# COMMUNITY REACTIONS TO ANTICIPATED HIGHWAYS: FEARS AND ACTUAL EFFECTS

Jon E. Burkhardt, RMC Research Corporation, Bethesda, Maryland

This paper reports a study to evaluate the hypothesis that residents and businessmen within a highway corridor see themselves as victims of adverse effects of highway improvements and that these fearful expectations themselves lead to adverse effects even before the final route selection. The study was designed to identify actual changes, identify preconceptions of residents and businessmen, distinguish between effects resulting solely from the preconceptions and those that would have occurred anyway, and develop procedures to alleviate the unnecessary concerns of residents and businessmen and to ease the strain of transition. Through regression analyses of time-series data, it was found that adverse community effects can be and are being avoided where efforts have been made to inform the community and to create highway plans that minimize disruption and enhance local benefits. But a substantial amount of fear is still evident, according to the results of in-depth face-to-face interviews. Actual adverse changes would probably be minimal in the communities studied (which are not representative of all communities), and persons who witnessed changes in their neighborhood caused by highway improvements reported that they experienced more benefits than expected. To offset unwarranted expectations, highway departments should take a much more active role in information dissemination and community interaction.

•ADVERSE changes have been observed in some communities between the time a major public works improvement—such as a highway or an urban renewal project—is tentatively announced and the time plans for its execution and impact are complete. Specific adverse effects that are alleged to occur include the flight of families and businesses from the neighborhood, the loss of business and jobs, the failure of some owners to maintain their properties, the loss of property values and rental income, an inability to sell properties, a breakdown in the social order, and a general deterioration in the physical and social tone of the area. Some observers feel that such changes have been induced or accelerated by the mere expectation that the community will change for the worse when, in fact, the community would not have been adversely affected (or not affected so badly) had not people been reacting to the anticipated adverse changes. In other words, the fear of certain events occurring is said to have led, in and of itself, to the occurrence of those events.

This study shows that adverse community effects can be and are being avoided where efforts have been made to inform and involve the community and to create highway plans that minimize disruption and enhance local benefits. But a substantial amount of fear is still evident even in these areas. Residents and businessmen expected substantial negative effects and minimal benefits from the highway improvement process and were strongly opposed to the change, in spite of the fact that realized adverse changes would probably be minimal in the communities studied (which are not representative of all communities). To offset these adverse expectations, highway departments should take a much more active role in information dissemination and community interaction. A

Publication of this paper sponsored by Committee on Social, Economic and Environmental Factors of Transportation.

vigorous information and 2-way communications program could allay a substantial portion of the fears and frustrations now felt by persons within a proposed highway corridor.

## DESCRIPTION OF THE RESEARCH PROJECT

### Research Objectives

The objectives of this study were as follows:

1. To determine community changes during "the period of anticipation", that time between the announcement that the community in question is part of a highway corridor and the actual selection of a final route for the highway;
2. To determine which of those changes could be attributed to exaggerated fears of possible highway-related effects by local residents and businessmen; and
3. To design methods to alleviate the effects of fear and uncertainty in the highway planning process, if necessary.

### Research Scope

Highway projects in various stages of planning, construction, and operation across the country were examined. The analysis was restricted to projects representing the best planning practices currently available to see if substantial changes were required in those practices presently thought to be most responsive to community feelings.

Visits were made to 4 cities—Chicago, Sacramento, Los Angeles, and San Francisco—to study neighborhoods in various stages of the highway planning process. Data on neighborhood changes occurring prior to route adoption were collected in 16 neighborhoods in these cities. In 5 of these neighborhoods, systematic samples of residents and businessmen were asked their perceptions of the highway planning process. The 5 chosen were selected so as to provide variations in (a) personal and neighborhood characteristics (income, race and ethnicity, and apparent community cohesiveness), (b) the highway planning process (number of alternative routes, types of information provided to the community), and (c) stage in the highway planning process (3 neighborhoods, called the "before" group, were awaiting route adoption, and in the other 2, called the "after" group, highways had been recently opened to traffic; the expectations of the "before" group were compared with changes perceived by residents and businessmen now in the "after" neighborhoods). Table 1 summarizes the interviews conducted by type and location.

### Conceptual Framework

Our problem is to separate what will happen anyway from what happens because it is expected to happen. To do this, we must consider (a) the highway decision sequence, (b) the community response sequence, and (c) community change factors. These factors are described in Figure 1. One way of stating the interaction of these factors is as follows: How will the process of highway construction (planning through implementation) alter the ongoing processes of community change (physical, economic, and social)? How much of the alteration is due to the highway itself and how much is due to the community's fears or expectations of changes?

Although the highway decision sequence and the community change factors are not complex from the aspects of theory or measurement, the community response sequence is difficult to conceptualize and measure. We are dealing with a situation in which a group of individual decision-makers must react to an uncertain future. To describe behavior in this case, we developed a model of behavior that focuses on the individual but also considers how his perceptions and reactions influence (and are influenced by) the perceptions and reactions of others. The components of this model are the following:

1. "Reality"--the actual highway situation;
2. The individual's perception of this reality;
3. The possible consequences the individual expects;
4. The probabilities that the consequences expected will actually come to pass;

5. The utility that the individual attaches to a particular consequence;
6. The individual's level of anxiety in light of the 3 previous factors;
7. His actions resulting from this anxiety; and
8. The effects of his actions on the reality factors and on the perceptions, expectations, and anxiety of others (1).

The major elements of this model are the individual's expectations and his actions in light of those expectations. In effect, what we are describing is decision-making under uncertainty as individuals react to their perceptions of their inclusion within the highway corridor. These reactions differ significantly among different individuals and in relation to the uncertainty of the exact nature of the highway improvements. A useful way to express these differences is through game theory as a non-zero sum game, a "game against nature." We feel that people generally do not consciously act in as rational or structured a fashion as the game theory model implies, but this model does provide a useful conceptual structure (2).

There are four possible procedures for decision-making under uncertainty (games against nature):

1. Minimax, i.e., deciding to minimize the loss that one could incur under the worst possible circumstances;
2. Estimating the subjective probabilities of the occurrence of particular events and finding the maximum expected payoff (or minimum expected loss);
3. Applying pure pessimism, i.e., the worst is bound to happen; or
4. Applying pure optimism, i.e., the best is bound to happen.

The only truly rational procedure is the second—decision-making based on expected payoffs. Each of the expected events ($E_1$, $E_2$) has an associated probability of occurrence ($\psi_1$, $\psi_2$). Each of the expected events also has certain subjective utilities that represent the positive (gain) and negative (cost) values to the person. We can theoretically define the subjective expected value of an anticipated event to be the product of its conditional probability of occurring and its utility.

No particular event is certain; there is always an element of risk. The individual can choose from several strategies or possible reactions ($S_1$, $S_2$) to deal with this risk. There will be a certain utility or disutility to the individual associated with each combination of event and strategy—a with $E_1$ and $S_1$, b with $E_2$ and $S_1$, etc. The expected payoff of a particular strategy is then the sum for all possible events of the probability of each event times the utility of each event. The individual should choose the strategy that maximizes his expected payoff, as shown in Table 2.

The most significant events in this study are whether or not the highway will actually affect an individual in the highway corridor. In the case of a homeowner, possible effects include displacement, significant alterations to the area immediately around the person's home, or no change in the area. Major strategies for the individual are moving and staying at the present location. If the individual stays, another strategic decision must be made about home repairs: Will the house get fixed when something goes wrong, or will repairs and alterations be postponed until after the location of the highway is certain?

We can now proceed to determine which community changes are caused by fear alone. The first step is to determine the expectations of community members with respect to highway-induced changes. Are these expected changes likely to occur? If they are not, then anyone who acts on the basis of these expectations is misinformed and can be said to be acting out of fear. If the expected changes are likely to occur, then we must look at the reactions to these expectations. Are they rational? If not, then this qualifies as another fear situation. What steps could highway departments take to alleviate these fears? On the other hand, if both the expectations and reactions are rational, what changes in highway planning practice are required to eliminate or alleviate adverse community consequences?

**Table 1. Sites for in-depth survey data.**

| Item | Planning Stage | | | | |
|---|---|---|---|---|---|
| | Before | | | After | |
| Metropolitan area | Chicago | Chicago | Los Angeles | Los Angeles | Sacramento |
| Neighborhood | Chicago Lawn | Englewood | La Habra | Glendale | Del Paso Heights |
| Characteristics | | | | | |
| Income | Middle | Low | Middle and low | Middle | Low |
| Ethnicity | White—Polish and Lithuanian | Black | White and Mexican-American | White | Mixed |
| Interviews | | | | | |
| Household | 68 | 68 | 69 | 68 | 69 |
| Business | 13 | 11 | 12 | 12 | 11 |
| Total interviews | 81 | 79 | 81 | 80 | 80 |

**Figure 1. Major conceptual issues and relationships.**

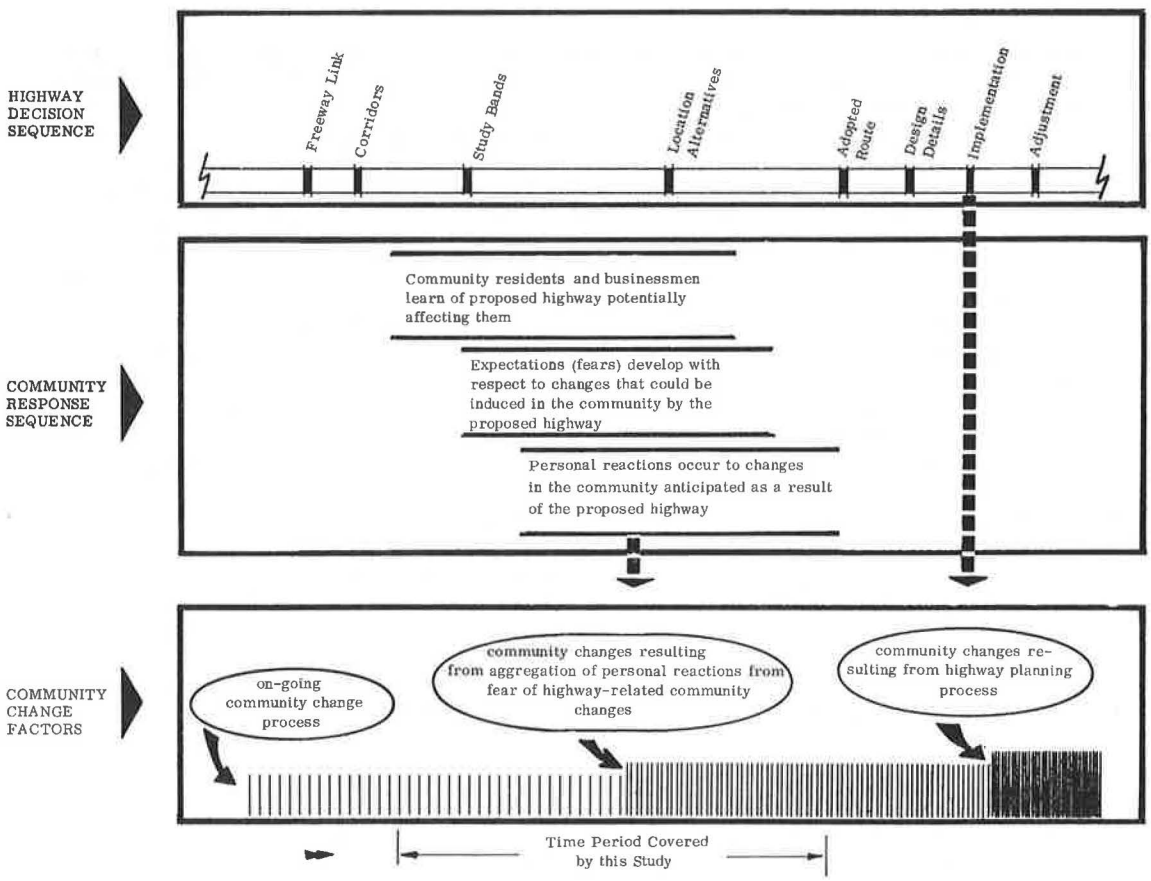


**Table 2. Expected payoff matrix.**

| Strategies for Action | Expected Events | | | | Expected Payoff of Each Strategy |
|---|---|---|---|---|---|
| | $E_1$ | | $E_2$ | | |
| | Probability of Event | Utility of Event | Probability of Event | Utility of Event | |
| $S_1$ | $\psi_1$ | a | $\psi_2$ | b | $\psi_1$ a + $\psi_2$ b |
| $S_2$ | $\psi_1$ | c | $\psi_2$ | d | $\psi_1$ c + $\psi_2$ d |

## COMMUNITY RESPONSE TO PLANNED HIGHWAY IMPROVEMENTS

Analysis of our survey of 5 neighborhoods—3 in which the final highway route is yet to be selected and 2 in which the highway has been constructed and has recently opened to traffic—yielded a great amount of detail about the ways in which people respond to anticipated highways in or near their neighborhood. In order to understand the behavior of residents and businessmen with respect to planned highway improvements, the following factors were examined:

1. The actual highway situation,
2. The consequences that the individual expects for himself as a result of his perception of the highway situation,
3. His level of anxiety as a result of these expected consequences, and
4. The actions that he takes.

The actual highway situation is discussed in the following section, after the discussion of our survey results.

### Expectations

Overall Expectations and Attitudes—Most people living in the neighborhoods surveyed where a highway was planned but the final route had not yet been selected were unfavorable to the prospect of a highway being built there. Persons expecting negative effects outnumbered persons expecting benefits 3.5 to 1 overall, ranging from 2 to 1 in one neighborhood to 7 to 1 in another. The major expectations among residents were greater noise (32 percent), greater pollution (25 percent), dislocation of self (22 per cent), loss in property value (18 percent), increased accessibility (other than to work) (12 percent), and change in the physical character of the neighborhood (11 percent). Major concerns of businessmen included a reduction in the number of their customers and the economic costs of dislocation and relocation. The impact on the community from each of these expected effects was usually anticipated to be great.

Factors Influencing Expectations—Race had a stronger influence on the kinds of effects anticipated than did any other community characteristic. Blacks were more concerned about possible dislocation, higher property taxes, changes in local street patterns, and the safety of children than with other possible community effects. Whites were more concerned about pollution and changes in the physical and social character of the neighborhood (often a euphemism for a racial and ethnic homogeneity—especially, no blacks) than with other effects. Blacks and whites generally shared the same concerns but attached differing priorities to these concerns.

The length of time a person knew of the highway plans was also significant. Those who had known of the highway plans the longest had more expectations (both positive and negative) and a higher proportion of negative expectations than persons who had not known as long.

Persons owning autos were more favorable than those who did not. Auto-owners foresaw more benefits and fewer negative effects than did non-auto-owners.

### Anxiety

Persons who feel strongly about an issue (in this case, those who are strongly threatened by the planned highway improvement) are more likely to react than are those people whose feelings are not so strong. Persons who were extremely unfavorable to the highway were likely to fear that the planned highway would cause the following effects in their neighborhood: a change in social character, a downgrading of the neighborhood appearance, a change in physical character, greater pollution, and loss in property value. These persons were also likely to (a) have lived a long time in the neighborhood, (b) be committed to staying in the neighborhood, (c) have an annual income under $10,000 [these findings confirm the results of other studies (3-8)], and (d) have gotten their information concerning the planned highway from TV or radio.

### Reactions

Few people considered overt action or actually acted. (It must be remembered that our sample did not include persons who had recently moved from the neighborhood but only those who were still there.) More people considered signing petitions than any other alternative. Persons who considered acting were more likely to have lived longer in the neighborhood as well as to have higher incomes and younger children. Of all the possible actions, more people postponed improvements to their property than any other action. Persons actually acting were more likely to be white, extremely unfavorable toward the highway, and expecting changes in physical and social character of the neighborhood and losses in property value. Those persons who did not act generally did not know how to persuade highway departments to listen to and understand their feelings and did not feel that their opinions or actions would make any difference to the highway planners.

## ACTUAL NEIGHBORHOOD CHANGES

This study found that actual neighborhood changes were much smaller than they were expected to be by local residents and businessmen in the kinds of areas studied—that is, where efforts have been made to inform and involve the community and to create highway plans that minimize disruption and enhance local benefits. (Where such steps have not been taken, adverse community effects are much more likely to occur.) This conclusion is derived from comparisons of the expectations of persons in or near a planned highway corridor (the "before" group) with the community changes perceived by persons who have had a highway built in or near their neighborhood (the "after" group) and with the measurable community changes during the period of anticipation.

### Perceived Changes Versus Expectations

Effects Anticipated—Persons who actually witnessed changes in their neighborhood caused by highway improvements reported that they experienced more benefits than expected. Only half of these realizing increased accessibility in general and relieved traffic congestion had expected these effects, while only two-thirds of those experiencing greater accessibility to work expected it. Conversely, many fears, including those of dislocation and loss in property value, proved to be exaggerated.

The differences between those in the "before" and "after" groups are even more striking. While 51 percent of the respondents in the "after" group have experienced increased accessibility, only 15 percent of those in the "before" group expect to benefit in this respect. Of the respondents in the "after" group, 18 percent feel that they have benefited from increased accessibility to a place of employment, while only 11 percent of those in the "before" group expect this benefit. The percentages of respondents benefiting from and expecting relieved traffic congestion are 24 and 8 respectively. A greater discrepancy is found between the benefits expected by businessmen and those actually experienced. For example, only 3 percent of the businessmen in the "before" group expect to benefit from increased customer accessibility, while 48 percent of those in the "after" group feel that they have experienced this benefit. None of the businessmen in the "before" group expects to benefit from increased supplier accessibility, while 17 percent of those in the "after" group feel that such an increase has occurred.

Negative effects were more often expected than realized; that is, the percentage of residents in the "before" group anticipating negative effects was almost always greater than the percentage in the "after" group who felt that negative effects had occurred. For example, 29 percent of the "before" group respondents expected to experience greater pollution. However, only 10 percent of those in the "after" group reported believing that such an increase actually occurred. The percentages of those expecting and experiencing increased noise were 45 and 14 respectively. While 28 percent of the respondents in the "before" group expected a decrease in property values, none of those in the "after" group still living in the neighborhood felt that such a decrease occurred. Although 40 percent of the respondents in the "before" group feared dislocation,

only 4 percent of those in the "after" group reported having been dislocated. The last comparison is undoubtedly exaggerated, given the fact that only those who were dislocated and remained in the neighborhood were included in the "after" sample.

Comparisons of businessmen expecting and experiencing negative effects reveal similar discrepancies in most cases. For example, while 42 percent of the businessmen in the "before" group expected a reduction in number of customers once the highway has been constructed, only 13 percent of those in the "after" group believed that such a reduction had occurred. While 31 of the respondents in the "before" group expected a decrease in customer accessibility, such a decrease was not mentioned by any of those in the "after" group.

Change in Anxiety—Comparison of the "before" and "after" groups shows a very significant decrease in anxiety over time. Residents and businessmen in neighborhoods where the highway route has yet to be adopted were, for the most part, extremely unfavorable to the prospect of highway construction. But over 70 percent of the persons in neighborhoods where highways have been constructed and opened to traffic reported that they are now favorable with respect to the highway. These people reported that they became more favorable after the highway was built than they were before construction.

Although it cannot be conclusively proved at this time, it appears quite possible that initial negative feelings toward the prospect of a highway coming through or near one's neighborhood do change over time to the point that overall feelings are positive after the highway is in use. The greatest factor in this change is the unanticipated increase in accessibility to other parts of the metropolitan area. Obviously, this kind of benefit is not available to those persons who do not own a car or who do not have convenient access to the highway. Therefore, one cannot expect this positive shift in feeling in all neighborhoods.

## Measurable Neighborhood Changes

U.S. Census data, city directories, multiple listing services, city planning departments, previous research, and other sources were used to document whether or not significant changes in community characteristics occurred during the period of anticipation. Characteristics receiving intensive analysis were land and property values, vacancy rates, and owner/renter ratios.

Land and Property Values—Previous research indicates that highway impacts on property values have varied from case to case and that it is possible (although not probable) that the impact will be negative (9-14). Therefore, fears of decreased property values have sometimes been justified. In this project, analyses of properties in Chicago and Sacramento could not uncover land value changes attributable to the influence of proposed highway improvements. An intensive analysis of residential property transactions was also performed in La Habra, California. Regression analysis disclosed that planned highway improvements did not affect (a) whether or not a particular property was sold, (b) the length of time it took to sell the property, or (c) the difference between the initial asking price and the final sales price in La Habra. A brief look at other cities confirmed the hypothesis that, while anticipated highways usually do not have a negative impact on land and property values, a reduction in land and property values has occurred in some cases.

Vacancy Rates—The possibility of highway construction has been said to increase the number of vacancies in the highway corridor during the period of anticipation. Analysis of residential vacancies (homes and apartments) in Glendale, California, during the period of anticipation of Route 134 there did not indicate any relationship between anticipation of the highway and vacancy rates.

Owner/Renter Ratios—Analysis of 2 Chicago neighborhoods within the highway corridor of the proposed Crosstown Expressway indicated small declines in the percent of owner-occupied dwelling units, while the total housing stock remained approximately constant from the 1960 to 1970 census. These declines were not directly attributable to the highway plans. Analysis of owner/renter ratios before and after highway construction in Glendale indicated that the highway was partially responsible for an in-

crease in residential densities (due to construction of high-rise apartment buildings) that significantly decreased the percent of owner-occupied dwelling units in the study area. This change occurred after the highway opened to traffic, not during the period of anticipation.

### Summary of Actual Neighborhood Changes

Businessmen and residents expect their neighborhoods to change substantially because of anticipated highways. In the cities studied, measurable neighborhood changes did not occur—during the period of anticipation—in land and property values or vacancy rates, and the slight changes in owner/renter ratios could not be directly attributed to the highway. In short, businessmen and residents within the highway corridors studied did not react to anticipated highways in ways that contributed to neighborhood deterioration during the period of anticipation.

## CONCLUSIONS CONCERNING ANTICIPATED EFFECTS

The following conclusions (applicable only to areas of good highway planning practices) were derived from analyzing the differences between (a) the perconceptions of residents and businessmen within the highway corridor with respect to highway-related community changes and (b) actual community changes during the period of anticipation:

1. Negative effects of the anticipated highway improvements are substantially overestimated and benefits are underestimated by residents and businessmen within the highway corridor.
2. Overall feelings can change from extremely unfavorable before final route selection to favorable after the highway is opened to traffic.
3. Most persons reported that they were not acting or planning to act, many of them because they did not know what to do or because they felt that their actions would have no effect.
4. Actual changes in the neighborhood—physical, economic, or social—were very small, if they occurred at all, during the period of anticipation.

These conclusions clearly indicate that unnecessary fears do exist among the residents and businessmen within the highway corridor and that these fears can be substantially reduced by an active information and communications program by the local highway department. The communications flow must be two ways: The highway department should obtain significantly more information from the community as well as providing more information to those within the highway corridor.

The following concepts of persuasive communication (15-17) are particularly relevant to the highway planner:

1. The audience will resist change.
2. The credibility of the source is crucial.
3. The inclusion of both sides of the argument is essential.
4. Local "opinion leaders" are usually the most effective source of communication within the community.

If the highway planner understands these concepts, the probability that residents and businessmen will accept facts communicated by the highway department will be significantly enhanced. The fears evidenced by persons within the highway corridor can thus be substantially reduced.

## METHODS OF REDUCING UNNECESSARY FEARS

With the foregoing considerations in mind, 4 techniques are proposed to increase communications between individuals and the highway department and thus allay the unnecessary fears that are now associated with anticipated highways. These techniques are as follows:

1. A mass mailing of a basic factual pamphlet;
2. Appearances of a "resource person" before community groups;

3. Creating a telephone information service run by the highway department for answering detailed questions from members of the community or other interested parties; and
4. Establishment of a committee within the highway department to receive complaints and consider community reactions to anticipated highways.

These techniques will increase the information flow to the community, increase the credibility of that information, increase the information flow from the community to the highway department, and substantially reduce uncertainty and fear among members of the community. Specific fears that should be assuaged by an action program designed to prevent their occurrence are increased noise, loss of property value, and changes in the physical and social characteristics of neighborhoods.

## CONCLUSION

A much more active role by highway departments is required in information dissemination and community interaction. The current practice of most highway departments is to maintain a low profile and to avoid giving out information concerning highway plans. This practice is distinctly counterproductive because the uncertainty promoted by such actions heightens fears that people naturally feel in the face of proposed changes in their surroundings.

Because residents and businessmen tend to substantially understate the probable benefits and overstate the possible negative effects from highway improvements, a vigorous information and two-way communications program between highway departments and the community (residents and businessmen) could allay a substantial portion of the fears now felt by persons within a proposed highway corridor and alleviate the frustration often evident. This information program will not significantly alter the ongoing processes of community change, since few of these changes are directly related to the highway. However, reduction of fear for those persons is a worthy accomplishment by itself and should be pursued vigorously by state and local highway departments.

## ACKNOWLEDGMENT

The research reported in this paper is a portion of a study conducted for the Office of Program and Policy Planning of the Federal Highway Administration. The opinions, findings, and conclusions expressed in this paper are those of the author and not necessarily those of the Administration.

## REFERENCES

1. Burkhardt, Jon E., and Chinlund, Nancy L. Anticipation of the Effects of an Urban Highway Improvement on the Highway Corridor, Vol. 2. Resource Management Corp., Dec. 1971.
2. Singh, J. Great Ideas of Operations Research. Dover Publications, 1968, Chapter 5, pp. 103-131.
3. Kemp, Barbara H. Social Impact of a Highway on an Urban Community. Highway Research Record 75, 1965, pp. 92-102.
4. Community Services and Family Relocation. District of Columbia Redevelopment Land Agency, April 1964.
5. Bishop, Bruce A., Oglesby, C. H., and Willeke, Gene E. Socio-Economic Community Factors in Planning Urban Freeways. Stanford Univ., Rept. EEP-33, Oct. 1969.
6. Key, William. When People Are Forced to Move. Topeka, 1967.
7. Smart, Walter L. Relocation Problems Viewed From the Affected Citizens' Point of View. HRB Spec. Rept. 110, 1970, pp. 30-32.
8. Thurz, Daniel. Where Are They Now? Health and Welfare Council of the National Capital Area, 1966.
9. Colony, David C. Estimating Traffic Noise Levels and Acceptability for Freeway Design. Highway Research Abstracts, Vol. 39, No. 12, Dec. 1969, p. 50.

10. Hess, Rudolf. The Influence of Modern Transportation on Value—Freeways. Assessor's Journal, Vol. 1, No. 1, Dec. 1965.
11. Hill, Stuart L. Glendale Report. California Land Economic Studies, California Highway Transportation Agency.
12. Miller, Stanley F., Jr. Effects of Proposed Highway Improvements on Property Values. NCHRP Rept. 114, 1971.
13. Downs, Anthony. Urban Problems and Prospects. Markham Publishing Co., Chicago, 1971, Chapter 9, pp. 228-250.
14. Burkhardt, Jon E., Lago, A. M., et al. Highway Improvement as a Factor in Neighborhood Change: Vol. 1, Physical and Economic Measures of Neighborhood Change. RMC Rept. UR-128, March 1971, pp. C-3 to C-9.
15. Mosel, James N. Ten Steps to Help You Sell. Nation's Business, April 1956.
16. Hovland, C., Janis, I., and Kelley, H. Communication and Persuasion. Yale Univ. Press, 1953.
17. Hovland, C., Lumsdaine, A., and Sheffield, F. Experiments in Mass Communications, Chapters 3 and 7.