ing the challenge of the automotive age or allowing the automotive revolution to master and overwhelm many mature and declining urban centers.

Responsibility for meeting the challenge of the automotive revolution and of making full use of benefits that can flow from the automotive age is not borne by the engineer alone. It extends through all levels of government from top to bottom and to administrative, political, industrial, commercial and civic leaders throughout the nation. No small part of this responsibility is informing the people of the issues involved and securing a full measure of public support. But the engineer must assume leadership and at the same time establish sound principles for the proper design and development of controlled access highways in urban areas.

This report is an approach to the general features of the subject. The success of the controlled access expressway in urban areas is dependent on skillful utilization of many factors and adaptation to each specific problem. These factors and the techniques involved are outlined generally in this report. It is hoped that subsequent committees will further develop specific techniques by additional research.

LOCATION CONSIDERATIONS

The location of an urban expressway should be governed by its ability to coordinate and improve travel on the existing street system and to provide an effective facility for the movement of all traffic. Properly located, an expressway can integrate Inter-city, Metropolitan, State and Federal routes, thereby relieving traffic congestion on major city streets and county highways. The removal of this overload from the local system will eliminate the necessity for many street extensions and widenings.

In sound and efficient highway planning, mass transportation and private transportation must be complementary, not competitive. Therefore, the coordination of express automobile and truck movement over the facility must be considered in the final location of an expressway if the public is to derive the full benefit of such improvement.

Expressways provide an excellent opportunity for express bus service, both urban and interurban. Express service by bus for the outlying districts of a metropolitan area and its suburban districts may use the expressways as efficiently as private rights-of-way. These buses can use the local streets for picking up passengers in the outlying districts and deliver them to destinations within the city. Where intermediate stops are desired on the express highway portion of these routes, such stops and convenient loading may be provided at street grade by means of the interchange lanes and ramps without interfering with traffic upon the expressway.

Access from the expressway to industrial areas is another factor for consideration if complete utility of the improvement is to be realized. This is important for freight transport as trucks take over more and more of the haulage of raw materials and finished products. Also, employees destined to these areas will receive the benefits of this convenience. The removal of motor freight trucks from the local street system will provide faster and safer trips for the traffic still using the existing facilities.

An expressway should not be considered merely as a highway for carrying vehicular traffic faster and farther out from the central area, as some have assumed, concluding that the system would accelerate decentralization of population. On the contrary, by concentrating through traffic on relatively few arteries, the improvement will aid materially in the appropriate conversion and redevelopment of the central residential areas. These areas are now blighted, or being blighted, by unwanted traffic congestion as well as other factors, and are consequently being abandoned for "greener pastures" in the suburbs They can regain the order, quiet and safety of local streets, competing in this respect with the suburbs, by confining through traffic to roadways specifically designed for the purpose.

The route of a proposed expressway should be determined with the thought to preserve the unity of neighborhoods

and for the redevelopment and conservation of central residential areas. Adequately landscaped and planted, the expressway will serve as attractive and logical boundaries for communities and good location for certain recreational facilities. They are viewed as an essential measure in the checking of wasteful decentralization and the restoration of older areas to economic health.

Several theories have been advanced relative to the best location for an expressway. Each has its advantages and disadvantages. The authorities who prefer between-block locations claim a cheaper right-of-way cost on the basis that this method, in the majority of cases: (1) will preserve the buildings facing the street by using the back yards of the property required; (2) through preservation of the houses and small retail neighborhood establishments cause the least disturbance and dislocation to the immediate area; (3) remove from the tax books taxable property of lesser value; and, (4) cause less disturbance to existing underground utilities thus reflecting a tremendous saving in construction costs.

The proponents of the center of street location claim; (1), a wider right-of-way can be obtained by the acquisition of entire lot depths; (2), the economy in acquiring the rear portions of city lots is not as great as appears; (It has been the experience of right-of-way negotiators that the ultimate cost of a portion of a parcel of land represents nearly the total value of the entire parcel in most cases) (3), with a wider right-of-way, a better opportunity is afforded to design flatter slopes and attractively landscape the area; (These two erosion control devices will reflect a lower maintenance cost for years in addition to their beautification abilities) and, (4), the existing local streets flanking the improvement will serve as feeders and collecting arteries.

WIDTH CONSIDERATIONS

It is generally agreed by highway engineers that generous right-of-way widths should be provided for expressways. Some advocate right-of-way widths of three hundred feet or greater, if possible. A wide right-of-way properly landscaped is a guarantee against damages to the abutting property values. Fumes, noise, and dirt, the objectionable by-products of arterial highways, are effectively eliminated where ample space is provided between the pavement and dwelling units. On wide rights-of-way, medians between pavements can be of generous widths to provide proper planting which provides more safety to the driving public.

An improvement of generous width will allow for future expansion, should it be needed, without entailing acquisition of additional land for widening purposes. Subsequent widening is a costly procedure and should be precluded in the original purchase.

DESIGN CONSIDERATIONS

In order to function as intended, an expressway cannot usually intersect other traffic arteries at grade, although conditions may be such that the highway economically may be at grade between intersections. This is generally possible in the open country, but it is more difficult in cities or towns, where railroads, waterways, and particularly city streets, may be so close together as to make impracticable the construction of an expressway at grade In certain cases however, it may be possible to construct it essentially as a surface road, for example where it can be located parallel and adjacent to an existing railroad or waterway, or to a hillside, swamp, park or other natural man-made barrier.

The vertical location of an expressway in relation to the ground or street surface will depend on the specific characteristics of the terrain and the street system, and possibly to some degree on the likes and dislikes of the communities through which it will pass. It may depend also on the relative cost of right-of-way and construction. Generally speaking, the following types of structures can be used:

(a) Above ground (embankments with earth slopes or between retaining walls; viaducts of steel or concrete).