitan community. Subsequent comprehensive plans for each section of the city properly give more attention to detailed study of elements of significance chiefly to that particular section.

The metropolitan origin and destination studies, according to the internal and external survey technique developed by the Public Roads Administration during the last few years with the cooperation of State and local officials, provide a very important tool in urban highway planning whose usefulness goes far beyond any other method I have seen. Unfortunately, the analysis of this information and subsequent planning procedures employed in most local areas, have not made the most of this opportunity.

Analysis of present and future highway needs will be simplified if the study is broken down into two elements:

1. "Long distance" traffic into, out of and passing through the metropolitan area.
2. Traffic whose origin and destination is within the metropolitan area.

LONG DISTANCE TRAFFIC

Separate generalized volume-desire line tabulations and maps can be useful for both (a) traffic approaching the metropolitan area and bound for points beyond, and (b) traffic

either approaching the metropolitan area bound for various districts within it or originating in various sections and bound outside the metropolitan area.

Separate study of through traffic can help answer questions such as whether to route it around or through the district, what is the most direct and easy route, and what the effect on the metropolitan community and the people and business within it would be either way.

The second category—outside traffic destined for various points within the urban area, or the reverse—will show what kind of feeders and distributors in the terminal system are necessary to collect the traffic or get it to its destination.

Information on present volume and desire lines is, however, an inadequate base for planning. The planner must form a judgement concerning the nature of change in volume and distribution that may be expected 25 or 30 years in the future.

This is one of the conclusion-jumps to be shortened as much as possible. The most certainly wrong conclusion would be that it would remain the same.

Changes in volume and direction of through traffic to be expected would be partly a result of general expectation of traffic volume trend nationally and in the larger region in relation to car registration, regional population and industrial growth; and partly of change in the relative use of various forms of transportation. As to the latter, the quality and location of highways to be provided might be an important factor.

Changes in the volume and direction of long distance traffic originating and terminating in the metropolitan area may be expected to be influenced by all the above factors as well as the following:

1. Trends in population growth and location of residence expected or planned for,
2. Trends in amount and location of industry expected or planned for,
3. Trends in amount and distribution of trade and other major traffic generators expected or planned for.

Studies of these trends are made by good city planning agencies who must prepare general metropolitan plans for change in land use, population distribution, development of new areas, redevelopment of old sections and es-

establishment of new business and governmental service centers. If the city planners are delinquent in this respect, highway engineers will be handicapped.

Modern O. D. surveys will give good clues to the traffic generating potential of various classes of the population, and various kinds of business and industry. To drop the role of "planner" for a moment and assume that of "research professor" I must point out that we need studies of traffic generation by various kinds of generator in many cities spread throughout the country, coordinated for comparability to increase the margin of predictability in this field. I hope that various state highway departments and local planning agencies will be willing to undertake such studies under the sponsorship of the Public Roads Administration.

To return to the main course of the discussion, after general conclusions as to the probable effect of changes on the future volume and distribution of traffic desire, a useful planning step is to construct new volume-desire line maps on this assumed basis.

LOCAL METROPOLITAN TRAFFIC

The highway requirements of present and potential traffic where origin and destination are both within the metropolitan area may be analyzed in a manner similar to that described above. In a large city it might be convenient again to sort out traffic between sections of the urban area and that which is of local neighborhood character. Much of the latter may considerably swell the volume of traffic in certain sections of major highways, but it needs separate and more detailed analysis in relation to local street and land use patterns. In this way the various functions of a highway may be considered separately and given proper weight in its design.

In the analysis of local metropolitan traffic it is particularly important to sort out the purposes of the trips. Trips to work may be expected to change in the future with changes in relation of place of residence and place of employment. They will be affected also by changes in mode of transportation used, which will, of course, depend partly upon the relative time-distance-cost-convenience of transportation by various means which may exist or be provided.

In order to reduce future guesswork in the

assumptions which must now be made on this point, it would be valuable to have research on trends in location of employment and residence in various cities, and in the relations between them. Likewise, more knowledge is needed on factors in the choice of mode of transportation by individuals of various kinds, and for various purposes of trips. For example, under what conditions do people choose to use public transportation rather than drive to work? How has the construction of a new highway caused some persons to drive rather than use public transit, and to what extent and for what purposes has it encouraged a total addition to number of trips? How has the provision of new parking facilities similarly affected amount of traffic over certain routes?

The Institute for Urban Land Use and Housing Studies at Columbia would be much interested in information throwing light on these questions.

Similar changes in traffic may be expected in trips for shopping, recreation, school and visiting, or other purposes. Each may be affected by a different set of factors. A trend in change of hours of employment in various occupations may considerably affect peak loads.

Changes in area distribution of various classes of the population which have different travel habits may be affected not only by normal community growth and population movement, but by various controls of new development which may be imposed, and also by large-scale programs of blighted area redevelopment and housing construction. Some of these programs may change the economic group living in a certain section as well as increase or decrease the density of population. Some redevelopment may change the kind of land use in an area entirely.

A good example of change by redevelopment may be seen in extensive sections of the East side of Manhattan with large-scale housing projects and now the United Nations headquarters. The extensive redevelopment programs now getting under way in Chicago and other cities are also illustrative.

Present trends in the outward movement of large-scale industry and the creation of new regional shopping centers outside present built-up areas will directly affect traffic patterns and also will indirectly change them through their influence on location of residen-

tial construction. It is possible that before many years we shall see the planned development of entire new towns either related to present metropolitan centers as satellites or in more independent locations.

In the light of such studies, again, maps showing assumed future volume-desire lines of traffic may be constructed. It is on the basis of these future directions that general highway planning should be done; certainly it should not be based upon the present pattern.

DESIRABLE URBAN DEVELOPMENT

A most important factor in planning for a metropolitan urban highway network is the kind of city which is the objective. The construction of highway and transit facilities will strongly affect the future pattern, for transportation is one of the strongest forces of change. If the highway engineer does not give due consideration to the effect of his highways on total development, if he does not work closely with the city planner, he is taking on himself a grave responsibility.

It is now to be seriously questioned whether much of urban congestion can be really cured by expensive highway and transit construction. Obviously, new travel facilities beget traffic. Centralized transportation systems are important forces in increasing congestion of land use in central areas. Perhaps the better solution is to encourage a shift in location of some activities in order to reduce the need for travel, through such means as refusal to apply the mustard plasters of alleviation and through strict public controls of the kind and intensity of new development. Let the highway planner be aware of the actual policies for the future kind of city which are inherent in his decisions.

ADAPTATION TO THE PRESENT CITY

Following all these considerations of need and policy are those of practical planning. What is wanted and needed must be adapted to possibilities found in the present and changing city. The feasibility of a desired change must be considered partly in relation to time in the programming of work.

Workaday considerations of this nature are generally familiar: possibilities and probable effects in the adaptation of present highways and streets; the need for removal of traffic

from some; the finding of appropriate routes for passenger, truck and bus traffic in relation to their effect on nearby land use; the coordination of highway construction with that of other proposed projects ranging from sewers to convention halls.

ROUTE ANALYSIS AND DESIGN

In the alignment and design of a specific highway the planner makes precise one element of the total network. In addition to factors of feasibility and cost he must study how it may affect nearby land users and the future trend of land use change. Here the previously described studies for the general pattern are invaluable in seeing that the location and design chosen are appropriate, fit in with other proposed projects, and will serve highway needs for years to come.

HIGHWAY AND CITY PLANNING

The subject of this paper is the coordination of highway and city planning. We have seen that the basic considerations are the same. The various elements of comprehensive metropolitan planning are not independent. They are very much dependent on each other. Land use in general, highways, transit, rail, port and air terminals, schools and recreation, public buildings, utilities—all must be planned and programmed concurrently, in relation to each other, if best results are to be achieved. They must be related to development needs and to budgetary requirements.

If independent plans for the various elements, made solely in light of the best advantage of each were to be overlaid on transparent maps, they would not fit together. The comprehensive city planning process must make possible mutual accommodations among the elements as the plan is developed. Further, all must be continuously restudied as knowledge grows and as goals and needs change.

In this process of planning is opportunity for participation of many citizens and individuals from their diverse points of view in the joint effort. If they do, and share the thinking, the plans will have more general support.

ADMINISTRATIVE PROBLEMS

Administrative problems of planning for metropolitan areas are tough. Within the

many jurisdictions often found, the pressures of special interests, the objectives, the requirements of local budgets and taxes are often in conflict. Until political scientists can give an answer on desirable and possible governmental forms for metropolitan areas, the joint planning must usually be voluntary. Many planning agencies of central cities are undertaking their own responsibilities through metropolitan planning beyond their boundaries because they could not otherwise make valid city plans.

Within this framework special committees are valuable on particular subjects such as industrial land use, housing, recreation, port, highways and local transportation.

In Philadelphia the City Planning Commission has had success with an advisory committee on local transportation made up of representatives of city agencies such as the Department of Public Works, Department of City Transit, and the Bureau of Traffic Engineering; the State Highway Department; the Delaware River Joint Commission; the transit company; the commuting railroads; the motor clubs; the Chamber of Commerce; the Board of Education. All general plans for highways or transit under study by the planning staff as well as all specific project proposals have been discussed fully by the Committee whose recommendations go to the Planning Commission before that body makes any recommendations.

But even such a city committee is not enough. Representation needs extension to various responsible officials in the metropolitan area. A number of cities, such as Cleveland, have established such committees for metropolitan highway planning.

Local officials and State and Federal representatives who have good will and an understanding of their joint concerns, can work out the best formula under existing conditions in each area. Certainly officials and citizens

can benefit by face-to-face meetings over these problems. Who should take leadership depends upon who can best exercise it, and who has the technical resources in the local situation. But all should have a voice.

Some State highway officials have been reluctant to participate in such metropolitan planning for fear it would commit them to certain projects and routes beyond their resources of finance and manpower. These officials are subjected to severe political pressure from all parts of a State.

However, such comprehensive planning as has been described here is not a commitment to a program of construction, to scheduling, or to undertaking a particular project at a particular time. It is merely an assurance that what is done will be done with relatively good judgment and with relatively better chances of satisfaction to the community in the long run.

In summary, highway planners are locating and designing long lasting routes which must serve both long distance and local traffic needs. Their urban highways are important factors in guiding future urban growth.

Present traffic is an inadequate base on which to design facilities to be used a long time in the future. The prospective amount, movement and distribution of people, industries, trade and other important traffic generators—in other words the probable future land use pattern of the urban area—will modify design assumptions. Cities are changing rapidly. Each highway constructed should avoid premature obsolescence, should be a step toward a balanced local transportation system and should help direct growth and change toward a better, more efficient and livable city.

There is no conflict between highway and city planners of good will. They are members of the same team.