

The Economic and Environmental Effects of One-Way Streets in Residential Areas

JOHN KENNEDY and DENNIS HILL, Transportation Planning Division,
Michigan Department of State Highways

•THIS RESEARCH was undertaken to improve highway planning criteria and to obtain data for use in answering questions raised by concerned property owners regarding property values and environmental effects. Although much has been said about the effect of one-way streets on residential property values and environmental conditions, very little direct research is available. State and city traffic departments defend the one-way street as an economical and efficient method for relieving traffic congestion. Accident studies, travel time studies, and capacity studies support this position. Criticism and opposition come, however, from residential and commercial interests. The nature of public criticism concerns itself far more with property values, business trends, and environmental conditions than with the ability of one-way streets to move traffic.

To understand what is involved in determining the consequences of locating one-way streets in residential areas, we examined agricultural location theory, transportation and urban land use theory, and environmental preferences. Selection of a one-way system suitable for case study was an essential second requirement in order that theoretical observations could be compared with actual conditions. A third requirement was to obtain the reactions of residents living in the affected corridor. The final requirement was an attempt to interpret the results obtained from the theory and case study.

AGRICULTURAL LOCATION THEORY AND TRANSPORTATION AND URBAN LAND USE THEORY

Transportation has always had an important position in agricultural location theory. The capacity of land to yield profit has historically been related to transportation costs to markets. As the distance from the market increases, rents or profits for the agricultural enterprise decline. Although the enterprise may substitute other cost outlays, such as fertilizers, improved cultivation, and more efficient equipment to compensate for increased transportation costs as the distance to market increases, transportation facilities are still an important influence in determining profit and land value. This influence obviously applies to all land use but varies in degree according to use. A family might live quite satisfactorily, for example, in a residence 20 miles from a city, but it might be very difficult to competitively operate a drug store at this distance.

The Alonso theory (1) of the land market has special significance with respect to residential land values and highway transportation improvements. In summary, this theory indicates that persons deciding on home locations in the land market attempt equilibrium between what they can spend for space for housing and what they can spend for all other commodities. Satisfaction from housing space and accessibility result jointly from the location decision. Land in central locations produces higher rent in relation to transportation costs and convenience. This is where access to opportunities is greatest.

For the homeowner, the process of locating in the urban land market is basically a matter of relating his own personal economy to the external economy of the city in the

most profitable manner—to obtain housing space and locate so as to maximize net returns or satisfactions. It does not seem that a prospective homeowner would be maximizing net satisfactions by purchasing housing next to a heavily traveled one-way street. From an environmental viewpoint, this is not consistent with what we normally think of as the ideal residential environment. On the other hand, this location could have superior accessibility and advertising advantages for more intensive usage. Quite possibly, then, implementation of a one-way system could cause an increase in residential property values and at the same time cause a decline in environmental conditions.

In the foregoing, the primary emphasis has been on the economic determinants of land use and property values. Other influences in the traditional noneconomic sense also have a very important role in determining the use and demand for land. Results of many sociologically oriented studies seriously question land use and value theories relying heavily on transportation-oriented economic determinants.

FACTORS IMPORTANT IN ENVIRONMENTAL SELECTION

In most sociological studies of residential neighborhoods and residential mobility, researchers have investigated the various likes and dislikes that residents have about their particular residential area to obtain environmental preferences. These preferences are then correlated with various socioeconomic indexes to obtain preferences for different types of residents and how these may change over time. The results of these studies help define what influences contribute to environmental dissatisfaction and what consequences of a transportation improvement in a residential area might be. Pertinent findings of some of these studies, particularly those factors important in housing and neighborhood selection, are as follows:

1. Social considerations are important in the location choice of a home and neighborhood.
2. Noise is the most frequently mentioned dislike in neighborhood areas most intensively developed.
3. The importance of neighborhood appearance, education, and open space considerations increases with income.
4. Sixty percent of all respondents moving had looked at a home in another location before deciding, indicating environmental "shopping."
5. In deciding on a home location, people in almost all income brackets consider social and aesthetic factors more important than convenience of location.
6. A location well out from the center of a metropolitan area is the predominant preference. This preference is based on the dislike for noise, crowding, and confusion and a desire for space for spare-time activities.

Although there are many aspects of the results from these studies, a very basic concern to the study is the effects of one-way streets in residential areas. The results presented reveal that a positive economic effect of a transportation improvement in a residential area based on a land value or use theory that places emphasis on transportation cost and convenience may be inaccurate. One-way conversion also causes undesirable environmental influences such as pollution, dirt, noise, and potential safety hazards that may affect the demand for land and the price. This is shown by the importance placed on social considerations in home selection, desire for quietness, the appearance of the neighborhood, and the dislike for influences that cause crowding and confusion. There is little doubt that, if conditions were severe enough, such as high traffic volumes and dwellings situated close to the street, the livability of the home environment would decline. The effect on residential property values is, however, more difficult to assess because the locational and advertising advantages can enter into the situation.

A one-way conversion could cause an increase in property values and at the same time cause a decline in environmental conditions. According to land use and transportation theory, a transportation environment such as a one-way conversion could, through increased advertising and locational advantages, tend to increase residential property values by creating the situation whereby change toward more intensive usage could occur. The previous presentation has also suggested that a housing market that limits

environmental choice and a one-way conversion that involves heavy traffic volumes will quite probably cause environmental conditions to decline as a result of the adverse effects of the improvement. This is a situation where public criticism or dissatisfaction would probably arise despite no loss to residential property values. This possibility becomes more obvious when consideration is given to the fact that people often do not move when it is possible but wait and speculate for the best sale.

RESULTS OF CASE STUDY

The study of the one-way system chosen served primarily as a pilot study to compare actual trends with theory, to refine measurement techniques, and to improve understanding for future highway planning decisions. The available indicators employed to reveal the economic effects included residential property value trends, property listing trends, zoning changes, and trends in the urban area economy and housing market. Personal interviews were conducted on a sample basis to allow comparison of attitudes between residents living adjacent to the one-way pairs and those living in the study corridor but removed from the one-way pairs. The method used to determine the effect of the one-way conversions on residential property values was to compare market value sales trends in a one-way corridor about 3 miles in length with control areas that paralleled the system. Selection of the study and control areas was important in making comparisons because the location of the boundary could affect the rate of value change. The first analysis area, study area 1, included sales occurring between the one-way pairs but not adjacent to them. The second analysis area, study area 2, included all sales occurring adjacent to the one-way pairs. A control area was selected outside and parallel to the one-way system because of similar housing qualities.

Implementing the one-way system involved converting a low-traffic-volume residential street and a parallel high-traffic-volume state highway to one-way operation. Distance between the one-way pairs varied from 1 to 2 blocks. Three separate construction stages were involved in the analysis. The before-and-after comparison periods for stage 1, stage 2, and stage 3 were 5 years and 6 months, 5 years and 3 months, and 3 years and 1 month respectively. The results of the 3 stage comparisons combined, given in Table 1, revealed that residential property values in study area 1 declined 7.54 percent; in study area 2, 2.20 percent; and in the control area, 4.16 percent. The urban area values increased 3.92 percent.

These comparisons indicate that, on the whole, the one-way conversions served to stabilize residential property values. The negative rates of change are, however, misleading. These are caused by inflation adjustments and partly by stage 1, which was converted during an economic recession. Separation of the low-traffic-volume residential street property sales from the high-traffic-volume state highway property sales for stages 2 and 3 provided more interesting insight. This comparison revealed that residential property values on the low-traffic-volume residential street converted to one-way operation increased 14.7 percent and those on the state highway decreased 10.2 percent.

Increases in residential property values on the converted residential street, in conjunction with the greatly increased traffic volumes that were transferred from the state

TABLE 1
RESIDENTIAL PROPERTY SALES AND VALUES
BEFORE AND AFTER ONE-WAY CONVERSION

Location	Before		After		Percent Change
	No. of Sales	Value	No. of Sales	Value	
Study area 1	95	\$13,306	106	\$12,303	-7.54
Study area 2	57	13,079	53	12,791	-2.20
Control area	213	11,976	204	11,478	-4.16
Urban area	12,696	16,051	15,570	16,681	+3.92

highway, suggest that values appreciated as a result of the increased locational and advertising advantages and as a result of speculation. As suspected, traffic volumes appeared to have an important role in determining these trends. It is significant that the value increase did not directly involve changes toward more intensive land usage. Although changes toward higher use did occur, the market value comparisons involved only single-family land use. The value increase is not easily attributed to an improved environment, based on what is normally considered a desirable residential living environment. Interestingly, the values declined on the state highway where congestion was relieved and access, in terms of capacity, improved. This would seem to further suggest that traffic volumes are important influences in property value trends. There were no unusual selling or buying attempts by residents in study areas 1 and 2.

The results of the attitude questionnaire revealed that the greatest degree of environmental dissatisfaction existed with those residents whose homes were adjacent to the one-way pairs. The most frequently mentioned dislikes were traffic noise, dust, and exhaust fumes. This attitude or feeling diminished in study area 1, which was at least one residential lot removed from the one-way pairs. Although not all residents expressed environmental dissatisfaction with the one-way system, the majority living next to the one-way pairs did. The response to the question concerning the influence of the conversions on the pleasantness of the neighborhood was directly related to traffic volumes. A much higher percentage of respondents living adjacent to the converted residential street responded that the neighborhood was less pleasant. This response was consistent with our theory that property values could increase as a result of locational and advertising advantages while environmental conditions could decline.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Speculation and advertising potential, in conjunction with traffic volumes, had the greatest influence on property value change. Despite adverse environmental impact of increased traffic noise, dust, and exhaust fumes, as reported by respondents living adjacent to the converted one-way residential street, property values increased substantially. Residential property values declined on the state highway that formerly carried practically all traffic. Although a higher percentage of respondents on this street than on the converted residential street responded that the neighborhood was more pleasant because of reduced traffic, a significant number felt the area was less pleasant.

There was no indication of adverse economic influence on business activity within the one-way corridor. The number of business failures was reduced after one-way conversion. Location of new commercial uses in the corridor also indicated positive effects or at least no adverse influence. It was apparent from a field survey, however, that much of the new land use was of the kind that tends to rely on advertising.

It would be unfair to evaluate the benefits and costs of the one-way conversions on the basis of the economic and environmental effects the conversions had on residents in the one-way corridor and to disregard the benefit accruing to the thousands of motorists using the system. It would also be unfair to substitute motorist benefit for compensation of adverse effect on residents in the corridor. This approach to the problem would yield little improvement in public acceptance. Preservation of human values and maintenance of more satisfactory living environments must become more definitive in planning and engineering of public works programs if environmental deterioration is to be arrested, or at least reduced, and the programs are to be satisfactory to the public. Improved highway locational criteria would do much to accomplish this goal. Certainly much could also be done to minimize or eliminate adverse economic and environmental effects through improved highway design.

Where transportation improvements are necessary, the consequences resulting from the alternatives available should be taken into account in the planning process to arrive at the best decision and to achieve maximum public acceptance. This process should include an evaluation of (a) the condition of the urban economy and housing market in order that the alternatives could be more accurately assessed; (b) the basic predominant socioeconomic characteristics of affected residents such as their age, family status, and social values; (c) the impact on local planning programs and overall development; (d) the

environmental impact of heavy traffic generated by the alternative; and (e) the probable land use and value impact of the alternative. These evaluations should result in a set of more meaningful criteria on which highway planning decisions could be based.

REFERENCE

1. Alonso, William. Location and Land Use—Toward a General Theory of Land Rent. Harvard Univ. Press, Cambridge, Mass., 1964.