Planning Highways for Industrial Development

Dorothy A. Muncy, A.I.P.

City Planner and Industrial Planning Consultant
Washington, D. C.

Industry's site standards have changed radically in the past decade. Land requirements have increased at a geometric rate. In the early postwar years, a ratio of three acres of land for one acre of building was thought spacious. Now a 10 to 1 ratio is not uncommon. Appearance of the surrounding area has become important. Until recently industry was resigned to "back of the track locations" in the slum end of town. Now management selects sites in neighborhoods that will not deteriorate into slums. Then, as a double insurance, the plan is encircled with acres of landscaping to protect the investment from the blight of future commercial or industrial neighbors. But least expected among the changes is the strong desire of many industries to be "up front," visible from the new highways and preferably one with controlled access. Thus added to transport economy are new advantages of a highway site—a prominent and protected location.

We cannot claim that the highway program will benefit equally all types of industry. Industries whose major cost is power, such as aluminum reduction, will continue to seek locations which provide cheap and plentiful power. Industries dependent upon the heavier forms of transportation—rail, water or air—will continue to rank these transport facilities above highways as location factors. Raw materials-oriented industries will continue to locate near the mines, the oil field, or the optimum point for cheap bulk transport. Thus for primary or heavy industries, the new highways will be of lesser significance as a location factor.

ADVANTAGES TO MARKET AND LABOR ORIENTED INDUSTRIES

For industries which are labor and market oriented, however, these new highways will allow considerable latitude in site selection. Because of the new highway program, we will see much sharper competition for

new industry among the towns within a region—and even between regions.

Transport and storage savings—Substantial savings in transport and storage costs are possible. Controlled access roads provide industry with a speed of transport never before known. And it is this speed that brings the economies. The critical factor in transport—of men or materials—is not distance, but time-distance.

Most obvious saving is lower transport costs because of fewer traffic delays. In recent years the cost of doing business in New York City has increased 4 to 5 per cent—as a result of traffic congestion on New York City streets.

Important savings in capital investment can be realized. Dependable fast transport shortens storage time between receipt of raw materials and shipment of finished goods. Less capital need be tied up in inventory—and less capital invested in land and storage buildings.

Wider labor source—Economies in labor cost and productivity can be achieved. The labor market area serving a plant will easily be quadrupled. These highways will be designed for 50 miles per hour in urban areas and 70 miles per hour in suburban and rural areas. A worker who now spends 30 minutes getting to work—driving 5 to 10 miles on crowded inadequate streets and highways—will consider traveling 25 miles to work if he can do it in the same half hour. Thus a 25- to 30-mile radius around the plant becomes a *reasonable* journey to work. Industries which can't find large enough sites inside cities, can move out into the country, with the assurance that their employees can quickly and safely drive to work. This widening of the area of employment opportunity is an advantage not only to management, but to labor as well.

Plant managers have become quite concerned about the dissipation of the worker's energy and disposition as he battles his way to work in the morning and home again at night. Controlled access highways can eliminate this journey-to-work tension.

Another management worry is the severe strain on community-plant relations resulting from the traffic jam that comes every day at the change of shift. Management is willing to pay its share to alleviate traffic congestion. For example, Ford Motor Company donated 7 acres to the New Jersey State Highway Department so that State Route 17 in front of their new assembly plant at Mahwah could be dualized and made into a controlled access highway.

Market area extended—Another major benefit is extension of the market area that can be economically served from one plant. Many

industries can obtain substantial economies from large-scale production. A single large plant located to serve several markets can often bring a much better return on capital investment than two small separate plants. Such industries will site future plants along interstate routes which link urban areas, for these will be the most economic locations to serve a multi-nucleated market.

INDUSTRIES SEEKING HIGHWAY SITES

What kind of industries seek highway sites? First, industries whose products must be familiar trade names to the average consumer. Medical suppliers and pharmaceutical concerns want the public to see their plants. They hope that the impression of attractive building and landscaped grounds will carry over in the public mind the immaculate environment inside such plants. Stuart Manufacturing Company, manufacturers of vitamins and other pharmaceuticals, built a new production plant in Pasadena, facing Route U. S. 66.

Food and beverage manufacturers benefit from locations passed daily by thousands of consumers. The National Biscuit Company located its new Philadelphia plant on Roosevelt Boulevard—a very heavily traveled route. The Carling Ale plant in Natick, Massachusetts, is on Route 9, a controlled access arterial road connecting Boston and Worcester. Carlings' new plant in Baltimore will be on the limited access circumferential now under construction.

Research laboratories seek prominent locations with three thoughts in mind: (1) prestige value in client relations; (2) stature in the community; and (3) equally important in these days of competitive recruiting of engineers and scientists—the laboratory serves as an advertising sign on the highway saying "Here is a pleasant, efficient, and prosperous place to work." Armstrong Cork's research laboratory on Highway U. S. 30 near Lancaster, Pennsylvania, is another typical example. Melpar, the electronics subsidiary of Westinghouse Airbrake, located their laboratory on U. S. 50 in Fairfax, Virginia, 18 miles outside Washington.

These plants had either free or partial access to the highway for they were constructed during the early 1950's when we had very little mileage on controlled access highways. Today, such plants would locate along limited access roads. Some groups representing small commercial interests are still actively opposing the controlled access feature of the interstate system. Their current argument is that control of access is a deterrent to industrial development. The recent record of industrial growth along limited access roads, however, disproves this criticism.

INDUSTRIES ALONG TOLL ROADS

Toll roads certainly present the most stringent conditions for industrial development: the economic factor of the toll and the great distances between interchanges. Yet in the last few years both the New Jersey Turnpike and the New York Thruway have experienced substantial new industrial growth immediately adjacent.

One of the largest new plants along the New Jersey Turnpike is that of Owens-Corning Fiber Glass in Barrington, New Jersey, near Camden. Cities Service Oil Company, which has the concession on the Turnpike, has erected a laboratory at Cranbury, New Jersey, so oriented as to make the maximum impression upon the passing motorist. Aluminum Company of America has erected a sign announcing their site for a new aluminum forge soon to be built facing the toll road. Phelps-Dodge has almost completed a new tube mill fronting the New Jersey Turnpike.

Several multi-million dollar plants have been built immediately adjacent to the New York Thruway. General Electric selected its site for Electronics Park from right-of-way plans, many years before the Thruway was completed. Ford Motor Company's new $20 million assembly plant at Mahwah, New Jersey, is within sight of the New York Thruway's Suffern Interchange.

Thus, despite the handicaps of a toll and the great distances between access points, industry seeks front sites with controlled access—even on toll roads.

INDUSTRIES ALONG CONTROLLED ACCESS FREEWAYS

There can be no mistaking the magnetic attraction of limited access freeways for new industrial plants.

Boston's Route 128—The limited access highway most often cited for industrial growth is the circumferential known as Route 128 which encircles metropolitan Boston, 10 miles from Boston harbor.

A recent survey of industrial growth along Route 128 was made for the Bureau of Public Roads, by Prof. A. J. Bone and Martin Wohl. Ninety-nine industries now located on or near Route 128 were interviewed. Half of these plants are distribution warehouses, one-third manufacturing facilities; the remainder, research and development laboratories or service industries. These plants plus some under construction represent an investment in land, buildings and equipment of $134 million, and provide more than 17,000 jobs.

One tract adjacent to Route 128 contributed only $5,000 in taxes as an abandoned gravel pit. In 1956, as a planned industrial park, this tract paid $160,000 in property taxes. The Chairman of the Board of Assessors for Needham, Massachusetts, reported that the tax rate would have been $6 higher without the new industry.

When asked about choice of sites, 82 per cent of the firms said they had considered locations in other suburbs of Boston before finally choosing a Route 128 site. The reasons most often mentioned for choosing the Route 128 location were:

1. *Employee accessibility*—savings in time or distance from home to work.
2. *Improved labor procurement and retention*—industry able to acquire and hold a labor force.
3. *Business accessibility*—ease of access for truck pick-up and delivery for salesmen, business and repair calls, and customer visits.
4. *Advertising value*—prestige derived from frequent viewing of attractive grounds and buildings.

Route 128 has given the metropolitan area of Boston a new focus for locating industrial plants, both large and small. By last count, Sylvania Electric has four plants along it, and refers to Route 128 as Sylvania Road. Other prominent names are American Can, Union Carbide & Carbon, Polaroid, and Singer Sewing Machine. This highway is like a show window, and the smaller firms are anxious to get their name, their plant, and their product into the showcase along with the better known industries.

Dallas Central Expressway—This attraction of limited access highway sites to industry is not just a phenomenon in one or two geographic sections of the country. The Dallas Central Expressway has had several new industrial and service plants built along the northern stretch. The Carrier Air Conditioning service depot is situated 7 miles north of the center of Dallas. Nearby, the Stewart Company, dealer for Ford farm equipment, built its headquarters. One architectural feature is the large mosaic panel on the wall facing the highway, an extra expense which the management of the firm evidently thought a worthwhile investment for the advertising value. Two miles to the north of these plants or 9 miles from the center of Dallas, Texas Instruments, an electronics firm now scattered in several buildings in Dallas, is constructing a manufacturing and development facility for its semiconductor division on 300 acres of land fronting on the Central Expressway. And 12 miles from Dallas, Collins Radio is constructing a research laboratory, set back but easily seen from this highway.

This next example is an answer to those who say "control of access will discourage industrial growth." Parke-Davis, a pharmaceutical manufacturer, placed such importance upon its site fronting on a limited access road, that its plant in Brockville, Ontario, was built and has been operating for several months with the rear facing an existing local road, and the front entrance oriented to a limited access bypass still in the grading stage.

Despite the critics of limited access, the trend of industry seeking "front sites" will continue and accelerate.

HIGHWAY ROUTING PROBLEMS

What measures then can be taken by highway engineers to insure beneficial industrial development? The location, efficiency, and attractiveness of future industrial sites are determined by you in the early stages of planning the new highway route.

Critical factors—There are four critical factors in route planning for industrial development: (1) Industrial sites must be *deep*. Distance between the new highway and other forms of transport is vital. (2) Land adjacent to new routes should be *level*. Gradient of industrial sites should be five per cent or under. (3) Routes should be through open land to create potential industrial sites. (4) Interchange locations and capacities should serve sites for future industry.

1. *Distance between highway and other transport routes is critical*—The distance between the new highway and other modes of industrial transportation will determine whether adjacent sites become prime industrial land or shallow tracts inadequate in dimensions for efficient industrial layout. This applies to railroads, to navigable bodies of water, to airports, and to existing roads.

a. *Railroad sites*—The prime industrial site served by rail and highway is situated *between* the highway and the railroad. Industry is too concerned with employee safety to willingly choose a location where workers must cross a railroad at grade to reach their place of work.

Considerable publicity has been directed recently to the subject of separating the new highway from the railroad. It is mentioned here because in my opinion the railroads, realtors, and other supporters have been too conservative in proposing minimum desirable distance. Industries requiring rail service need deep sites. Therefore, when topography permits a routing choice, a 2,000-2,500-foot depth will produce a good industrial site. This depth is essential for several reasons:

Production lines require deep as well as long tracts. Factories and large distribution warehouses which require rail have structures not less than 500 feet in depth, and more frequently over 1,000 feet. Length will vary from 700 feet to over 2,500 feet in large plants. The front setback, in order to be in scale with major building, is seldom less than 200 feet from the highway and usually more. This front yard is formally landscaped with a visitors' driveway and separate areas for executive and visitor parking. Additional front depth must be allowed for a frontage road.

Rear yards are deeper, because service buildings, open storage area, rail spurs, and truck loading docks and aprons are usually located here. Extra land held for future expansion is often at the rear of the site.

Thus, sites under 1,000 feet in depth would be too shallow for plants with heavy rail traffic; and even 1,500 feet depth might require more modifications of a site plan than would be acceptable to a major plant. Some service industries which require rail, such as building supply and lumber wholesalers, and concrete mix plants, could utilize shallow sites. However, it is reasonable to assume that these industries would not be interested in competing price-wise for prominent locations with commercial uses.

b. *Routes near navigable waters*—No community can afford to be profligate with land adjacent to a shipping channel. Large sites served by navigable water are becoming an exceedingly rare commodity at a time when the demand for such sites is increasing. New highway routes near navigable waters should be spaced not less than 2,000 feet and preferably twice as deep.

c. *Airport sites*—Airports should be served, not strangled, by highways. We are just beginning to see the development of industries adjacent to airports. The new highway routes should preserve rather than pre-empt future sites of airport-oriented industries.

A case in point is Westinghouse Air Arm and Electronics Divisions at Friendship Airport, Baltimore. The flight testing of military airborn electronic equipment required a site in immediate proximity to the airport. A site large enough to construct a laboratory and production and testing facilities was obtained. When the plant was expanded, however, the new buildings had to be built upon the existing parking lots. In order to provide adequate parking for the over 5,000 employees, new parking areas were provided on the opposite side of a public road fronting the plant. Needless to say, the pedestrian underpass which was built and the staggering of working

hours cannot eliminate the serious traffic congestion at the morning and afternoon change of shifts. Further expansion on this site is practically impossible.

d. *Distance from existing highways*—When a limited access highway is built close to an existing parallel highway, presumably the other facility can serve as the frontage road. However, if there are roadside developments, industry has lost the opportunity for an attractive *front* site. When a distance of 1,000 or more feet is planned between the new and old highway, then truck-oriented industry can plan its landscaped setting, face the front toward the controlled access road, and utilize the existing highway in the rear as an important route for dispersing its employee and truck traffic.

2. *Land adjacent to routes should be level*—To be readily available for industrial use, the topography of adjacent land should have a gradient, 5 per cent or under, with good load-bearing soil. All too frequently, local topography makes the 250- to 300-foot right-of-way for the highway difficult to obtain, not to mention another 1,000 to 2,000 feet of level land. Where there can be a choice of routes, the one providing level land suitable for industry will contribute most to the economic development of the area. Route choice cannot be predicated solely upon the immediate demand for industrial land. A *reserve* of industrial sites must be provided in advance to accommodate the potential economic growth which will result from the highway—just as the new highway must have a reserve capacity planned to meet the future traffic demand for the route.

3. *Routes through open land create future industrial sites*—Sometimes the demand for industrial sites comes quickly—just as the maximum vehicle capacity is often reached years before the estimated time. To illustrate, there is the decision between a choice of routes made a few years ago by the Massachusetts Department of Public Works. Route 28, an arterial connecting Boston to Manchester, New Hampshire, was to be relocated to by-pass the congested center of Lawrence, Massachusetts. A choice lay between two locations, an easterly route bordered by extensive swamp, and a westerly route with the only sizable tract in the area suitable for industry. The route with the industrial site was chosen.

Two years later, the foresight of the highway engineers and the local officials was fully justified. The industrial site they had created or saved was purchased by Sylvania Electric and Corning Glass for a joint multi-million dollar atomic research center. Two significant points in this case history—first, the community leaders and highway engineers had

studied the area carefully to identify industrial land that could logically be opened by the new highway. And second, both the highway engineers and the community recognized the industrial potential of a new highway long *before* an industrial firm came looking for a site.

Expressway routes which follow existing roads cannot provide much industrial land. Even on the outer fringes of the suburbs, existing routes usually have roadside commercial development. Also, land holdings are small and difficult to assemble because of premature or scattered real estate subdivision.

Expressway routes through built-up areas cannot create sites for future industry, except through the slow and costly process of urban redevelopment. The freeways of Los Angeles, passing through miles of built-up areas, have produced none of the adjacent industrial growth evident on most new expressways.

4. *Interchange location and capacity must be designed for future industry*—Finally, future interchanges at the largest potential industrial tracts must be planned in advance to accommodate the traffic to be generated at these sites. Even at today's industrial space standards a tract of 300-500 acres can readily employ 5,000 to 10,000 employees, either in one or two large plants, or in a group of smaller plants designed as a planned industrial district. New connecting roads must also be located at these sites as part of a comprehensive highway system.

JOINT ACTION NEEDED BY HIGHWAY ENGINEERS AND PLANNERS

This leads to my final point. If highway engineers can apply these criteria in their routing of future highways—and thereby create industrial sites—city planners have the obligation to *protect* such sites for future industry.

Two types of planning action will be needed: *First,* the sites must be zoned *exclusively* for industry, so that they will not be usurped by residential or commercial uses. *Second,* to protect the *capacity* of the highway, city planners, with the advice of highway engineers, must limit the density of industrial development. Planners can no longer zone a continuous belt of industry along the railroad—or propose an unbroken strip of industrial use on both sides of the new controlled access road. You couldn't begin to build the interchange capacity to serve an industrial concentration of such proportions. Besides, industry itself is trying to avoid large industrial agglomerations.

There must be planned dispersal of industry with land use controls to protect the new highways. The important planning criterion must be traffic capacity of the highway and its interchanges.