

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM  
SYNTHESIS OF HIGHWAY PRACTICE

**71**

# **DIRECTION FINDING FROM ARTERIALS TO DESTINATIONS**

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## **DIRECTION FINDING FROM ARTERIALS TO DESTINATIONS**

RESEARCH SPONSORED BY THE AMERICAN  
ASSOCIATION OF STATE HIGHWAY AND  
TRANSPORTATION OFFICIALS IN COOPERATION  
WITH THE FEDERAL HIGHWAY ADMINISTRATION

**SUBJECT AREAS**

HUMAN FACTORS  
OPERATIONS AND TRAFFIC CONTROL

**MODE**

HIGHWAY TRANSPORTATION

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## NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Systematic, well-designed research provides the most effective approach to the solution of many problems facing highway administrators and engineers. Often, highway problems are of local interest and can best be studied by highway departments individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation develops increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

In recognition of these needs, the highway administrators of the American Association of State Highway and Transportation Officials initiated in 1962 an objective national highway research program employing modern scientific techniques. This program is supported on a continuing basis by funds from participating member states of the Association and it receives the full cooperation and support of the Federal Highway Administration, United States Department of Transportation.

The Transportation Research Board of the National Research Council was requested by the Association to administer the research program because of the Board's recognized objectivity and understanding of modern research practices. The Board is uniquely suited for this purpose as: it maintains an extensive committee structure from which authorities on any highway transportation subject may be drawn; it possesses avenues of communications and cooperation with federal, state, and local governmental agencies, universities, and industry; its relationship to its parent organization, the National Academy of Sciences, a private, nonprofit institution, is an insurance of objectivity; it maintains a full-time research correlation staff of specialists in highway transportation matters to bring the findings of research directly to those who are in a position to use them.

The program is developed on the basis of research needs identified by chief administrators of the highway and transportation departments and by committees of AASHTO. Each year, specific areas of research needs to be included in the program are proposed to the Academy and the Board by the American Association of State Highway and Transportation Officials. Research projects to fulfill these needs are defined by the Board, and qualified research agencies are selected from those that have submitted proposals. Administration and surveillance of research contracts are responsibilities of the Academy and its Transportation Research Board.

The needs for highway research are many, and the National Cooperative Highway Research Program can make significant contributions to the solution of highway transportation problems of mutual concern to many responsible groups. The program, however, is intended to complement rather than to substitute for or duplicate other highway research programs.

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The Transportation Research Board evolved from the 54-year-old Highway Research Board. The TRB incorporates all former HRB activities and also performs additional functions under a broader scope involving all modes of transportation and the interactions of transportation with society.

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## PREFACE

There exists a vast storehouse of information relating to nearly every subject of concern to highway administrators and engineers. Much of it resulted from research and much from successful application of the engineering ideas of men faced with problems in their day-to-day work. Because there has been a lack of systematic means for bringing such useful information together and making it available to the entire highway fraternity, the American Association of State Highway and Transportation Officials has, through the mechanism of the National Cooperative Highway Research Program, authorized the Transportation Research Board to undertake a continuing project to search out and synthesize the useful knowledge from all possible sources and to prepare documented reports on current practices in the subject areas of concern.

This synthesis series attempts to report on the various practices, making specific recommendations where appropriate but without the detailed directions usually found in handbooks or design manuals. Nonetheless, these documents can serve similar purposes, for each is a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems. The extent to which they are utilized in this fashion will quite logically be tempered by the breadth of the user's knowledge in the particular problem area.

## FOREWORD

*By Staff  
Transportation  
Research Board*

This synthesis will be of special interest and usefulness to highway engineers and others who seek information on methods employed to aid motorists in finding the way to desired destinations after exiting from the arterial network. Examples of relevant federal and state standards and regulations are included in this report.

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Administrators, engineers, and researchers are faced continually with many highway problems on which much information already exists either in documented form or in terms of undocumented experience and practice. Unfortunately, this information often is fragmented, scattered, and unevaluated. As a consequence, full information on what has been learned about a problem frequently is not assembled in seeking a solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem. In an effort to correct this situation, a continuing NCHRP project, carried out by the Transportation Research Board as the research agency, has the objective of synthesizing and reporting on common highway problems. Syntheses from this endeavor constitute an NCHRP report series that collects and assembles the various forms of information into single concise documents pertaining to specific highway problems or sets of closely related problems.

Highway agencies have developed various procedures to assist motorists in finding the way from arterial highways to destinations in unfamiliar areas. This report of the Transportation Research Board documents the range of technical, legal, political, social, and environmental factors affecting the development of information systems designed to meet drivers' direction-finding information needs.

To develop this synthesis in a comprehensive manner and to ensure inclusion of significant knowledge, the Board analyzed available information assembled from numerous sources, including a large number of state highway and transportation departments. A topic panel of experts in the subject area was established to guide the researchers in organizing and evaluating the collected data, and to review the final synthesis report.

This synthesis is an immediately useful document that records practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As the processes of advancement continue, new knowledge can be expected to be added to that now at hand.

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James K. Williams, Transportation Safety Coordinator, Transportation Research Board, assisted the Special Projects Staff and the Topic Panel.

Information on current practice was provided by many highway and transportation agencies. Their cooperation and assistance were most helpful.



# DIRECTION FINDING FROM ARTERIALS TO DESTINATIONS

## SUMMARY

For many motorists, finding the way from arterial highways to destinations in unfamiliar areas is a difficult task, which is complicated by problems in obtaining trip-planning aids and using them in relation to highway signs and other features along the highways.

The destination information that is supplied on highway signs is usually determined by a state's written policies, which vary considerably among individual states. A basic problem is determining the amount of information that public agencies should provide and the amount that the driver should be responsible for obtaining.

The main legislation in this area has been with respect to outdoor advertising. The decrease in advertising signs has been good from an aesthetic point of view; however, many motorists have used the information on the signs for locating services and attractions. More recent legislation has been directed toward assuring that necessary direction-finding information will continue to be available to motorists.

Some states allow proper names on official signs for public agency attractions such as state parks. For private attractions, however, most states use generic names (for example, Amusement Park instead of Disneyland).

There is some disagreement between cities, which use freeway names and landmarks on signs, and the Federal Highway Administration, which prefers route numbers and destination cities.

Studies have shown that almost all motorists do some form of trip planning when traveling to a destination for the first time, but fewer than half of motorists who are familiar with the general area (but not the specific route) will do so. More than half of the direction-finding problems are in urban areas. The strategy most often used for finding destinations is that of arriving at the local area and then asking a service station attendant for detailed routing information. Traffic engineers believe that motorists *must* do a greater amount of trip planning; they believe it is appropriate to sign for the stranger with a map.

Although there have been few complaints about maps, there is a lack of standardization among maps and not much effort to coordinate map features with signs or other features that motorists may observe along the highways. The greatest limitation to the usefulness of maps is the difficulty in persuading people to use them.

Signs are a cost-effective, 24-hr method of transmitting information to motorists. However, on urban arterials it is virtually impossible to provide the amount of information desired because there are too many other signs and too many destinations of interest. Trailblazing signs for tunnels, airports, stadiums, etc., are desirable, although this practice might result in cluttered signposts on arterials. The use of logo signs (for services) to replace off-right-of-way signs and billboards is increasing.

Motorists' organizations believe the destination-finding problem is more severe and deserving of attention than do most traffic engineers, who acknowledge the problem but think that other matters should have higher priority. The extent of the problem needs to be determined before its importance can be agreed upon. Other conclusions and recommendations include:

- A study should be made to determine costs, implementation problems, and benefits of highly visible street-name signs (midblock, illuminated, or larger than usual). Other signs more nearly approach the optimum trade-off between added information and clutter so that major improvements are not likely.
- Destination- and service-signing policies vary from state to state, both in the kinds of services and attractions that are signed and in those services and attractions that are permitted to install their own signs.
- The initial destination-information sign for an attraction will almost always be located on a major artery. It is important that the motorist be directed all the way to his destination after leaving the arterial.
- Most agencies do not approach the destination-finding problem through a formal, analytical procedure for defining driver needs. Instead, guidelines for signing for specific types of destinations are utilized in their responses to requests. Signing for individual attractions is done primarily in response to requests from the attractions.
- Some drivers find their destinations by following specific routes and looking for destination information on signs; others navigate within some self-generated reference system. The information needs of each of these groups are quite different.
- Service stations, fire departments, police officers, and pedestrians will continue to serve as major components of the destination-finding system. Unfortunately, information from these sources is not always correct nor is it always properly interpreted by the motorists.

## CHAPTER ONE

## INTRODUCTION

One of the most difficult tasks for drivers is finding their direction in unfamiliar locations. This task is even more difficult when the desired destination is located within an urban area or a large recreational area. Although existing route guidance information systems generally achieve the goal of directing drivers to a desired geographic area, motorists unfamiliar with the arterial network will have difficulty in navigating to the proper exits and then finding the way through the local systems to specific destinations. Motorists often travel farther than they intended because of missed turns or lack of sufficient information on available routes.

## VIEWPOINT OF HIGHWAY AGENCY OFFICIALS

Although many states have issued policy statements regarding the kinds of destinations and traffic generators that should be signed, policies and state and local laws regulating signing for attractions and commercial enterprises vary greatly. Transportation agency officials, who define and attempt to meet the needs of motorists, must (a) exert some control over billboards and other sources of information proposed by various commercial and government interests, (b) maintain conformance with federal and state standards and requirements, and (c) assist state tourist agencies with their information programs. Budgetary and political considerations affect all these decisions and activities.

However, the engineers in operating agencies who were interviewed for this report indicated that solving the problems associated with direction finding from arterials to destinations has a fairly low priority in their day-to-day operations. Usually their policies, which address the kinds of signs that should and can be installed, are used as guidelines when responding to specific requests for signs and designing appropriate destination signing for new construction and major upgrading projects. Although these traffic engineers acknowledge some minor problems, they do not consider them to be of great concern and have no specific suggestions for research or continued study.

In some states, such as North Carolina and Pennsylvania, the state is responsible for much of the roadway network, including some highways that would be classified as county roads in other states. States that have more extensive highway networks have more problems with signing for specific destinations and attractions.

The amount of interest in the problem is also related to the amount of tourism and the number and density of attractions in the state. Although engineers in jurisdictions with limited networks and in areas with relatively few attractions have observed few motorists encountering prob-

lems with direction finding, these problems are not ignored or considered unimportant.

There are some traffic engineers who believe that a significant portion of travel on the nation's highways, particularly in the urban areas, is unnecessary. A study from Great Britain estimates travel "waste" attributable to poor destination information to be 3 to 5 percent of total travel and perhaps as high as 10 to 15 percent when commuter trips are excluded (1). If these figures hold true for the United States, the potential for savings in fuel is tremendous—from the vehicles directly involved in the unnecessary travel and their effect on congestion and resulting energy inefficiencies for other drivers.

Some agency officials, particularly those of the National Highway Traffic Safety Administration, are concerned that drivers are making wrong choices of routes and thus wasting fuel, and suggest that programs are needed to educate drivers on the need for energy consciousness. Others are not concerned about the driver who knowingly chooses to follow an energy-inefficient route; they want to reduce the amount of errors caused by the lack of destination-finding information.

The Federal Highway Administration (FHWA) is in the early stages of a major project dealing with route guidance and the attendant time losses and energy inefficiencies caused by excess travel. The first project in the program is designed to identify the nature of the route-guidance problem and to quantify the time and energy losses.

Some public agencies may not perceive problems dealing with direction finding as particularly significant because they focus their attention on problems of congestion and safety. It is difficult to detect and measure destination-finding problems directly within these two contexts, even though drivers seeking destinations do contribute to congestion and safety problems.

It is commonly believed that the lost or misdirected driver is an unsafe driver because less attention is being paid to other than immediate driving tasks. There does not, however, seem to be any hard evidence linking this to safety problems.

## MOTORISTS' ATTITUDES

Motorists' direction-finding difficulties include both problems in obtaining and using suitable trip-planning aids before and during the trip and problems in following routes and finding directions with existing information displays.

Even though some transportation agency officials do not assign a high priority to destination finding, the driving public identifies it as one of the most significant problems of highway travel. Public agencies receive very few com-

plaints in this area, but organizations such as the American Automobile Association (AAA) receive numerous complaints and comments about highway signing and destination finding. This inconsistency may be a result of the fact that although public agencies do not discourage complaints, they do not actively seek feedback. It is probable that most drivers consider destination-finding problems to be minor irritations, or suspect that they may be partly at fault for inefficient trip planning, or are not sure whom they should call with complaints; thus they do not make the necessary effort to register complaints. However, their problems and concerns, do show up under the "solicitation" of complaints on questionnaires sent out by such organizations as AAA.

Surveys requesting drivers to indicate their greatest difficulties in using the highway systems reveal that signing is a major problem. Some traffic engineers believe that this is because signs (or the lack of signs) are so evident compared to skid resistance, geometric deficiencies, and guard-rail installation, and because everyone has some trouble with information deficiencies (for example, every driver would like to find signs leading directly to every minor destination). Many engineers acknowledge the survey results but do not believe that they establish the need for new policies and programs. Other engineers argue that because signing is a problem area often mentioned by drivers, there is an obvious need for major improvement. They cite the very existence of such organizations as AAA, the Chicago Motor Club, and the Amoco Travel Club as evidence of the public's desire for more destination-finding information. However, these organizations indicate that this is not the primary service they furnish to their members; there is more call for emergency services.

Another complicating aspect of this problem is the multiplicity of public, commercial, and private agencies involved in the motorist information system and the relative independence of these various groups.

## BASIC QUESTIONS

The following key questions need to be addressed in assess-

ing the state of the art of providing destination-finding information and in planning for the future:

- At what point does the direction-finding problem become the responsibility of the driver? (How much information should public agencies provide and what should be the driver's part in finding a specific destination?)
- If this problem is intractable because of the numerous destinations of the driving public, should policies and practices be based on the assumption that drivers must find their own way once they leave the freeways and main arterials?
- Are there some specific types of information that should be provided to drivers?

## STUDY DATA

All types of terminal destinations were considered both in the discussions and interviews that were the basis for this report and in the literature review. For example, visits to public recreation areas such as national parks, trips to commercial recreation enterprises and public buildings, and visits to friends or relatives in unfamiliar locations were examined.

A number of information systems—signs, maps, billboards, advisory radio, citizens-band radio, information centers, and motorists' organizations—are helpful to motorists in finding directions from arterials to destinations. Although considerable research has been directed toward signing, there is little literature available on the other information systems.

Campgrounds, hotels, motels, restaurants, and service stations are considered intermediate services rather than destinations and receive only minor attention in this report.

The material presented in this synthesis was gathered from extensive interviews with officials of several state highway and transportation departments, with personnel from various Federal Highway Administration (FHWA) offices, and with officials of automobile clubs. These interviews were supplemented by a review of the literature and by personal observations and interpretations of the consultant and the topic panel.

## LEGISLATION, POLICIES, AND MANUALS

### LEGISLATION

There is little federal legislation that bears directly on the problem of direction finding. However, the following general acts and policies are relevant.

- The "Bonus Act" of 1958 encouraged states to develop outdoor advertising control measures. This act granted additional interstate system construction funds to states enacting appropriate controls.

- The Highway Beautification Act of 1965 called for withholding funds from states that failed to adopt acceptable legislation to control outdoor advertising signs, displays, and devices in areas adjacent to the interstate and primary systems. However, directional and other official signs were permissible.

- As an aid in the interpretation of the scope of the term "directional sign," and to facilitate implementation of the Highway Beautification Act, National Standards for Directional and Official Signs were adopted in 1969 and amended in 1973 and 1975 (Appendix A).

- The Federal-Aid Highway Act of 1976. Because the National Standards for Directional and Official Signs did not resolve the objections raised by tourist-oriented businesses, Congress again considered the problem of directional information in the Federal-Aid Highway Act of 1976. Directional signs were exempted from removal in hardship situations, and the Secretary of Transportation was directed to "encourage and assist the states to develop sign controls and programs which will assure that necessary directional information about facilities providing goods and services in the interest of the traveling public will continue to be available to motorists." FHWA does not interpret the 1976 act to require more information on state parks, monuments, recreation areas, etc. Some congressmen and states, however, consider these types of destinations to be services and thereby claim that the state is charged with providing "necessary directional information about [these] facilities."

Legislation at the state level has generally been limited to enabling legislation for implementing federal policies and laws, although some states (for example, Iowa, Oregon, and Virginia) have enacted even more restrictive legislation.

The effects of the new regulations and national standards have varied considerably from state to state. In some states there has been a noticeable decrease in the number of billboards; in others, only a few have been removed (one reason being that money for sign removal is scarce).

An analysis of the Georgia experience in controlling billboards was made by Floyd and McGurn (2), who con-

cluded that the legislation failed to achieve the stated objectives. Only 2 percent of the nonconforming signs had been removed by 1977, and loopholes in the various state and federal acts have permitted extensive billboard construction. On the other hand, the Minnesota Department of Transportation reported that an estimated 10,630 nonconforming, illegal, and abandoned billboards and other advertising signs have been removed since 1971, and that about 1,000 signs still need removal (3).

Some states have resisted the implementation of more rigorous laws on information signs because of the expenses of monitoring the signs, issuing permits, enforcing the laws, etc. For example, Indiana has had to create a whole new division of the state highway commission to administer programs related to signing and information legislation.

Much of the recent controversy in this area has been caused by more rigorous enforcement of the 1965 Highway Beautification Act and subsequent legislation. The changing billboard and sign policies have begun to hurt the tourist-based economies of some areas. For example, there has been public backlash from the removal and prohibition of food and lodging signs, with many drivers feeling that adequate substitutes have not been provided. Some believe that the government should relent in this area, and that the government has been unsuccessful in attempting to legislate an information system previously provided by private enterprise.

The decrease in advertising signs is obviously an aesthetic advantage. However, many motorists feel the need for the service and attractions signs; some kinds of information are not provided by any other source. Certain (place-name and "miles to") signs give drivers a reference system on the open highway; using this information they can locate themselves on any map and can make judgments about distances to stopping points, probable locations of service stations, and other travel information needs.

Automobile club officials indicated that there appears to be little effect from current and past legislation in this area, but do not have any proposals for significant changes in legislation. On the other hand, some environmentalists argue that the original purpose of the 1965 legislation has been undermined over the years and that it now serves to protect billboards instead of effecting their removal.

### POLICIES AND MANUALS

The destination and service signing policies of the states vary considerably in terms of which types of services and

attractions the states will sign and which types will be permitted to install their own signs. (For examples of state regulations and policies, see Appendixes B and C.)

In 1975, the New Jersey Department of Transportation conducted a survey of the 50 states asking for information and copies of warrants for signing nonservice facilities such as colleges, amusement parks, sports stadiums, transit stations, and tollways (4). The results of the survey have been tabulated but not widely distributed.

Almost all interviewed agreed that clear and firm policies are needed in each state to discourage political pressures, accusations of favoritism toward large attractions, and the frivolous sign requests that are primarily efforts in obtaining free advertising instead of providing useful information to the traveling public.

FHWA prefers that each state set and enforce standards on attraction signing before it considers support for those policies. Not only should the guidelines be tailored to the particular needs of the individual state but they should also address the amount of signing permissible at any single location and give consideration to the following basic criteria (5) for signing a tourist attraction or service:

1. The expected number of visitors to the facility;
2. The distance or travel time from the first sign to the attraction or service and the number of signs for any given facility;
3. The problem of the location of multiple attractions or services at one intersection or interchange; and
4. The minimum spacing between any two signs, and the number of destinations and legend length per sign.

The *Manual on Uniform Traffic Control Devices* (6) provides only very general guidelines and warrants for the installation of destination and service signs. Considerable discretion is left to the states to reflect the varying situations among states regarding the extent of the state highway network, amount of tourist traffic, and number and nature of large cities.

Traffic engineers rarely have enough personnel to initiate sign revision programs. However, they usually respond to the need for signing for a new attraction. On some new highways, of course, comprehensive plans for sign messages and placement are possible, but the approach appears to be intuitive, based on past experience and existing policies instead of an information-decision-action model or driver task analysis.

The Pennsylvania Department of Transportation (PennDOT) has a rule of thumb that not more than three destinations can be signed each to the right and to the left of a non-interstate intersection. In addition, they believe that straight-ahead destinations ordinarily do not need signing.

Some agencies allow the use of proper names on official signs for public agency attractions (historic monuments, state parks, etc.) but not for private attractions. Some traffic engineers claim that there is probably too much concern by the states about free advertising. However, it is likely that signs giving directions to Disneyland would be more helpful to motorists than those using the words "amusement park" or "theme park."

PennDOT provides signs to commercial attractions and campgrounds from the nearest numbered route if these facilities meet certain volume criteria, hours of service, etc., but its policy prohibits the signing of those attractions that use their own billboards. Pennsylvania has an extensive network of state highways; consequently, the distance between an attraction and the nearest numbered route is never great.

The Indiana State Highway Commission will not install destination signs on a state right-of-way for any public or private agency unless that agency supplies a written agreement to trailblaze with signs from the state highway to the destination. It is the state's view that the motorist should not be directed off the state network and then "dumped."

Most states have implemented programs to remove non-conforming billboards and exert control over outdoor advertising. However, at least three states have established tourist information councils (or similar agencies) to take affirmative action in providing state-installed signs that provide directional information regarding public and private attractions (7-9); some of these programs are not viewed favorably by FHWA because they clutter public highways with too many signs and emblems.

Temporary trailblazing signs are often permitted for certain special events, such as the Indianapolis 500 automobile race, which draw spectators from a wide area for a brief period. The peak need for certain information outweighs the temporary violation of standard policies.

Although federal, state, and local agencies generally agree on destination-signing practices, there is one area of considerable controversy. Cities prefer to use freeway names and landmarks (such as major bridges and tunnels) as reference points in their destination signing. FHWA, on the other hand, encourages the use of route numbers and destination cities and discourages memorializing freeways and signing for local landmarks. These differences of opinion probably result from the differing types of motorists served by the agencies. City officials claim that a major problem is destination finding by local drivers and that they can be helped most by the use of freeway names and landmarks in signing. FHWA tends to give priority to long-distance travelers, contending that they will be best served by route numbers and destination cities on signs and that this type of destination information would be just as helpful to local drivers.

Along the Indiana Toll Road, there are often signs that precede the exits and indicate the several small cities that can be reached via each exit. This information is provided in addition to the route numbers and distant major cities.

At least six states are using logo signs on the interstate system (Fig. 1), and a number of other states have shown considerable interest in this practice. These are primarily service signs, however, unless one considers lodging places along interstates as destinations.

Not all states favor logo signs, and some feel pressure by FHWA to use these signs as well as the "food-gas-lodging" signs on the non-interstate, federal-aid highway system (Fig. 2). One state traffic engineer stated that these nonspecific service signs are of questionable merit—





FIGURE 1 Logos on sign located on interstate highway (Virginia).



FIGURE 2 Food-gas-lodging sign.

that people encounter these services frequently enough to make these signs unnecessary. Campgrounds, recreation areas, etc., should have higher priority for the limited amount of signing that can be provided effectively at off-interstate highway junctions.

There is some disagreement over the appropriateness of signing for large shopping centers (Fig. 3). Some traffic engineers claim that there are many motorists driving to a shopping center for the first time who would find the directional signing useful; others claim that most visitors have been there before or at least know the name of the needed intersection highway or street. One engineer observed that almost every request for signing for shopping centers comes from owners or operators looking for free advertising; the requests rarely originate with motorists, although perhaps they may be instigated by patrons' remarks about difficulties in finding the shops. The National Advisory Committee on Uniform Traffic Control Devices has recently reaffirmed its position against placing signs for shopping centers on freeways.



FIGURE 3 Directional sign to a large shopping center. When a large shopping center opened, this sign was installed but was removed a few years later.

## INFORMATION NEEDS AND HUMAN FACTORS

King and Lunenfeld (10) surveyed the state of the art of urban route guidance and found that "no organized body of complaints, or of any other data, existed that could serve as a basis for analysis of specific problems (urban guidance) as perceived by the driver." They organized and analyzed information available in the literature at the time of their study and identified the major constraints on dealing with these problems. To date few if any state or local operating agencies have formal programs under way to seek destination-finding information that is needed or wanted by motorists on urban roadway systems. Destination finding and guidance in rural areas have received even less attention.

The King and Lunenfeld report (10) includes an extensive discussion of the state of the art of urban guidance up to the time of the study, the results of a number of case-study analyses, and an extensive questionnaire survey on road-user guidance needs and perceived problems. Some of their more pertinent findings follow:

1. Almost all trips by strangers (drivers making the trips for the first time and unfamiliar with route and area) are preceded by the making of trip plans. Self-prepared plans predominate, chiefly in the form of reliance on maps. On the other hand, fewer than half of the trips by local strangers (drivers assumed to be broadly familiar with the area but not the route) are preceded by the making of trip plans, either written or memorized.

2. Somewhat more than half of the respondents to the questionnaire reported they felt lost at some stage during their most recent trips. Of these, approximately half were actually lost.

3. Questionnaire respondents categorized as strangers rated the relative importance of different types of information in the following order: (a) route numbers, (b) street names or numbers, (c) city names, (d) destinations, (e) exit numbers, (f) route names, and (g) route compass directions. Local strangers ranked the information types in the same order except for interchanging the first two items.

4. Major failures of urban guidance are associated with the interfaces between the freeway system and the conventional street and highway systems. These failures are evident in motorists' problems such as choosing the proper freeway exit, choosing the optimum direction of travel from the foot of an exit ramp, locating a freeway while traveling on a conventional system, and, once the freeway is located, determining the right entry for the proper direction of travel.

5. In classifying the problems encountered in the case studies, it was noted that more than half are associated with difficulties in navigating urban arterials or city streets. The primary areas of difficulty are lack of arterial identification and lack of destination signing. Current methods of arterial

identification are deficient in indicating to the motorist the identity of the artery on which he is traveling and in identifying approaching cross-arteries in sufficient time for the driver to make and implement turning decisions. Standard street-name signs are considered inadequate for these tasks. The almost complete lack of destination signing on the arterial surface network adds to the difficulty of destination finding and route following. Navigation on the arterial network is further complicated by street discontinuities, natural or man-made barriers, one-way street systems, and turn restrictions; existing signing practices are judged inadequate to compensate for these complications.

The only application of formal signing analysis techniques cited by those interviewed in the preparation of this report is the use of "trace analysis techniques" by Al Berg of the University of California at Los Angeles and William Marconi of San Francisco in planning some of the signing on the San Francisco freeway system. Even this technique, however, does not provide information on priorities if choices must be made among several desirable information messages.

Another aspect of the problem is that "current route guidance systems (highway route numbers, mileage signs, street names, maps, etc.) furnish information aimed at *all* drivers; the information is necessarily incomplete and presented intermittently, and the system relies on the driver to integrate it with his desired destination and make his own decisions at each choice point" (11). Customizing destination information for each driver and the specific destination is conceptually possible, but obviously a whole new generation of information systems would be required, and technical and cost feasibility of these sophisticated systems has yet to be proved.

Studies by Armstrong (1) and Gordon and Wood (12) indicate that although drivers experience some difficulties with the en route phase of their trips, most inefficiencies occur during the "terminal search" phase. The most common strategy for finding destinations is that of driving to the local area and then asking a service station attendant for detailed routing information.

There is still a considerable lack of definitive knowledge regarding drivers' basic information needs and the strategies various drivers employ in finding destinations. Arthur (13) asks: "What is it that he [the driver] wants to know? And once we think we have the answer to that question, what do we know about the conditions under which he could assimilate and utilize the information he is given? And then there is the matter of the driver's own attitude. Is he willing to stop his car long enough to get this information or is he not? Must the information be free, or is he willing to pay for it?"

Knowledge of driver route-finding strategy is critical to



the development of effective guidance aids. Gordon and Wood (12) suggest: "If the driver follows his route point by point, he should be given detailed information at each road juncture. If he orients himself in the general direction of his goal, as certain psychological studies indicate . . . over-all information should be provided. If he uses certain large cities as milestones, they should be included on the highway signs."

#### **OBSERVATIONS BY TRAFFIC ENGINEERS AND OFFICIALS OF MOTORISTS' ORGANIZATIONS**

The accepted standard for planning destination signs seems to be: "We sign for the stranger with a map." However, not all strangers have or can use maps and not all features observed while driving on the highway can be related to what is shown on the map.

One traffic engineer gave the following example of what drivers are presumed to know in finding their destinations. If a motorist is looking for the Railroad Museum in Chicago, for example, it is reasonable to assume that he knows the name of the street before leaving home, perhaps the approximate street number, and also the name of the closest freeway exit ramp. Signing appears to be based on these kinds of assumptions, but it is clear that many drivers do not do this much trip planning.

Some engineers claim that beltway and freeway signing should be limited to the naming of cross streets (or highways), so that a driver's knowledge that his destination is on a certain street is all that is necessary. But other traffic engineers say they are not comfortable in deciding which destinations are the most important when all desired destinations cannot be signed—in assigning priorities when several destinations meet the formal or informal criteria for destination signs.

It appears that some decisions on providing destination-finding information are made on the basis of traffic volumes on approaches or nearby routes, although much of the traffic in urban areas may be local drivers who are provided with signs that they really do not need while strangers following their natural routes (perhaps with lower volumes) may be ignored.

Several of those interviewed emphasized that not all drivers are equal in traveling experience and sophistication; some drivers can find their way if given a few vague clues

and some general cardinal directions, whereas others must be virtually led by hand. One person observed that the driver's task changes from general orientation to quite specific maneuvers as the destination is neared and suggested that signing policies could be based on this transition.

Most signing and route guidance principles, standards, and guidelines were developed by federal agencies and state highway departments. These agencies have a rural orientation, whereas many of the destination-finding problems occur in urban areas. The larger number of potential destinations in the urban areas appears to make the application of established principles and guidelines inappropriate.

Another observation is that freeway signing practices should be seriously considered in establishing policies for off-freeway signing, because motorists are familiar with this system and their minds are "set" by the freeway signs as they approach their destinations. Unfortunately, there is considerably more competition and less control in the off-freeway areas.

One approach to achieving the optimal destination-finding information system might be to design the best possible theoretical system and then compare it with the existing system. However, even though it would be feasible to change some sign legends, it would be impossible to change existing street names and numbering systems.

Traffic engineers with state highway agencies seldom react to specific research studies (of which there are very few) in the area of destination-finding information, claiming that it is not realistic to pursue the "latest idea" but more practical to take a larger overview of research and gradually incorporate the convergent findings in implementation practices. They also say that the research must be related to the specific needs and problems of the given state, and that the overall effect of new practices on the state's signing programs must be considered.

Several of those questioned observed that it is probably not possible to determine the needs and desires of motorists by interviewing them, presumably because drivers are not able to articulate their problems in solution-oriented terms.

The predominant question that needs to be answered in setting destination-finding information policies and practices is: At what point can traffic engineers say they have provided drivers with "sufficient" information? As yet, there has been no definitive answer to this question.

## CURRENT PRACTICES

### GENERAL OBSERVATIONS AND PROBLEMS

By far the most common practice in providing destination-finding information is to respond to specific requests from existing or new attractions and facilities instead of seeking out information needs. There is, however, some gathering of information needs when there is new construction or a major upgrading project. As signs are the major component of the destination information system, a well-stated overall signing policy is a substantial aid in providing efficient and fair rulings on sign requests.

Those opposed to increasing governmental activity in providing destination-finding information argue that if there is enough demand for this information, the sponsors of the particular attraction will find it desirable to provide the information; the state need not become involved. Operators of private and commercial attractions, in particular, will make certain that motorists can find them. Although this is not as true for public attractions, such as state parks, the park service would likely demand better information systems if there were many complaints from their visitors.

Service stations, fire and police departments, and pedestrians will continue to serve as major components of the destination-finding information system. (No one appears to have a viable substitute for this one-to-one, interrogative, inexpensive, multidestination information resource.) Unfortunately, direction-finding information from such sources is not always correct or interpreted properly.

Many traffic engineers are convinced that motorists *must* do more trip planning, just as they do when making a trip by plane, bus, or rail, to gather appropriate information before they leave home and not depend on signs in finding their destinations. However, the experience and sophistication of the driver are important factors. Many experienced travelers can find their way to almost any destination by their ingrained reference system and correct expectations as to the types of information they will encounter as they approach their destinations.

#### Alternative Routes

Many traffic engineers in operating agencies believe that giving motorists a choice of routes, by means of permanent signs, is not good practice because it tends to confuse the inexperienced motorist and is not particularly helpful to experienced drivers. However, several studies indicate that there may be considerable merit in diverting traffic or providing real-time alternative routing information during

emergencies such as restricted flow because of disabled motorists or accidents; construction or maintenance operations; heavy commuter traffic flow periods; and approaches to major sporting events (14–19).

### Emergency and Intermediate Services

With respect to destination-finding information deficiencies, the most common complaints received by AAA concern finding emergency services such as hospitals and state police. A few states have erected white-on-blue “Hospital, next right” signs along the interstate highways and have provided white-on-blue “H” trailblazing signs to the hospital (Fig. 4). Pennsylvania, for instance, has a very specific policy statement on signing for hospitals that includes qualification criteria (for example, 24 hr per day for 7 days per week), locations of the signs, and color and design specifications. Several states have placed signs for the state police on freeways and other highways and a few have erected signs for local police stations (Fig. 5).

AAA receives many more requests for additional service information along highways than for removal of these signs. This could reflect the desires of motorists for more information or simply that they think that it is more appropriate to send this kind of request to AAA. The problems encountered and enumerated by operating agencies also tend to center around intermediate service information instead of terminal destination finding.

### Confusing Route and Street Designations

Roads or highways with several different names are encountered frequently (for example, the Edwardsburg Pike, South Bend Avenue, and State Route 23). Motorists may identify a highway by one of its names but frequently do not recognize the other names. Hence, when installing signs and other destination-finding information, a choice must be made as to the designation most frequently needed by long-distance drivers instead of the one most frequently recognized by local drivers. There appear to be no guidelines for decision-making in this area.

A similar problem occurs where a name of a street or highway changes for no reason apparent to the motorist (for example, Hickory Road on one side of a through highway and Logan Road on the other). It is difficult for people to follow directions under such circumstances because they may see a street-name sign that is different from the expected one and pass by the desired turning place.

Often several names are used for the same or similar destinations in various cities; for instance, signs may indicate the direction to downtown, civic center, city center, business district, center city, etc.

### Return Routes

Although none of the public agencies contacted had experienced a large number of complaints from motorists regarding the finding of appropriate return routes (for example, from a sports arena to the major highway system), most agencies indicated that there are information deficiencies in this area. The problems associated with locating specific freeways and the exact on-ramp locations, identified in the King and Lunenfeld study (10), may be manifestations of the return route problem. At the very least, there should be signs at exits from major parking lots, especially where large numbers of unfamiliar visitors might be expected, to direct departing motorists to major highways.

The signs shown in Figure 6 are located on a local street near the parking lots at a major university. For drivers leaving sporting events or other university functions, these signs are helpful in finding the way back to major routes. In fact, drivers are directed onto another local arterial before they encounter any of the major routes designated on the signs.

The "Toll road ahead" sign in Figure 6 is encountered by the motorist *after* passing under the toll road but is helpful to the motorist who is uncertain about whether or not he has missed the entrance ramp. The sign is literally incorrect. The toll road is behind the driver, but the entrance can be reached by proceeding straight ahead.

### Parking Facilities

In urban areas, the destination-finding problem is not solved when the motorist reaches his destination until a place to park can be found. Thus information on the locations of parking facilities would be helpful in cities.

Some traffic engineers suggested that motorists be provided with information to enable them to find parking lots near commuter buses and transit stations (Fig. 7). Although regular commuters would not need such information, it would greatly help strangers who are trying to avoid driving in unfamiliar downtown areas. Highly visible signs might encourage more fringe parking by occasional visitors. However, the argument has been raised that these signs would be of little value—that strangers will not use fringe parking lots because they have no knowledge of bus system operation or the way to proceed from the bus to their final destination.

### Lane Designations

Although not specifically related to destination-finding information, a study of signs and pavement marking for lane

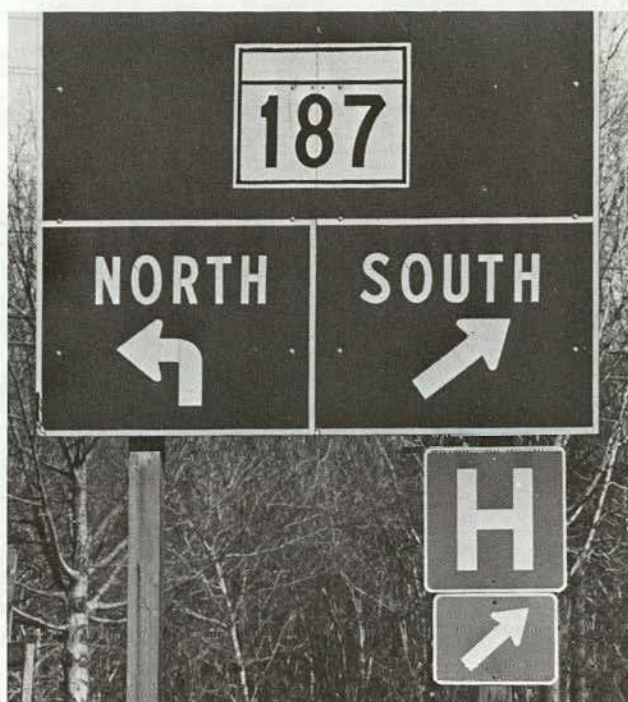


FIGURE 4 Directional and trailblazing signs to a hospital.



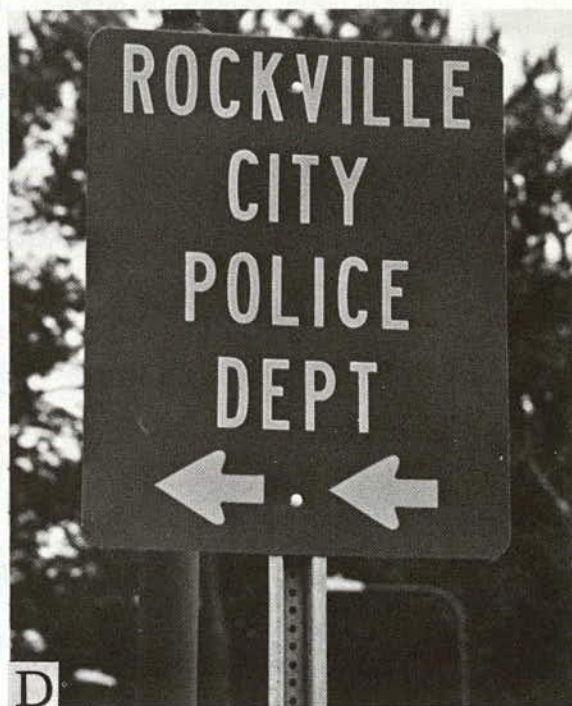
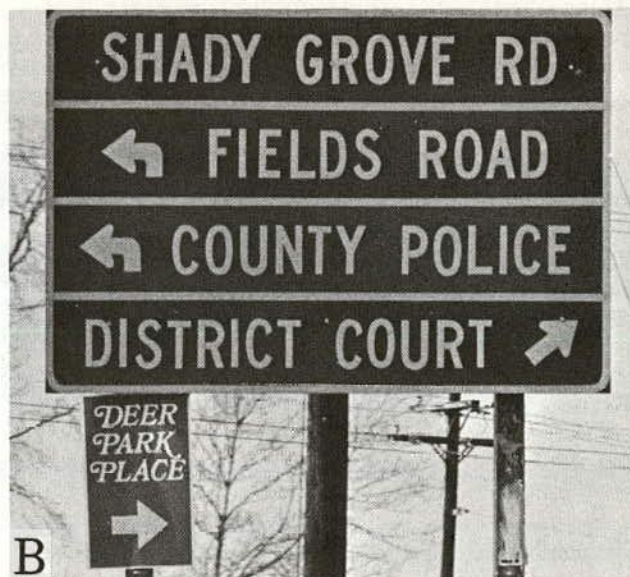


FIGURE 5 Signs directing motorists to police stations: *A*, on a freeway; *B*, at intersection of two county roads, one of which carries traffic coming from a freeway; *C*, on a state arterial; and *D*, at intersection of state highway and city street (city-installed sign).

designation on the approach to urban intersections is needed. Frequently a driver must choose a straight-through or right-turn-only lane before the street-name sign or the route designation is visible; although the driver is not lost in this situation, it can cause indecision and irritation or result in extra travel.

#### MAPS

State traffic engineers and AAA officials believe that the public is generally happy with state highway maps and those from AAA; there have been few complaints about these maps.



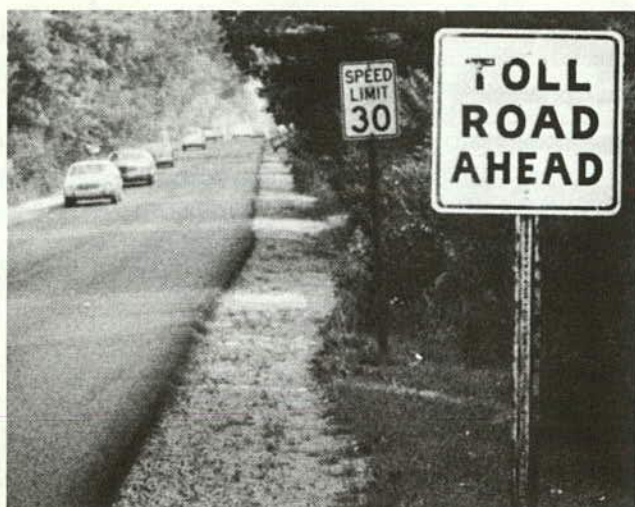


FIGURE 6 Signing to assist motorists in finding return route.

Several states each give away more than 1 million maps per year. The importance of state highway maps has increased with the gradual disappearance of free oil company maps. However, the symbols used for various classes of highways on state and other maps are not standardized. A study of state maps showed that a red line had 13 different definitions (20). In 1961 the American Association of State Highway Officials (now the American Association of State Highway and Transportation Officials) adopted a recommended system of uniform symbols for representing highway features on state tourist maps (21). Several states are using this system (see Fig. 8) and others should be encouraged to adopt it for their maps.

There does not appear to be any effort to coordinate map features with the signs or any other identifying features that drivers may observe on the highway systems. Even though a driver may have an up-to-date map to assist in finding

particular destinations, at times he may have considerable difficulty in identifying his particular location on the map. Coordination of map features with identifying features along the highway could provide significant improvements in destination-finding information systems without instituting major changes. The smaller the scale of the map, of course, the more difficult it would be to provide this coordination of information.

It is important to have local input regarding the places and items that should be identified on local maps. Knowledgeable city officials should be involved in the map-making process; it should not be delegated completely to some outside agency.

The lack of information on the arrangement and proper use of exit and entrance ramps along the freeway system in some cities has created problems for many drivers. AAA has attempted to include this kind of information with its maps. However, the details needed to indicate proper maneuvers make it impractical to furnish this information on anything other than a strip map for a particular segment of freeway. Few motorists have access to such maps, and since it is difficult to use these ramp maps to find particular locations quickly, they are not generally useful to the driver approaching a particular intersection (although they would be helpful in the pretrip planning process). In addition, only those unfamiliar with the area would find such information useful; anyone who has previously traveled



FIGURE 7 Signing to assist motorists in finding commuter parking lots.



through this maneuver would most likely not need the information. Most drivers rely on on-the-spot signs to direct them through complex interchanges.

One state traffic engineer suggested that putting interchange numbers on maps would help drivers determine relative locations but noted that his state does not provide this information on state highway maps.

The Illinois Department of Transportation prepares and distributes motorist service guides that list the automobile service, dining, lodging, and camping facilities and points of interest at each exit along each interstate highway across the state. These are very attractive map directories but are expensive to produce and require frequent updating (see Fig. 9). Information about the exit numbering and the milepost marker systems is provided at the end of each directory.

There is considerable variation in quality among maps provided in publications such as motel brochures. Some of these maps are easy to follow and well keyed to identifiable roadside signs and features, whereas others are not as helpful to the motorist. As in any mapping program, updating

is important but is frequently neglected. Sample motel directory maps are shown in Figure 10.

FHWA is planning a study of the adequacy and limitations of present highway maps. The study will attempt to delineate the types of information drivers expect and need from maps. Some attention will be given to determining if some standard features, such as county lines and names, are of aid to the motorist or simply clutter the map.

#### Limitations on the Use of Maps

The greatest limitation to the usefulness of maps is the failure of the public to use them. Many motorists seem unwilling to do trip planning or have difficulty reading maps. In addition, many maps are almost impossible to read at night in vehicles because of the very small print required to squeeze a great amount of information into a small space.

At least two studies indicate that as much as 40 percent of the driving public cannot or will not use maps. Some motorists simply cannot derive the information they need
















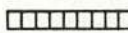
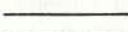
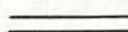
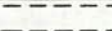






PAVED HIGHWAYS	PRINCIPAL THROUGH HIGHWAYS	OTHER THROUGH HIGHWAYS	OTHER HIGHWAYS
2 LANE, PAVED	 W/R 1.00	W/R 0.67  W/R 1.00	 W/R 0.67
MULTILANE UNDIVIDED	 W/R 1.50	 W/R 1.50	
MULTILANE DIVIDED	 W/R 1.50	 W/R 1.50	
MULTILANE DIVIDED ACCESS PART. CONTROLLED	 W/R 1.50		
MULTILANE DIVIDED ACCESS FULLY CONTROLLED	 W/R 1.50		
2 LANE ACCESS FULLY CONTROLLED	 W/R 1.00		
MULTILANE TOLL ROAD	 W/R 1.50		
2 LANE TOLL ROAD	 W/R 1.00		
OTHER SURFACE TYPES 2 LANE WIDTHS		BLACK OR DARK BLUE	GRAY OR LIGHT BLUE
DUSTLESS			
OTHER ALL WEATHER			
UNIMPROVED			
UNDER CONSTRUCTION			
RED		GRAY OR LIGHT BLUE	
BLACK OR DARK BLUE		YELLOW	

FIGURE 8 System of uniform symbols for representing highway features on state tourist maps as recommended by the American Association of State Highway Officials in 1961 (21).



# Motorist Services Points of Interest

EXIT NO.	AUTO SERVICE	DISEL FUEL	TIRE REP.	TRUCK REP.	DINING	SEATING	MEALS	CREDIT CARDS	LODGING	NUMBER ROOMS	POOL	CREDIT CARDS	CAMPING	NUMBER SITES	ELECTRIC	SWIMMING	DATES OPEN	POINTS OF INTEREST
172	UNION 78 STEWART OIL ARCO SUNOCO SHELL	*	*	*	DAIRY QUEEN BRAZIER HEN HOUSE	40	LD	Visa, MC	HERITAGE INN	17		Major	CAMPER'S RIDGE	68	*		Apr-Nov	
174	TEXACO STANDARD	*	*	*									LAKE OF THE WOODS TIN CUP PARK	100	*		All Year Mar-Nov	
179	NO SERVICES																	
181	CLARK TEXACO SHELL MARATHON PROSPECT 66 MOBIL	*	*	*	SHAKEY'S PIZZA HONG KONG RESTAURANT RED LOBSTER HOME STRETCH KENTUCKY ROAST BEEF THE EMIGRE BEST INNS RESTAURANT	150 170 160 150 87 200 44	LD LD LD LD LD BLD BLD		BEST INNS PENNY'S MOTEL PROSPECT MOTEL	107 26 40	* * *	Visa, MC Visa, MC	DEE-N-W LAKE	90	*		All Year	KRANNERT ART MUSEUM MISSISSIPPI NATIONAL HISTORY WORLD HERITAGE MUSEUM
182	STEWART OIL CO. STANDARD ARCO	*	*	*	ORANGE BOWL WAG'S RESTAURANT FRIENDLY ICE CREAM BOAR'S HEAD HOLIDAY INN RESTAURANT	20 140 98 160 108	LD BLD BLD LD BLD	Major Major	HOLIDAY INN	207	*	Major						TRAUMA CENTER
183	SPEEDWAY BRIGHT'S U-HAUL MOBIL	*	*	*														
184	STANDARD SHELL MOBIL PAY LESS KERR MCGEE TEXACO	*	*	*	TRAVEL LODGE RESTAURANT HOWARD JOHNSON'S SEA MERCHANT	102 89 176	BLD BLD LD	Major Major	TRAVEL LODGE HOWARD JOHNSON'S WILSON MOTEL MOTEL 6	150 104 16 104	* * * *	Major Major Visa, MC						

FIGURE 9 Sample page from motorist services guide (Illinois).

from maps; this difficulty appears to have little relationship to general intellectual ability. In some states, instruction in trip planning is given in driver education courses. For example, Fairfax County, Virginia, devotes 2 hr of its 36-hr course to map procurement, map reading, route selection, and timing.

In their study of urban guide signing, King and Lunenfeld (10) conclude that both major changes in the availability and adequacy of highway maps and improvements in drivers' navigational and trip-planning skills are required. They note that although trip planning and preparation are aids in destination finding on freeways, they do not help the motorist on the arterial streets. King and Lunenfeld believe this is due to the superior and more predictable freeway signing, as opposed to the harder-to-read and less predictable arterial signing.

Another problem is the increasing difficulty in finding highway maps. Many service stations no longer carry maps and those that do often charge for them. It is particularly difficult for the casual traveler to find inexpensive maps of urban areas. Hence, although the intercity driver may not encounter any problems in reaching the destination city, difficulty in obtaining map assistance to find the actual destination may cause a problem.

It has been suggested that the availability and distribution of city maps be standardized and programs to encourage their use be set up, but it has not been made clear which particular agency should develop and conduct such a program.

## REFERENCE SYSTEMS

Some motorists find cardinal direction information helpful, but many prefer left-right rather than east-west directions or directions to a particular city, bridge, tunnel, etc. Those who live in areas where roads are laid out in cardinal-direction grids seem to develop a facility for this reference system, whereas those who reside in areas where highways follow irregular terrain features rely on other reference systems.

One state traffic engineer observed that many motorists depend on following a numbered route to find the downtown area in a town or city. But this system becomes less dependable as principal through routes are rerouted to take advantage of the highest standard of highways and fastest travel paths available, often via bypass and ring roads.

Some motorists are "line" drivers who follow specific routes to their destinations with no concept of the area; other drivers appear to move within a reference frame based on particular features (for example, knowing that one is eastbound on a roadway north of the interstate highway and south of the river) or systems (for example, knowing that one is on a grid system and must continue straight ahead approximately 3 miles and then go left 2 miles). "Ground credibility" may be a problem for the motorist who has a strong frame of reference. The driver will have difficulty when a sign indicates to go left at a point where he knows the destination is to the right (or is shown to the right on the map).

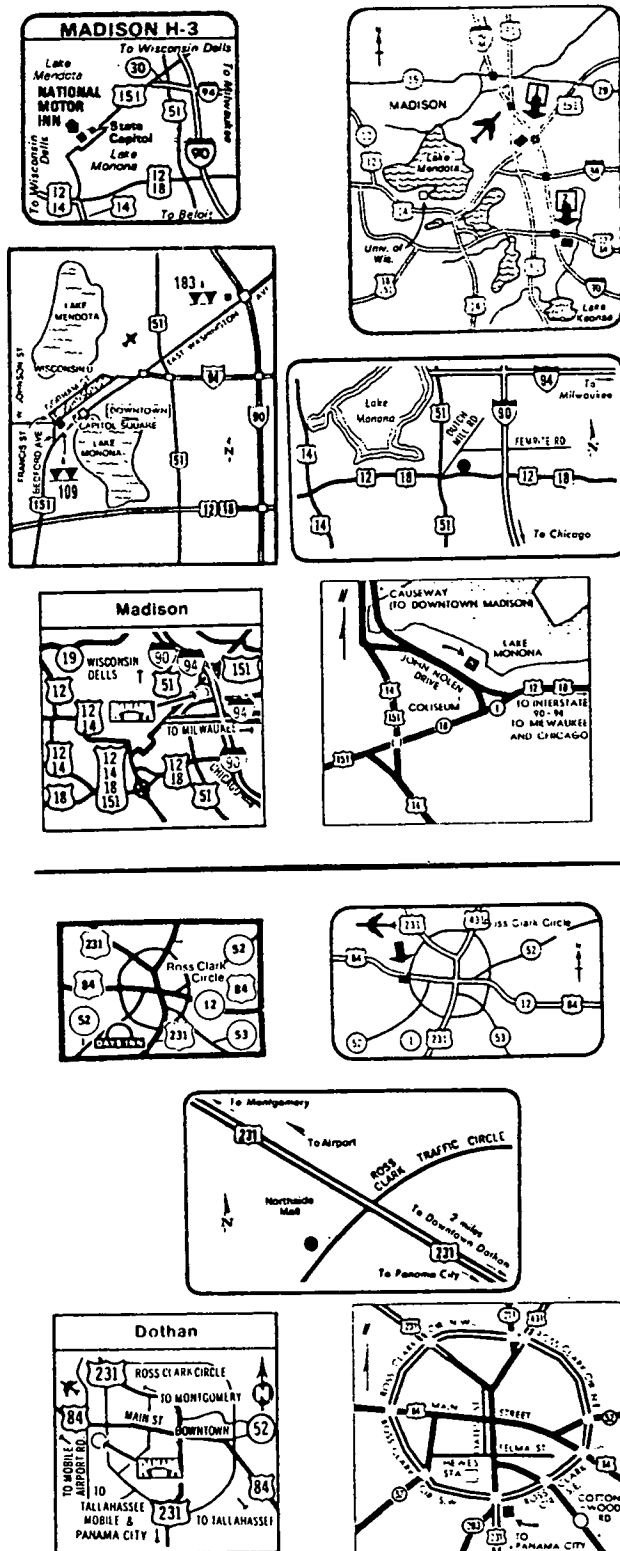


FIGURE 10 Examples of motel directory maps. *Top:* Madison, Wisconsin (Best Western, Holiday Inn, Howard Johnson's, Quality Inn, Ramada Inn, and Sheraton). *Bottom:* Dothan, Alabama (Days Inn, Holiday Inn, Quality Inn, Ramada Inn, and Sheraton).

Many traffic engineers agree that better reference systems are desirable, but have few suggestions concerning the ways to establish them. Grid systems, alphabetic street names, and consistent numbering systems are all helpful in setting up reference systems, but it is almost impossible to alter existing street names, numbers, etc. At the least, major streets should be identified on all urban maps and easily recognizable from the vehicle. One suggestion is to establish some well-known reference points in cities so that map users, or anyone who can match his reference system to these points, can find the way. If these reference points are established, then some interstate highway signing practices can be implemented in urban areas by designating these reference points on signs.

In Fairfax County, Virginia, prominent display of house numbers is required, which is of considerable assistance to motorists. Similar efforts should be encouraged in other areas, including urban business communities.

It is often difficult to establish good reference systems in rural areas, particularly in wooded, uneven terrain with winding roads, because it is difficult for drivers to orient themselves and to give and receive directions under these circumstances. Residence numbering systems, if they exist at all, are not nearly as helpful in rural areas as they are in urban areas. Other features, such as stream crossings, could be used.

One advantage of advertising signs with messages such as "\_\_\_ miles to John's Restaurant" is that they assist drivers in locating themselves within their own reference systems. But many of these information resources are being removed under the Highway Beautification Act, and some motorists have been complaining that many roadsides provide no indication of location.

Overall, orientation is the key concept in maps and reference systems. If a driver can orient himself on a map or with respect to a personal reference system, and that reference system is sophisticated enough, he will be able to find virtually any destination.

## SIGNS

Most traffic engineers agree that signs are a cost-effective means of transmitting information to motorists; signs are present 24 hr a day, usually demand attention, and are relatively inexpensive.

Presence and attention-attracting, however, are not always positive features. Arthur (13), arguing for wider use of maps, radio, guidebooks, etc., points out that these same signs also obtrude on those who do not need or want the information. He further states that the complexity of the highway network makes it inefficient to provide tourist-attraction information solely through signs. More signs than are aesthetically desirable, and perhaps more than are permitted by state policies and legislation, are often required for remote facilities.

It is not possible to provide a significant amount of destination-finding information through signs on urban arterial streets and highways. Most of these facilities already have too many signs. In addition, there are too many destinations of interest to the motorists on these facilities. Where





FIGURE 11 Large street-name sign.

destination signs must compete for motorist attention with regulatory and warning signs as well as with private advertising signs, they almost always get lost among the general visual clutter.

Mid-block, illuminated, and large street-name signs (Fig. 11) are favored by most of the people interviewed. These signs are more expensive than standard signs, however, and this added cost has discouraged their adoption in many areas. Where a warning sign is used in advance of an intersection, a plate with the name of the intersecting road may also be used (Fig. 12). Standard signs should be visible from either direction to both moving and stopped motorists.

In a questionnaire survey (10) directed at finding drivers' information needs, respondents indicated concern with aspects of signing such as size, legibility, target value, blockage, and illumination. The results of this survey suggest that improvements in street signing (larger signs, more prominent locations, advance signing) are high priorities with drivers. The display of Cartesian (grid) coordinates on street-name signs is strongly supported by the survey results.

Some engineers suggest that more trailblazing signs be used for tunnels, bridges, airports, sports stadiums, etc. The King and Lunenfeld (10) study supports this view, although others are convinced that this practice could easily get out of hand and result in "Christmas tree" signposts along main arterials. Figure 13 shows examples of such trailblazing signs. It is important to continue trailblazing signs all along the way to the point of interest. The geometry illustrated in Figure 14 was encountered while attempting to follow signs to a particular park; there are no signs to indicate whether the left or right side of the fork should be taken (right is the correct choice).

A final confirmation sign near some attraction centers would be very helpful. A driver frequently gets close to the city hall and then cannot identify the building.

Logo signs installed on the right-of-way are being viewed as replacements for off-right-of-way signs and billboards. Some state traffic engineers think that this is not a desirable trend, claiming that the single word "gas" meets the driver's needs and is easier to process than a whole bank of logo information. FHWA encourages the use of logo signs in rural areas, but opposes the use of such signs in urban areas on the basis that services are generally available in urban areas and these signs would unnecessarily add to the clutter. But it has been argued that if motorists encounter these signs regularly in rural areas but do not find them in urban and suburban areas, they will assume that the services are not available at the unsigned exits (9). Oregon charges rental fees for space on these on-right-of-way signs. Nationally known logos are easy to sign and simple for the motorist to comprehend, but a problem exists in the signing for local restaurants in that they do not have a recognized logo identity.

Finding particular campgrounds is also a problem for many motorists. Often they have only a general idea of the location of the campground they are seeking and are not certain whether the sign "camping" refers to that campground or another one. Pennsylvania permits the use of specific campground names on official signs, even if they are privately owned. Similarly, a "lodging" sign may not be helpful to a motorist looking for a particular hotel or motel.

The National Park Service is developing and implementing park sign plans for each park (22). These signs will conform to the National Park Service System Standards, but will *not* conform to the symbols, lettering style, and background color codes incorporated in the *Manual on Uniform Traffic Control Devices (MUTCD)* (6). For instance, each park will be able to select the background



color for its sign; e.g., the directional signs as shown in Figure 15 might be white on gray-blue, green, or brown (note in Figure 15 that the lettering style differs from that in *MUTCD*). An extensive set of symbols has been developed and is shown in Figure 16.

It is obvious that the very large attractions (e.g., major

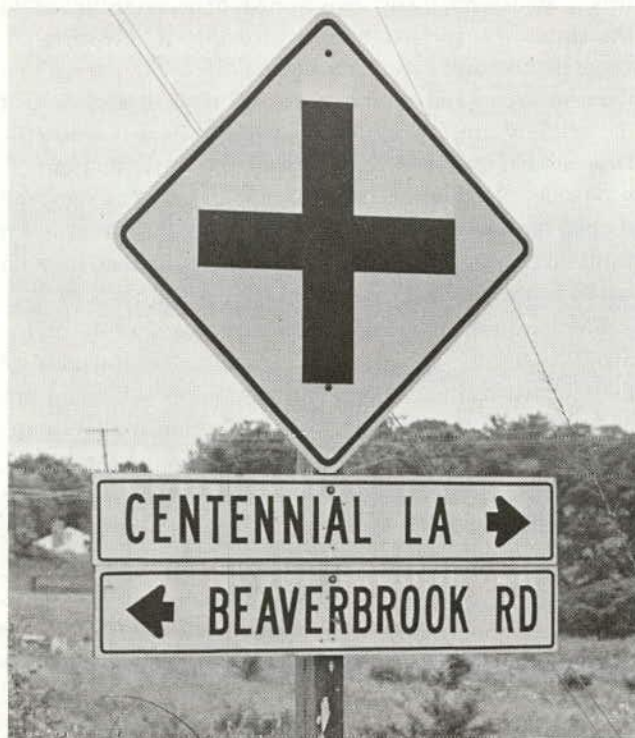


FIGURE 12 Intersection warning signs with name plates of the intersecting roads.

theme parks) must be signed for in some manner. Often it takes considerable ingenuity to provide the information that the motorists desire without violating the rules regarding the use of proper names and other signing principles and guidelines. One approach frequently used in a number of instances, including a few shopping centers, is to give the connecting roadway a name similar to the destination; then the roadway can be signed for even if the destination cannot. For example, Figure 17 shows signing for a road that goes to the plant of an automobile manufacturer. Figure 18 also illustrates this principle (although the Garden of the Gods Road may well have been named before the interstate highway was constructed). In this instance the driver is not provided with any information on whether to turn left or right at the base of the exit ramp to reach Garden of the Gods Park.

Many of those contacted suggest that it would be helpful to provide information about the business hours of services and attractions on approach signs. However, there have been no suggestions on how this might be reasonably accomplished.

Operating traffic engineers indicate that there are problems with the word "next" as used in "next exit," "next turn to the right," etc. Interpretation of these signs appears to depend somewhat on placement; some drivers interpret the sign to refer to the immediate exit, whereas others believe it refers to the next exit after the immediate one.

A related problem is encountered by drivers on I-25 looking for the exit to Colorado College in Colorado Springs. Shortly before the appropriate exit, and at a location where the exit cannot be seen because of alignment and vegetation, a sign states "COLO. COLLEGE, RIGHT LANE." There is no specific indication that the driver should exit at the first opportunity, and no mention of Colorado College at the exit gore itself.

Signing of ring roads and beltways has received considerable attention, but a satisfactory way of designating cardinal directions on these facilities has not been found.

Another area of confusion in signing that has no apparent satisfactory solution occurs when short segments of interstate highways run perpendicular to their general orientation. For example, I-90, an east-west route, runs north-south for a short segment in the Chicago area. In general, I-90 is signed east and west on this segment, which may confuse some drivers who know they are traveling north or south. The signs directing an off-interstate driver onto northbound ramps designated I-90 West create some distortion of the personal reference system unless the driver is familiar with the larger picture. This is not a problem for those who are sign followers, but it causes difficulty for those who attempt to drive within a mental frame of reference. The problem can be exacerbated if the segment of interstate overlies a normally north-south named freeway; in that case, the motorist may encounter signs indicating the same roadway as, for example, "I-50 Westbound" and "Smith Freeway Northbound."

King and Lunenfeld (10) indicate that major improvements are necessary in sign construction, erection, and maintenance practices. Particularly important is the selection of locations in terms of sight lines, competing infor-





FIGURE 13 Trailblazing signs.

mation sources, and the possibility of blocking by transit and commercial vehicles.

#### ADDITIONAL INFORMATION SOURCES

##### Changeable Message Signs

Those interviewed did not know of any instances in which changeable message signs were used to provide destination-finding information on any continuing, systematic basis. However, these signs are being used to assist drivers in selecting alternate routes in an experiment on Long Island, but it is generally assumed in this case that drivers are familiar with the general routes and know the way to their destinations.

A study (16) was made of the use of changeable message signs in providing alternative route information to those attending football games in the Cotton Bowl in Dallas. Drivers were directed off the freeway and onto other routes that were trailblazed to the stadium. Changeable message signs are also employed to assist motorists attending sporting events at the Cincinnati Stadium.

##### Billboards

If directions given on commercial billboards are not clear, the commercial interests mentioned on the billboards usually correct the information in short order, as the information loses its value if it is out of date, incorrect, or ineffective.

#### Radio Communications

Many of those interviewed mentioned that the advisory radio system at the Los Angeles airport is helpful in direction finding. However, the airport is a very closed system, and it is not certain that such a radio system would be useful on a citywide basis where the area to be covered is



FIGURE 14 Intersection where a trailblazing sign should have been provided as part of a series of signs.



FIGURE 15 National Park Service information and direction signs (22).

much larger and there is greater variation in the trip purposes and destinations of drivers.

Highway advisory radio was used to some extent in Philadelphia during the bicentennial celebration to assist drivers in finding outlying parking facilities so that they could use public transit for the remainder of the trip to the downtown area. This system made use of a prerecorded audio message repeated continuously at preselected points along the road; signs informed the driver of the proper radio setting to receive this information.

Where radio is used to provide real-time information on detours, traffic problems, etc., it is advisable to reference the information to points (bridges, tunnels, etc.) as well as to routes and streets. This will aid drivers unfamiliar with the immediate area in making inferences regarding traffic conditions in the surrounding areas and in choosing more effective bypass routes. These audio systems are conceptually similar to static or changeable message signs but permit the transmittal of information more detailed than can be posted on a sign.

Signs stating that "motorist information" can be obtained by tuning the radio to certain frequencies appear in some states. However, these stations do not provide continuous highway information; they apparently qualify for mention on these signs if they provide a certain amount of travel information per hour or day.

CB radio is used by a number of public agencies to assist motorists in emergencies. In general, the agencies discourage the use of CB radio for giving destination-finding information. However, motorists do cooperate with each other, and some claim that this is a very useful source of information. Others believe that interest in CB radio is

declining and that it is unlikely that CB radio will be central to any official information system.

The state police, a volunteer CB group, and track officials teamed up in the use of CB radio to provide route information to the 300,000 people attending the Indianapolis 500 race in 1978. It was estimated that from 30 to 35 percent of the incoming fans had CB radios and could receive the one-way information on routes, hazards, and parking conditions.

A number of motels and truck stops advertise on signs that they monitor specific CB radio channels. Again, this is not a very systematic source of information but might be useful to some motorists looking for services or motel vacancies.

#### Information Centers

Information centers can be excellent aids to motorists with destination-finding problems. The principal advantages of these centers are that the motorists ask for and receive the information at the times when they need it and have a chance to question any aspects of the information they do not understand. There are implementation problems, however, which are primarily related to cost. Many information centers operate only during limited hours, and this uncertainty of availability of service is a significant disadvantage. At a minimum, the centers should provide a good map display when no attendant is present. A multitude of approaches to a city or major recreation area creates the need for several information centers in most instances, which results in additional costs.

An information center is not helpful to the driver with an immediate problem in destination-finding within a city or recreational area. Usually the centers are on the edges of the area of interest and useful primarily to those who plan their trips in advance.

Questionnaire surveys by AAA confirm that information centers along interstate highways are very popular with motorists. It is not clear, however, whether the principal use of these facilities is as rest areas or information areas or as a combination single stop.

Commercial and public attractions often distribute descriptive brochures at these information centers. The brochure maps (Figs. 19, 20) are similar to those found in hotel and motel directories and are extremely variable in quality. (Note that Figures 19 and 20 are maps of the same area.) Because directions to specific points are given, it should be relatively easy to key these maps to easily identified landmarks.

Sign plazas are used in both rural and urban areas in Vermont, which charges a fee for a permit to display an advertising plaque. These fees cover the operating costs of these sign plazas (7).

#### Miscellaneous

Vermont, Nebraska, and Oregon have established travel information councils to provide information needed by mo-

## GENERAL

Firearms*	RS-001							RS-039 Picnic Shelter
Smoking*	RS-002							RS-040 Trailer Sites*
Automobiles*	RS-003							RS-041 Trailer Sanitary Station
Trucks*	RS-004							RS-042 Campfires*
Tunnel	RS-005							RS-043 Trail Shelter
Lookout Tower	RS-006							RS-044 Picnic Area*
Lighthouse	RS-007							RS-045 Kennel
Falling Rocks	RS-008							WINTER RECREATION
Dam	RS-009							RS-077 Winter Recreation Area
Fish Hatchery	RS-010							RS-046 Ski Touring
Deer Viewing Area	RS-011							RS-047 Downhill Skiing*
Bear Viewing Area	RS-012							RS-048 Ski Jumping
Drinking water*	RS-013							RS-049 Sledding*
Information	RS-014							RS-050 Ice Skating*
Ranger Station	RS-015							RS-051 Ski Bobbing*
Pedestrian Crossing*	RS-016							RS-052 Snowmobiling*
Pets on Leash*	RS-017							WATER RECREATION
Environmental Study Area	RS-018							RS-053 Marina
ACCOMMODATIONS OR SERVICE								RS-054 Launching Ramp*
Lodging	RS-018							RS-055 Motor Boating*
Food Service	RS-019							RS-056 Sailboating*
Grocery Store	RS-020							RS-057 Row Boating*
Men's Restroom	RS-021							RS-058 Water Skiing*
Restrooms	RS-022							RS-059 Surfing*
Women's Restroom	RS-023							RS-060 Scuba Diving*
First Aid	RS-024							RS-061 Swimming*
Telephone	RS-025							RS-062 Diving*
Post Office	RS-026							RS-063 Fishing*
Mechanic	RS-027							LAND RECREATION
Handicapped	RS-028							RS-064 Horse Trail*
Airport	RS-029							RS-065 Trail Bike Trail*
Lockers	RS-030							RS-066 Bicycle Trail*
Bus Stop	RS-031							RS-067 Recreation Vehicle Trail*
Gas Station	RS-032							RS-068 Hiking Trail*
Vehicle Ferry	RS-033							RS-069 Playground
Parking*	RS-034							RS-070 Amphitheater
Showers	RS-035							RS-071 Tramway
Viewing Area	RS-036							RS-072 Hunting*
Sleeping Shelter	RS-037							RS-073 Stable
Campground*	RS-038							RS-074 Interpretive Trail
								RS-075 Interpretive Auto Road
								Prohibiting Slash

\*Symbol available with red slash mark to indicate activity is prohibited

FIGURE 16 National Park Service recreational symbols (22).



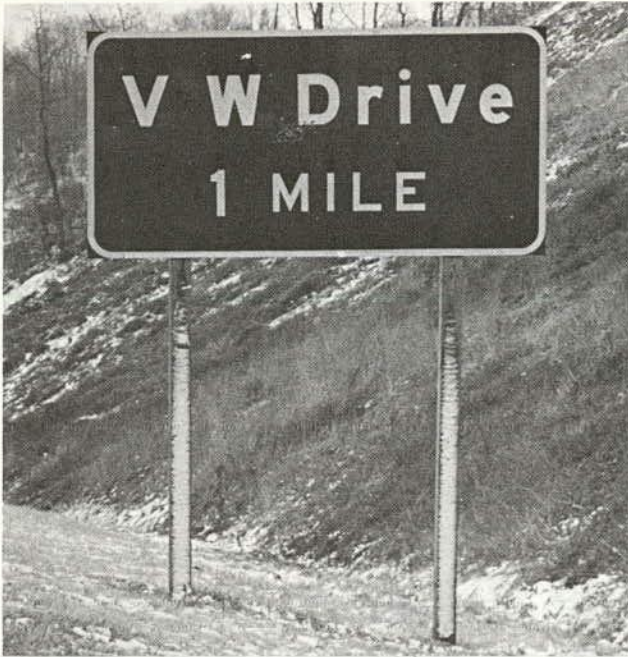


FIGURE 17 Signing for a road that goes to the plant of an automobile manufacturer.

torists. Vermont's program calls for the removal of all private roadside advertising except on-premise signs and a few directional signs. The travel information is to be provided by a combination of information centers, guidebooks and maps, sign plazas, and official directional signs (7).

Taxi drivers in some cities have books that provide information on links between minor streets and major arteries. This system is easily learned and almost any address can be found after just a brief training period. Perhaps some aspects of this technique could be adapted for use by the driving public.

#### ADVANCED INFORMATION SYSTEMS

Signing principles and systems are adequate at the present time, and it is unlikely that major advances in destination-finding information technology can be made in this area. However, some fundamental changes in information systems will be required before destination-finding performance improves significantly. Safety considerations have not provided sufficient motivation for the new investments and research required; however, increasing energy costs may well provide this impetus. As fuel costs rise, drivers will be motivated to be efficient and to use helpful, credible information systems provided by the highway agencies. However, there are those who doubt that increasing fuel costs will alter the manner in which motorists plan specific trips or choose among alternate routes.

In a FHWA research study, drivers were purposely misdirected from their intended routes, and then asked to

"recover" and continue to their original destinations. Those drivers provided with interrogative information systems found their destinations more easily than those using maps who, in turn, did somewhat better than those with no aids at all. Hence, sophisticated information systems can be effective in reducing energy loss due to inefficient routing. It is not as clear, however, whether these systems are actually cost-effective in view of the number of drivers likely to use and benefit from them.

In-vehicle display systems for providing destination-finding information are of particular current interest. Various elements of the electronic route guidance system (ERGS) are being considered by FHWA for further study. [See Stephens *et al.* (23) for a comprehensive description of ERGS.] A similar system known as comprehensive automobile control (CAC) is currently being operated as an experiment in Japan. Three-hundred and thirty vehicles have been equipped with dashboard instrumentation that gives the driver a visual indication of the desired route, with illuminated arrows showing where to make turns and when to change lanes, warning of congestion ahead, and recommending an alternate route. The system covers a 28-km<sup>2</sup> (11-miles<sup>2</sup>) test area in Tokyo (24, 25).

Armstrong (1) discusses the need for an electronic route guidance system in England, outlines the major features of a proposed system, and performs a cost-benefit analysis to show how the system would be economically feasible.

Holographs received some attention at one time. Their principal advantage is an ability to project the sign message directly into the driver's line of vision without any signposts; one disadvantage is their cost.



FIGURE 18 Signing for Garden of the Gods Road. Note that arrows point in both directions (*bottom*).

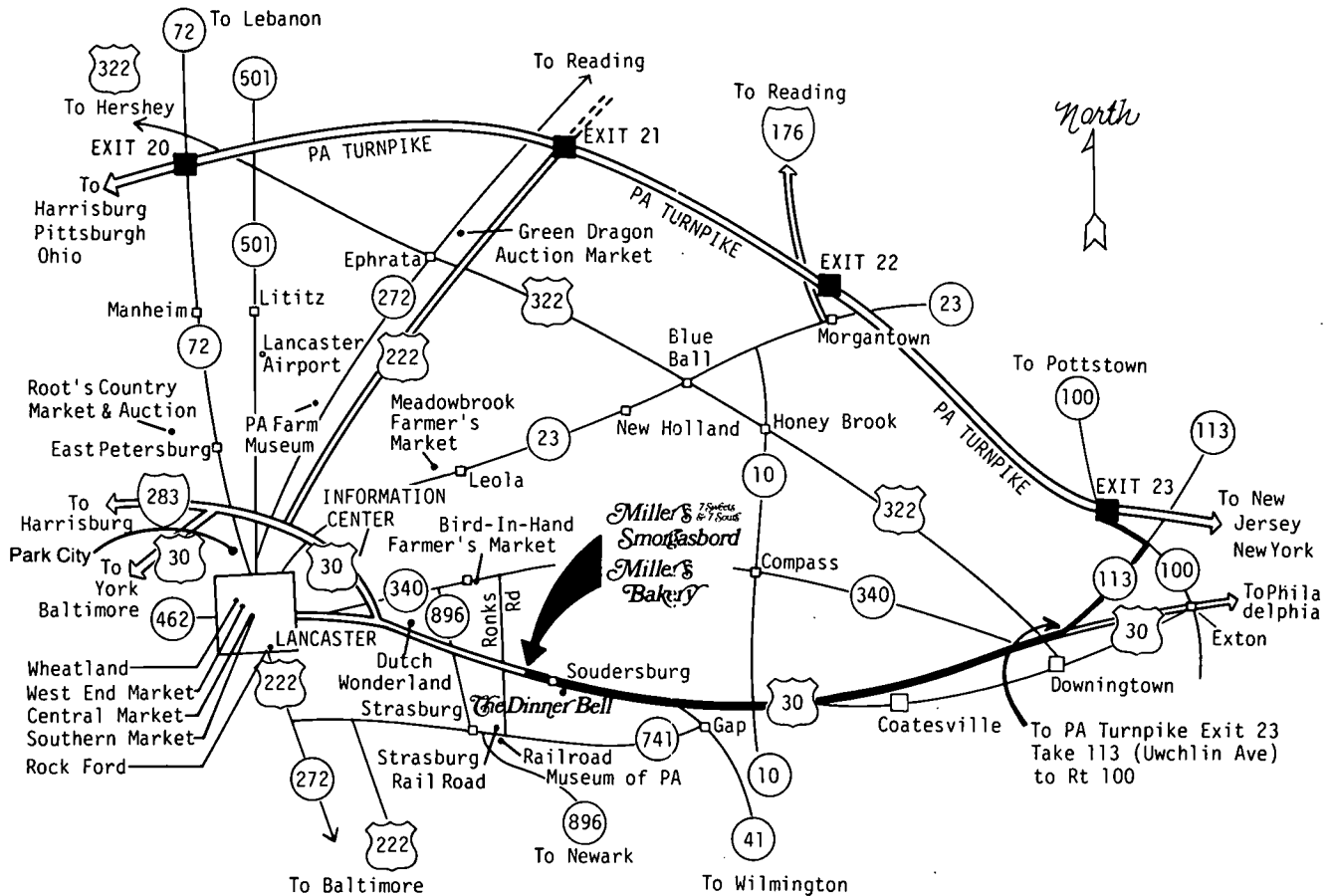


FIGURE 19 Map from brochure for a restaurant. Note that the map shown in Figure 20 covers approximately the same area.

In-vehicle telephone systems could give drivers access to information centers, computers, etc. These telephones are becoming less expensive and more readily available. FHWA intends to initiate a study of the possibilities of these telephone systems in the Washington, D.C., area. One important advantage this system has over other electronic and radio systems is that the telephone network already exists so that no special hardware system will be needed.

A different approach that requires planning and anticipation of destination information needs was developed at the Texas Transportation Institute and field-tested in Dallas. A telephone dial-in information service, utilizing a standard recorded message that was updated every 10 min during peak hours, gave drivers accurate information to aid them in planning intracity trips. Types of information provided included the locations of accidents and traffic congestion, suggested alternate routes, and current operating conditions on the urban freeways and arterials. The system was operated for approximately 18 months before it was terminated because of lack of use by the driving public (26).

Although not basically directed at destination-finding problems, the integrated motorist information system (IMIS) concept, which provides certain types of information to alleviate congestion problems for motorists operating in an intercity corridor, employs technology that would

be useful in providing destination-finding information. Variable message signs, roadside radio, CB radio, call boxes on the freeways, printed brochures, and dial-in telephone recordings for pretrip information were all evaluated in a demonstration project on the northern Long Island corridor in New York (14).

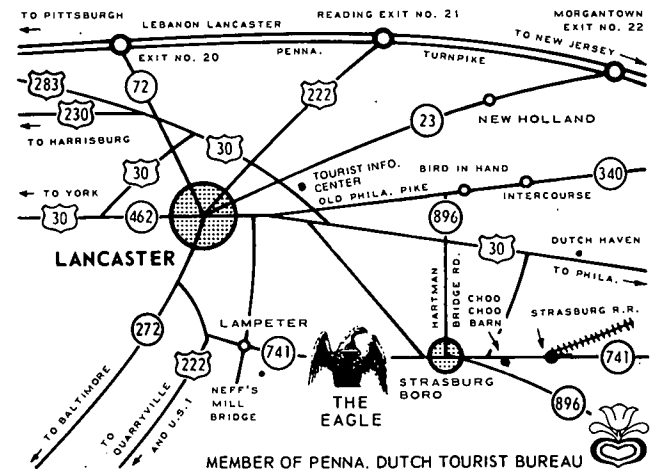


FIGURE 20 Map from a brochure for a museum.

## CONCLUSIONS AND RECOMMENDATIONS

There is diversity of opinion regarding the extent of the effort required to study and improve existing destination-finding information systems. Those involved in highway research and motorists' organizations such as AAA believe that the problems are more severe and deserving of attention than do the engineers charged with widespread implementation of the information systems and general operation of the highway transportation network. The latter group acknowledges that there are problems but thinks that a number of other concerns should have higher priority.

It is essential that the extent of the destination-finding problem be determined before deciding the amount of attention that should be accorded this matter. Researchers with FHWA plan to initiate such a study in the near future.

Major investments will be required to bring about any large-scale reduction in the energy, safety, and driver discomfort losses associated with present destination-finding information systems. Thus a careful and accurate description of the nature of the problems associated with deficiencies in the present systems is essential in order to estimate potential benefits at the time when decisions on major investments are required.

Although it is not likely that the overall nature of the problems associated with destination-finding information can be altered by modifications to existing information systems (as opposed to implementation of major new systems such as the widespread use of radio-telephone, ERGS, etc.), there are some areas that deserve attention and appear to hold promise for meaningful improvements in the operation of highway systems. These include the installation of improved street and road signs, increased use of trailblazing signs for special facilities, and better correlation between the information provided on maps and the signs and other features observed by drivers along the highway.

More specific conclusions and recommendations concerning direction-finding information follow:

- There is near unanimity among traffic engineers, representatives of motorists' organizations, and human-factor specialists in highway transportation that street-name signs are a key element in the destination-finding process. Mid-block, illuminated, or large street-name signs have been installed in a few locations and an analytical study (27) has indicated the need for these signs. However, there has not been a field evaluation of the merits of these more expensive signs as compared with the standard, small, street-corner signs. It is recommended that a study of costs, implementation problems, and benefits of highly visible streetname signs be made, which might include a demonstration project.
- It is not likely that feasible improvements to signs providing destination-finding information will lead to major improvements in travel efficiency or ease. More signs, or more information per sign, would provide useful information to some drivers, but this advantage could be offset by the difficulty these drivers would have sifting through the additional information provided to find the directions pertinent to their own trips. Also, the intrusion of more or larger signs would not be environmentally acceptable. Present signing systems appear to be close enough to the optimum trade-off between additional information and clutter so that major improvements in this area would not be helpful.
- There is a great amount of literature reflecting a considerable research effort with respect to signs and the more exotic information systems that have been proposed and, in some cases, tested. The highway community has not paid much attention to the human factors and motorist needs associated with maps, billboards, advisory radio, CB radio, and information centers. Either the community has decided that these methods of communicating destination-finding information do not merit more consideration, or there are no strong proponents or specific officers within transportation organizations who feel responsibility for advancing the state of the art of these means of delivering information to the driving public. Gradual progress in changing existing information systems will be possible only if efforts are concentrated on effective programs for new facilities, new maps, etc.
- It is not at all clear that the driving public favors the removal and prohibition of food and lodging signs resulting from the highway beautification efforts in recent years. In many cases, adequate substitutes have not been provided. Although drivers may now travel in a more attractive environment, they experience more difficulty in orienting themselves in unfamiliar locations (there are fewer checkpoints identified to fill in the frame of reference). Further, they find it more difficult to integrate food and lodging needs with other trip requirements.
- The destination and service-signing policies of individual states vary considerably, not only in the types of services and attractions that are signed by the states but also in those types that are permitted to install their own signs. It will be difficult to develop policies that are reasonable and pertinent for the whole nation or even for several individual states. There is great diversity in the density of attractions meriting consideration for signing, in the density of the highway systems under jurisdiction of particular agencies, in the regularity or irregularity of street and highway patterns because of topographic constraints, and in the relative proportion of unfamiliar drivers in given areas. All



of these factors are critically important to the design of meaningful information system policies.

- In addition to the initial destination information signs for particular attractions that are usually placed on major highway systems, it is important that the driver be directed all the way to the destination after leaving the major artery by means of destination signs or trailblazing signs. If the destination merits specific mention on the major arterial system, it also merits signs on intermediate roadways. The return route to the arterial should also be signed.

- There is disagreement regarding the relative usefulness of placing route numbers, names of distant major cities, or local landmarks on guidance signs located on major arteries. It is not always possible to provide all these kinds of information. Although the majority of drivers passing a particular sign location might prefer one type of information, in fact many will not need or use the information on the sign, whatever it may be. The sign should be designed to suit the drivers who need information at that point.

- Driver problems have not been documented nor have driver needs been defined in terms that are directly useful in the development and implementation of policies regarding destination-finding information. Most practicing agencies do not approach the problem from that viewpoint, i.e., an analytical study based on probable driver needs. They have, instead, developed guidelines for specific types of destinations to use in their responses to requests for additional signing (almost always initiated by the "destination" itself rather than by motorists). Although attention is given to routes and major city destinations on new facilities, signing for individual attractions is still done primarily in response to requests instead of as affirmative action on the part of the transportation agency.

- The procedures used by motorists to find their destinations are numerous and not well-documented. Some drivers follow specific routes and look for "point" destinations

on signs, whereas others drive within some self-generated reference systems. The needs of these two types of motorists are obviously different: the "route followers" need continual confirmation that they are on the proper routes heading toward their specific destinations; the "reference system" drivers need information that reinforces their reference systems, and they may find all kinds of landmark information useful (even if the landmarks are not directly on their routes).

- Service stations, fire and police departments, and pedestrians continue to serve as major components of the destination-finding information system. A real alternative for this one-to-one, multidestination information resource does not exist at the present. Unfortunately, direction-finding information from such sources is not always correct or always interpreted properly by the receivers. In addition, there may well be safety problems associated with the stops and other erratic behavior by drivers to obtain this information.

- There appears to be little effort to coordinate map features with the signs (or any other identifying features) that motorists may observe while driving the highway system. Hence, even a driver who has an up-to-date map to assist in finding particular destinations may at times have difficulty identifying his particular "moving location" on that map. An associated problem is that many drivers cannot or will not use maps effectively.

- Sophisticated electronic route guidance systems are under study in a number of countries, and small-scale installations have been tested. These systems can assist drivers in finding their destinations and selecting efficient routes, but are very expensive to install in a systematic fashion. Questions still remain regarding the solution of destination-finding problems with these systems and the means to encourage motorists to use such systems if they do become available.

## REFERENCES

1. ARMSTRONG, B. D. 1977. The Need for Route Guidance. *Transport and Road Research Laboratory Supplementary Record 330*. Crowthorne, Berkshire, Great Britain: Transport and Road Research Laboratory.
2. FLOYD, C. F., and D. M. MCGURN. 1977. Control of outdoor advertising: the Georgia experience. *Transp. Res. Rec.* 631: 91-95.
3. 10,630 Advertising Signs Removed. 1979. *AASHTO Quarterly* 58(1): 38.
4. MULLOWNEY, W. L. 1977. Signing Warrants for Non-Service Facilities. Unpublished report from the New Jersey Department of Transportation (August).
5. KOBETSKY, K. F., et al. 1977. Report of the AASHTO Traffic Subcommittee Task Force on Attraction and Travel Service Signing (June).
6. Federal Highway Administration. 1978. *Manual on Uniform Traffic Control Devices*. Washington, D.C.: Federal Highway Administration, U.S. Department of Transportation.
7. JUSTIS, R., JR. 1973. Vermont's Travel Information System. Pp. 7-15 in *Highway Research Circular No. 152*. Washington, D.C.: Transportation Research Board, National Research Council.
8. CHRISTENSON, B. M. 1973. Nebraska's Interstate Travel Information System. Pp. 15-19 in *Highway Research Circular No. 152*. Washington, D.C.: Transportation Research Board, National Research Council.
9. HAMPSON, A. 1973. Oregon's Travel Information Council. Pp. 20-22 in *Highway Research Circular No. 152*. Washington, D.C.: Transportation Research Board, National Research Council.
10. KING, G. F., and H. LUNENFELD. 1972. Urban Area Highway Guide Signing. Final Report prepared for NCHRP Project 3-12(2).
11. EBERHARD, J. W. 1968. Driver information requirements and acceptance criteria. *Highw. Res. Rec.* 265: 19-30.
12. GORDON, D. A., and H. C. WOOD. 1970. How drivers locate unfamiliar addresses—an experiment in route finding. *Public Roads* 36(2): 44-47.
13. ARTHUR, P. 1973. An Exploratory View of Tourist Information Systems. Pp. 1-6 in *Highway Research Circular No. 152*. Washington, D.C.: Transportation Research Board, National Research Council.
14. ZOVE, P., R. GORDON, J. SCOTT, and C. BERGER. 1977. Integrated Motorist Information System (IMIS) Feasibility and Design Study. Phase 1: Flexibility Study. Vol. 3. Executive Summary. Federal Highway Administration Report No. FHWA-RD-77-49.
15. WEAVER, G. D., C. L. DUDEK, D. R. HATCHER, and W. R. STOCKTON. 1977. Approach to real-time diversion of freeway traffic for special events. *Transp. Res. Rec.* 644: 57-61.
16. RICHARDS, S. H., W. R. STOCKTON, and C. L. DUDEK. 1978. Analysis of driver responses to point diversion for special events. *Transp. Res. Rec.* 682: 46-52.
17. LEVIN, M. 1977. Evaluating location effectiveness of freeway directional and diversion signs. *Transp. Res. Rec.* 644: 122-124.
18. DUDEK, C. L., G. D. WEAVER, D. R. HATCHER, and S. H. RICHARD. 1978. Field evaluation of messages for real-time diversion of freeway traffic for special events. *Trans. Res. Rec.* 682: 37-45.
19. ALLEN, B. L., S. M. EASA, and E. R. CASE. 1978. Application of freeway-corridor assignment and control model. *Transp. Res. Rec.* 682: 76-84.
20. WARD, A. W. 1977. The state of state road maps. *Am. Cartogr.* 4(1): 5-9.
21. Subcommittee on Uniform Map Symbols of the Committee on Highway Planning. 1962. *Report on Uniform Map Symbols*. Part I—Progress Report; Part II—Final Report. Washington, D.C.: American Association of State Highway Officials.
22. National Park Service (circa 1977). *National Park Service Signs*. Washington, D.C.: U.S. Department of the Interior.
23. STEPHENS, B. W., R. A. ROSEN, F. J. MAMMANO, and W. L. GIBBS. 1968. Third generation destination signing: an electronic route guidance system. *Highw. Res. Rec.* 265: 1-18.
24. DOUGLAS, J. H. 1977. Computerizing Tokyo's traffic. *Sci. News* 112(25): 412-414.
25. International Road Federation. 1979. Electronic route guidance system tested successfully in Tokyo. *World Highw.* 30 (8) (August): 2.
26. CARVELL, J. D., JR., and D. R. HATCHER. 1977. Dial-in freeway-traffic information system. *Transp. Res. Rec.* 643: 37-40.
27. WOODS, D. L., and N. J. ROWAN. 1970. Street name signs for arterial streets. *Highw. Res. Rec.* 325: 51-61.

## APPENDIX A

### FEDERAL STANDARDS FOR DIRECTIONAL AND OFFICIAL SIGNS<sup>1</sup>

#### Subpart B—National Standards for Directional and Official Signs

**AUTHORITY:** 23 U.S.C. 131, 315, 49 U.S.C. 1651; delegation of authority in 49 CFR 1.48(b).

#### § 750.151 Purpose.

(a) In section 131 of title 23, United States Code, Congress has declared that:

(1) The erection and maintenance of outdoor advertising signs, displays, and devices in areas adjacent to the Interstate System and the primary system should be controlled in order to protect the public investment in such highways, to promote safety and recreational value of public travel, and to preserve natural beauty.

(2) Directional and official signs and notices, which signs and notices shall include, but not be limited to, signs and notices pertaining to natural wonders, scenic and historical attractions, which are required or authorized by law, shall conform to national standards authorized to be promulgated by the Secretary, which standards shall contain provisions concerning the lighting, size, number and spacing of signs, and such other requirements as may be appropriate to implement the section.

(b) The standards in this part are issued as provided in section 131 of title 23, United States Code.

[38 FR 16044, June 30, 1973, as amended at 40 FR 21934, May 20, 1975]

#### § 750.152 Application.

The following standards apply to directional and official signs and notices located within six hundred and sixty (660) feet of the right-of-way of the Interstate and Federal-aid primary systems and to those located beyond six hundred and sixty (660) feet of the right-of-way of such systems, outside of urban areas, visible from the main traveled way of such systems and

erected with the purpose of their message being read from such main traveled way. These standards do not apply to directional and official signs erected on the highway right-of-way.

[40 FR 21934, May 20, 1975]

#### § 750.153 Definitions.

For the purpose of this part—

(a) Sign means an outdoor sign, light, display, device, figure, painting, drawing, message, placard, poster, billboard, or other thing which is designed, intended, or used to advertise or inform, any part of the advertising or informative contents of which is visible from any place on the main traveled way of the Interstate or Federal-aid primary highway.

(b) Main traveled way means the through traffic lanes of the highway, exclusive of frontage roads, auxiliary lanes, and ramps.

(c) Interstate System means the National System of Interstate and Defense Highways described in section 103(d) of title 23, United States Code.

(d) Primary system means the Federal-aid highway system described in section 103(b) of title 23, United States Code.

(e) Erect means to construct, build, raise, assemble, place, affix, attach, create, paint, draw, or in any other way bring into being or establish.

(f) Maintain means to allow to exist.

(g) Scenic area means any area of particular scenic beauty or historical significance as determined by the Federal, State, or local officials having jurisdiction thereof, and includes interests in land which have been acquired for the restoration, preservation, and enhancement of scenic beauty.

(h) Parkland means any publicly owned land which is designated or used as a public park, recreation area, wildlife or waterfowl refuge or historic site.

(i) Federal or State law means a Federal or State constitutional provision or statute, or an ordinance, rule, or regulation enacted or adopted by a State or Federal agency or a political subdivision of a State pursuant to a Federal or State constitution or statute.

(j) Visible means capable of being seen (whether or not legible) without visual aid by a person of normal visual acuity.

(k) Freeway means a divided arterial highway for through traffic with full control of access.

(l) Rest area means an area or site established and maintained within or adjacent to the highway right-of-way by or under public supervision or control for the convenience of the traveling public.

(m) Directional and official signs and notices includes only official signs and notices, public utility signs, service club and religious notices, public service signs, and directional signs.

(n) Official signs and notices means signs and notices erected and maintained by public officers or public agencies within their territorial or zoning jurisdiction and pursuant to and in accordance with direction or authorization contained in Federal, State, or local law for the purposes of carrying out an official duty or responsibility. Historical markers authorized by State law and erected by State or local government agencies or nonprofit historical societies may be considered official signs.

(o) Public utility signs means warning signs, informational signs, notices, or markers which are customarily erected and maintained by publicly or privately owned public utilities, as essential to their operations.

(p) Service club and religious notices means signs and notices, whose erection is authorized by law, relating to meetings of nonprofit service clubs or charitable associations, or religious services, which signs do not exceed 8 square feet in area.

(q) Public service signs means signs located on school bus stop shelters, which signs—

(1) Identify the donor, sponsor, or contributor of said shelters;

(2) Contain public service messages, which shall occupy not less than 50 percent of the area of the sign;

(3) Contain no other message;

(4) Are located on schoolbus shelters which are authorized or approved by city, county, or State law, regulation, or ordinance, and at places approved

<sup>1</sup> From Code of Federal Regulations, Title 23, Chapter 1.

by the city, county, or State agency controlling the highway involved; and

(5) May not exceed 32 square feet in area. Not more than one sign on each shelter shall face in any one direction.

(r) Directional signs means signs containing directional information about public places owned or operated by Federal, State, or local governments or their agencies; publicly or privately owned natural phenomena, historic, cultural, scientific, educational, and religious sites; and areas of natural scenic beauty or naturally suited for outdoor recreation, deemed to be in the interest of the traveling public.

(s) State means any one of the 50 States, the District of Columbia, or Puerto Rico.

(t) Urban area means an urbanized area or, in the case of an urbanized area encompassing more than one State, that part of the urbanized areas in each such State, or an urban place as designated by the Bureau of the Census having a population of five thousand or more and not within any urbanized area, within boundaries to be fixed by responsible State and local officials in cooperation with each other, subject to approval by the Secretary. Such boundaries shall, as a minimum, encompass the entire urban place designated by the Bureau of the Census.

[38 FR 16044, June 30, 1973, as amended at 40 FR 21934, May 20, 1975]

#### § 750.154 Standards for directional signs.

The following apply only to directional signs:

(a) *General.* The following signs are prohibited:

(1) Signs advertising activities that are illegal under Federal or State laws or regulations in effect at the location of those signs or at the location of those activities.

(2) Signs located in such a manner as to obscure or otherwise interfere with the effectiveness of an official traffic sign, signal, or device, or obstruct or interfere with the driver's view of approaching, merging, or intersecting traffic.

(3) Signs which are erected or maintained upon trees or painted or drawn upon rocks or other natural features.

(4) Obsolete signs.

(5) Signs which are structurally unsafe or in disrepair.

(6) Signs which move or have any animated or moving parts.

(7) Signs located in rest areas, parklands or scenic areas.

(b) *Size.* (1) No sign shall exceed the following limits:

(i) Maximum area—150 square feet.

(ii) Maximum height—20 feet.

(iii) Maximum length—20 feet.

(2) All dimensions include border and trim, but exclude supports.

(c) *Lighting.* Signs may be illuminated, subject to the following:

(1) Signs which contain, include, or are illuminated by any flashing, intermittent, or moving light or lights are prohibited.

(2) Signs which are not effectively shielded so as to prevent beams or rays of light from being directed at any portion of the traveled way of an Interstate or primary highway or which are of such intensity or brilliance as to cause glare or to impair the vision of the driver of any motor vehicle, or which otherwise interfere with any driver's operation of a motor vehicle are prohibited.

(3) No sign may be so illuminated as to interfere with the effectiveness of or obscure an official traffic sign, device, or signal.

(d) *Spacing.* (1) Each location of a directional sign must be approved by the State highway department.

(2) No directional sign may be located within 2,000 feet of an interchange, or intersection at grade along the Interstate System or other freeways (measured along the Interstate or freeway from the nearest point of the beginning or ending of pavement widening at the exit from or entrance to the main traveled way).

(3) No directional sign may be located within 2,000 feet of a rest area, parkland, or scenic area.

(4)(i) No two directional signs facing the same direction of travel shall be spaced less than 1 mile apart;

(ii) Not more than three directional signs pertaining to the same activity and facing the same direction of travel may be erected along a single route approaching the activity;

(iii) Signs located adjacent to the Interstate System shall be within 75 air miles of the activity; and

(iv) Signs located adjacent to the primary system shall be within 50 air miles of the activity.

(e) *Message content.* The message on directional signs shall be limited to the identification of the attraction or activity and directional information useful to the traveler in locating the attraction, such as mileage, route numbers, or exit numbers. Descriptive words or phrases, and pictorial or photographic representations of the activity or its environs are prohibited.

(f) *Selection method and criteria.* (1) Privately owned activities or attractions eligible for directional signing are limited to the following: natural phenomena; scenic attractions; historic, educational, cultural, scientific, and religious sites; and outdoor recreational areas.

(2) To be eligible, privately owned attractions or activities must be nationally or regionally known, and of outstanding interest to the traveling public.

(3) Each State shall develop specific selection methods and criteria to be used in determining whether or not an activity qualifies for this type of signing. A statement as to selection methods and criteria shall be furnished to the Secretary of Transportation before the State permits the erection of any such signs under section 131(c) of title 23, United States Code, and this part.

#### § 750.155 State standards.

This part does not prohibit a State from establishing and maintaining standards which are more restrictive with respect to directional and official signs and notices along the Federal-aid highway systems than these national standards.

[38 FR 16044, June 20, 1973, as amended at 40 FR 21934, May 20, 1975]

## APPENDIX B

### STATE REGULATIONS

Many states have adopted the federal standards (Appendix A) with only minor additions or changes. Examples are given of some state regulations that expand on the federal standards for local use.

#### ARIZONA

4. f. iii. The Director, Arizona Department of Transportation, will appoint a "Selection Board of Directional Signing Qualifications" consisting of three administrative or professional employees of the Department of Transportation, one of whom shall be designated as chairman, to judge and approve the qualifications for directional signing of privately owned activities or attractions as limited to the categories in subdivision (i.) and the qualification in subdivision (ii.) above.
- iv. Applicants for directional signs involving privately owned activities or attractions shall first qualify such activity or attraction by submitting an official qualification form to the attention of the Maintenance Permit Engineer, Highways Division, Arizona Department of Transportation. The Maintenance Permit Engineer will forward the application for qualification, along with any technical data which may assist the Board in making their determination, to the Selection Board.
- v. Applicant shall indicate one or more categories (as listed in subdivision (i.) above) that is applicable to the activity or attraction for which qualification is sought. Applicants shall submit a statement and supporting evidence that the activity or attraction is nationally or regionally known and is of outstanding interest to the traveling public.
- vi. The Qualifications Board will, upon approval or rejection of an application, give notification of its determination, in writing, to the applicant and to the Maintenance Permit Engineer.
- vii. The Maintenance Permit Engineer will not issue any permits for any privately owned activity or attraction until receipt of qualification approval by the Qualifications Board. All directional sign permits issued for the Department of Transportation by the Maintenance Permit Engineer will meet the standards for

directional and other "official signs" as incorporated in the "Rules and Regulations for Outdoor Advertising Along Arizona Highways" approved and issued by the Director, Arizona Department of Transportation.

- g. "Rural Activity Signs" are intended to give directions to rural activity sites located along rural roads connecting to state highways. The signs must be located in areas primarily rural in nature. Rural activities that may qualify include ranches, recreational areas and mines. Signs for private residences, subdivisions, and commercial activities are not permitted. Industrial activities that are located in primarily rural areas such as mines or material pits may be allowed. The signs shall not be located in "business areas," "unzoned commercial or industrial areas," or within municipal limits. The selection Board may make final determination of eligibility for such signs which are necessary. Not more than one sign pertaining to a rural activity facing the same direction of travel may be erected along a single route approaching the rural connecting road. Signs will be limited to ten square feet in area. All other standards for directional signs shall apply.
- h. No application fee is required for "Official signs and notices," "Public utility signs," "Service club and religious notices," "Public service signs" or "Directional signs" erected by federal, state or local governments. Other directional signs require a permit application and \$20.00 fee.

#### MISSOURI

##### 7 CSR 10-6.020 DIRECTIONAL AND OTHER OFFICIAL SIGNS.

**PURPOSE:** This rule provides standards for the selection, erection and maintenance of directional and other official signs and notices authorized by section 226.520(1) RSMo which are consistent with federal regulations, 23 CFR 750.151 *et seq.*, implemented under 23 USC 131 (c)(1). This rule does not apply to signs erected by the State Highway Commission on highway right-of-way under sections 226.525 and 226.535 RSMo or to signs, displays or devices providing directional information about goods and services in the interest of the traveling public under section 226.520(5) RSMo and 7 CSR 10-6.060 (2)(D).

(1) **DEFINITIONS.** See 7 CSR 10-6.015.

(2) **CATEGORIES OF DIRECTIONAL AND OTHER OFFICIAL SIGNS.** Directional or other official signs include the following five classes of signs:

- (A) "Official signs and notices" means signs and notices erected and maintained by public officers or public agencies within their territorial or zoning jurisdiction and pursuant to and in accordance with direction or authorization contained in federal, state or local law for the purpose of carrying out an official duty or responsibility. Historical markers authorized by state law and erected by state or local government agencies or nonprofit historical societies may be considered official signs.
- (B) "Public utility signs" means warning signs, informational signs, notices or markers which are customarily erected and maintained by publicly or privately owned public utilities, as essential to their operations.
- (C) "Service club and religious notices" means signs and notices, whose erection is authorized by law, relating to meetings of nonprofit service clubs or charitable associations, or religious services.
- (D) "Public service signs" means signs located on school bus stop shelters which shall: identify the donor, sponsor, or contributor of such shelters; contain public service messages, which shall occupy not less than 50 percent of the area of such sign; contain no other message; be located on school bus shelters which are authorized or approved by city, county, or state law, regulation, or ordinance, and at places approved by the city, county or state agency controlling the highway involved.
- (E) "Directional signs" means signs containing directional messages about public places owned or operated by federal, state or local governments or their agencies; publicly or privately owned natural phenomena, historic, cultural, scientific, educational, and religious sites; and areas of natural scenic beauty or naturally suited for outdoor recreation, deemed by the State Highway Commission to be in the interest of the traveling public.

(3) **STANDARDS FOR OFFICIAL SIGNS AND NOTICES.**

- (A) General. These signs do not include official traffic signs such as street name signs, speed limit signs or other directional or regulatory signs.
- (B) Size. There are no size limitations.
- (C) Lighting. Signs may be illuminated subject to the restrictions of 7 CSR 10-6.020(7)(C).
- (D) Spacing. There are no spacing limitations.

(4) **STANDARDS FOR PUBLIC UTILITY SIGNS.**

- (A) Size. There are no size limitations.

- (B) Lighting. Signs may be illuminated subject to the restrictions of 7 CSR 10-6.020(7)(C).
- (C) Spacing. There are no spacing limitations.

(5) **STANDARDS FOR SERVICE CLUB AND RELIGIOUS NOTICES.**

- (A) Size. Several such signs may be secured to a single structure providing a separate permit is obtained by the sign owner or occupant of the land on which the sign is located from the State Highway Commission for each display or emblem on each side or facing of the sign. Each display or emblem shall not exceed 8 square feet in area.
- (B) Lighting. Signs may be illuminated subject to the restrictions of 7 CSR 10-6.020(7)(C).
- (C) Spacing. There are no spacing limitations.

(6) **STANDARDS FOR PUBLIC SERVICE SIGNS.**

- (A) Size. Each sign may not exceed 32 square feet in area.
- (B) Lighting. Signs may be illuminated subject to the restrictions of 7 CSR 10-6.020(7)(C).
- (C) Spacing. There are no spacing limitations except that not more than one sign on each shelter shall face in any one direction.

(7) **STANDARDS FOR DIRECTIONAL SIGNS.** The following standards apply only to directional signs:

- (A) General. The following directional signs are prohibited: signs advertising activities that are illegal under federal or state laws or regulations in effect at the locations of those signs or approaching, merging, or intersecting traffic; signs that move or have any animated or moving parts; signs located in rest areas, parklands, or scenic areas; and signs not lawfully existing under section 226.550.2 RSMo or unlawful signs under section 226.580 RSMo and 7 CSR 10-6.080(2).
- (B) Size. No sign shall exceed the following limits: maximum area—150 square feet; maximum height—20 feet; and maximum length—20 feet. All dimensions include border and trim but exclude supports.
- (C) Lighting. Signs may be illuminated, subject to the following restrictions: signs that contain, include, or are illuminated by any flashing, intermittent, or moving light or lights are prohibited; signs that are not effectively shielded so as to prevent beams or rays of light from being directed to any portion of the traveled way of an interstate or primary highway or that are of such intensity or brilliance as to cause glare or to impair the vision of the driver of any motor vehicle, or that otherwise interfere with any driver's operation of a motor vehicle are prohibited; and no sign may be so illuminated as to interfere with the effectiveness of or obscure an official traffic sign, device, or signal.
- (D) Spacing. Each location of a directional sign must

be approved by the district engineer prior to its erection. No directional sign may be located within 2,000 feet of an interchange or intersection at grade along the interstate system or freeway primary highway (measured along the interstate or freeway primary highway from the nearest point of the beginning or ending of pavement widening at the exit from or entrance to the main traveled way). No directional sign may be located within 2,000 feet of a rest area, parkland, or scenic area; no two directional signs advertising the same activity or attraction and facing the same direction of travel shall be spaced less than 1 mile apart. No more than three directional signs pertaining to the same activity or attraction facing the same direction of travel may be erected along a single route approaching the activity or attraction. Signs located adjacent to the primary system shall be within 50 air miles of the activity or attraction.

- (E) **Message Content.** The message on directional signs shall be limited to the identification of the attraction or activity and directional messages useful to the traveler in locating the attraction or activity, such as mileage, route numbers, or exit numbers. Descriptive words or phrases, and pictorial or photographic representations of the activity or attraction, or its environs, are prohibited and disqualify the sign from being maintained as a directional sign.

(F) **Selection Method and Criteria.**

1. **Criteria.** Activities and attractions qualifying for directional signing shall be limited to: public places owned or operated by federal, state or local governments or their agencies; publicly or privately owned natural phenomena, historic, cultural, scientific, educational, and religious sites; and areas of natural scenic beauty or naturally suited for outdoor recreation.
2. **Selection.** The State Highway Commission shall determine those public and private activities and attractions which qualify for directional signing. After filing an application for a directional sign permit, the applicant may petition the State Highway Commission to determine whether or not a specific public or private activity or attraction is eligible for directional signing. The petition may be in letter form and shall include: a statement by the owner of the activity or attraction describing the activity or attraction; and evidence that the activity or attraction is nationally or regionally known and is of outstanding interest to the traveling public. In the case of any publicly owned activity or attraction the petition must also be accompanied by the written consent or approval of the federal, state, or local political subdivision having legal authority or control over the activity or attrac-

tion where the authority is not the applicant requesting that the activity or attraction be designated as eligible for directional signing. The State Highway Commission may grant the applicant, upon request, a public hearing to aid the commission in reaching a decision of whether or not the activity or attraction qualifies for directional signing. Such a hearing would be informal and would not be subject to the procedural requirements of Chapter 436 RSMo. In exceptional cases, the commission may require review and concurrence by the United States Secretary of Transportation before reaching a decision. Petitions and requests for public hearing must be in writing and addressed to the district engineer for the county in which the activity or attraction is located. See 7 CSR 10-6.010.

## NEBRASKA

### 21-(7) *Class IV Signs*

- (a) Class IV signs are those signs containing directional information erected by governmental authorities, civic organizations, nonprofit clubs, churches and schools.
- (b) *Class IVA Signs:* Class IVA signs are those signs erected by governmental authorities containing directional information about public places owned or operated by federal, state or local governments or their agencies; public or privately owned natural phenomena, and historic, cultural, scientific, educational and religious sites; and areas of natural scenic beauty or naturally suited for outdoor recreation deemed to be in the interest of the traveling public. The message of Class IVA signs must be limited to identification of the activity and directional information to assist in locating it. Descriptive words or phrases or pictorial representations shall not be permitted.
  - (i) **Class IVA Signs—Size:** Class IVA signs shall not exceed 150 square feet in area and shall not be more than 20 feet in length or height.
  - (ii) **Class IVA Signs—Spacing Requirements:**
    - (A) Class IVA signs shall be located in such a manner as not to endanger the health, safety and welfare of the traveling public. They shall not obstruct the view of oncoming traffic or any traffic control devices.
    - (B) Class IVA signs may be placed no closer together than one per 100 feet within urban areas or the corporate limits of a municipality and

no closer than one per mile outside of urban areas or the corporate limits of a municipality.

- (C) Class IVA signs may not be located closer than 2,000 feet to a rest area, parklands, or scenic area.
- (D) Not more than 3 directional signs visible to the traveling public, pertaining to the same activity and facing in the same direction of travel, may be erected along a single route approaching the activity, in areas in advance of an interchange or intersection nearest to the activity. None of such signs may be located nearer than 1 mile to the interchange nor more than five miles from such interchange on the Interstate System and such signs may not be located more than five miles from such intersection on the primary system.
- (E) Class IVA signs must be located within 75 air miles of the activity advertised if the sign is adjacent to an interstate highway or within 50 air miles of the activity advertised if located upon a primary highway.

- (iii) Class IVA signs must have a permit from the State of Nebraska, Department of Roads.

- (c) *Class IVB Signs:* Class IVB signs are those signs erected by the governing body of a municipality or a civic organization, which contain directional information about various noncommercial activities within the municipality, including but not limited to directional information about churches, schools, service clubs, parks and other points of interest to the traveling public. The message on Class IVB signs must be limited to identification of the activity and directional information to assist in locating it. Descriptive words or phrases or pictorial representations shall not be permitted.

- (i) Class IVB Signs—Size:

- (A) Class IVB signs shall not exceed 8 square feet in area or, if in combination with other signs on the same structure, a total combined area of 150 square feet, provided no individual sign exceeds 8 square feet.
- (B) No Class IVB sign or combination of signs shall exceed 20 feet in length or height.

- (ii) Class IVB signs shall not be erected within

the area of advertising control on the Interstate System except by the governing body of a municipality or its authorized agent. Such authorization must be provided for by official ordinance or resolution.

- (iii) Class IVB signs erected within the corporate limits of a municipality and within the advertising control area on the Primary System shall be spaced so that:

- (A) No more than one sign facing each direction of travel may be erected in the block preceding the intersection of the federal-aid primary highway and the street leading to the activity.
- (B) Class IVB signs within urban areas or the corporate limits of a municipality shall not exceed 8 square feet in area.

- (iv) Class IVB Signs—Spacing:

- (A) Class IVB signs shall be located in such a manner as not to endanger the health, safety and welfare of the traveling public. They shall not obstruct the view of oncoming traffic or any traffic control devices.
- (B) Not more than 3 directional signs, visible to the traveling public, pertaining to the same activity and facing the same direction of travel, may be erected along a single route approaching the activity in areas in advance of the interchange or intersection nearest to the activity. On the Interstate System, none of such signs may be located nearer than 1 mile to the interchange nor more than five miles from such interchange. On the Primary System, such signs may not be located more than five miles from the nearest intersection leading to the activity or may not be more than five miles in advance of the corporate limits of a municipality served by the Primary System.

- (v) Class IVB signs must have a permit from the State of Nebraska, Department of Roads.

#### 21-(10) *Prohibited Signs*

- (a) The erection or maintenance of the following signs may not be permitted in controlled areas:



- (i) Signs advertising activities that are illegal under federal, state or local laws or regulations.
- (ii) Obsolete or discontinued signs.
- (iii) Signs that are not in substantial good repair or a major portion of the message or advertising content is obscured and unreadable.
- (iv) Signs that are not securely affixed to a substantial structure.
- (v) Signs that attempt or appear to attempt to direct the movement of traffic, obscure or interfere with the effectiveness of, or imitate or resemble any official traffic signal, sign or device.
- (vi) Signs that prevent the driver of a vehicle from having a clear and unobstructed view of official signs and approaches to intersections.
- (vii) Signs erected or maintained upon trees or painted or drawn upon rocks or other natural formations or features.
- (viii) Signs that move or have animated or moving parts are prohibited except for the following signs:
  - (A) Class IIB signs if they comply with all other requirements of that class.
  - (B) Class IID signs if they comply with all other requirements of that class.
  - (C) Class IIE signs if they comply with all other requirements of that class.
- (ix) Signs painted, printed or mounted upon parked automobiles, trucks, trailers or a movable structure are prohibited except for the following signs:
  - (A) Class IIB signs if they comply with all other requirements of that class.
  - (B) Class IID signs if they comply with all other requirements of that class.
  - (C) Class IIE signs if they comply with all other requirements of that class.

## VIRGINIA

3. The State Highway and Transportation Commissioner, under §33.1-352, has the duty to administer and enforce provisions of Chapter 7, Title 33.1. The Commission and he recog-

nize that there are other state agencies that have as their primary purpose the control and administration of the type of specific unique phenomena or site, for which a directional sign application may be made, and have valuable experience and knowledge in the matters contained in sub-paragraph (1r). Therefore, the following state agencies are hereby recognized for the purpose of making recommendations whether a site, area, agency, or phenomenon falls within the definition set forth in sub-paragraph (1r);

Department of Conservation and  
Economic Development  
Commission of Outdoor Recreation  
Historic Landmarks Commission  
State Library (Historical Publication  
Division)

The recommendations must be based upon criteria presently utilized or hereinafter adopted by one of these agencies. After the recommendation is received the Commissioner must employ the following standards in addition to those which appear elsewhere to ascertain whether a site, area, agency, or phenomenon is eligible for directional signs.

- (a) That publicly or privately owned activities or attractions eligible for directional signing are limited to the following: natural phenomena; scenic attractions; historic, educational, cultural, scientific, and religious sites; and areas naturally suited for outdoor recreation.
  - (b) Any of the above must be nationally or regionally known as determined by the Commissioner.
  - (c) Any of the above must be of outstanding interest to the traveling public as determined by the State Highway and Transportation Commissioner.
  - (d) The area, site, agency or phenomenon seeking to qualify for "Directional Signs" shall be the principal area, site, agency or phenomenon that would appear on proposed sign and not ancillary to the message that would appear on the sign.
4. The Commissioner shall make the final determination whether a site, area, agency or phenomenon is eligible for directional signs. The signs must conform to the requirements and standards set out herein.

## APPENDIX C

### EXAMPLES OF STATE POLICIES AND CRITERIA FOR DIRECTIONAL SIGNING

#### PROCEDURES

State of Florida Department of Transportation

#### SUBJECT:

#### SIGNING POLICY FOR TRAFFIC GENERATORS ON INTERSTATE AND FREEWAYS

##### 1. SCOPE

Establish criteria and priorities for the erection of supplemental guide signs on Interstate Highways and Freeways (as defined in the 1970 Manual on Uniform Traffic Control Devices) maintained and operated by this State of Florida Department of Transportation.

##### 2. PURPOSE

- a. Provide a system of supplemental signing that will inform the motorists of facilities that generate a comparatively large rate of traffic.
- b. Improve the traffic flow and safety at interchange locations in the vicinity of large traffic generators.
- c. Limit the use of supplemental guide signs by establishing criteria for their use.
- d. Comply with the provisions of the 1970 Manual on Uniform Traffic Control Devices, as adopted by this Department, and comply with requirements of the Federal Highway Administration.

##### 3. SPECIFIC REQUIREMENTS

- a. Supplemental guide signs shall be those so defined in the 1970 Manual on Uniform Control Devices and locations and other characteristics of any such signs erected shall be in conformance with the provisions of this manual and the criteria established in this policy.
- b. All supplemental guide signs for traffic generators must be approved by the Director of Road Operations prior to the erection of the signs. Supplemental guide signs will not be automatically erected for all facilities that meet the criteria. Requests for signing must be made by the facility and recommended by the appropriate District Engineer prior to consideration for approval.
- c. All supplemental guide signs for traffic generators on interstate highways, or other routes requiring federal concurrence, must be approved by the Federal Highway Administration prior to the erection of the signs.
- d. Existing signs not in compliance with this policy shall not be rehabilitated and may be removed at any time up to December 31, 1973. All signs not in compliance with this policy shall be removed after that date.

##### 4. CRITERIA FOR SUPPLEMENTAL GUIDE SIGNS

- a. Restrictions or limitations must be established so that facilities that generate the greatest need for information will appear on the supplemental guide signs. This, however, does not mean that all facilities that meet the criteria will automatically receive informational signing. Signs will be restricted to a maximum of two facilities and, where the sign may be installed, must meet other standard criteria as to space and location. In the event that there are more than two qualifying traffic generators, the two traffic generators that exceed the prime criterion by the greatest percentage should be shown. Signing for the traffic generators is considered supplemental to the overall signing. In all cases, sufficient longitudinal space shall exist for the placement of the sign without interfering with the necessary traffic control devices. Traffic generator signs will not be installed in advance of freeway-to-freeway interchanges.
- b. Not more than one supplemental guide sign for traffic generators shall be provided in each direction along any one freeway. Signs for these facilities shall be located in advance of the interchanging minor road that is the more direct and best route to the facility.
- c. Information relating to a traffic generator may be displayed along a second freeway, providing the prime criteria is exceeded by at least 50 percent and the traffic generator is within two-thirds of the specified distance for the nearest freeway and within the specified distance for the farthest freeway.

TABLE I

TRAFFIC GENERATORS NOT RECOMMENDED FOR  
SUPPLEMENTAL SIGNING

Businesses

TV/Radio Stations  
Theaters  
Motels/Hotels/Inns  
Trailer Parks

Cemeteries

Local or State  
Private/Public  
Military

Communities

City Centers  
Civic Centers  
Libraries  
Churches  
Subdivisions

Governmental

Research/Experimental  
County and City Police  
Facilities  
Courthouses  
Driver's License Centers  
Highway Buildings  
Jails/Prisons  
Civil Defense Facilities  
Maintenance Facilities

Schools

Grade/High  
Vocational/Trade  
Seminaries  
Private

Historical

Homes and Buildings  
Sites and Monuments  
Privately Owned Facilities

Medical

Mental Facilities  
Research Facilities  
Sanitariums  
Infirmaries or Treatment Centers  
Veterans Facilities  
County, Fraternal, or Nursing Homes  
Retirement Facilities  
Humane Facilities

Military

Sites or Detachments  
Armories  
Arsenals

Recreational/Conservational

Country Clubs and Golf Courses  
Fish Hatcheries, Game Farms,  
Preserves, and Refuges  
Tree Nurseries, Arboretums  
Points of Interest  
Aquariums, Museums, Zoos, and  
Planetariums  
Camps: Scout, Church, 4-H, Youth  
YMCA and YWCA

Transportation

Bus Terminals  
Railroad Stations  
Truck Terminals  
Parking Facilities

- d. Signing for a generator operating for a limited time period each year and that meets the annual criteria may be displayed on a temporary supplemental guide sign removed at the end of the limited period. If the facility exceeds 25 percent of the prime criteria during the balance of the year, permanent supplemental guide signs may be provided.
- e. In no case shall information relating to traffic generators be displayed on a supplemental guide sign until signing has been installed along the interchanging minor road and other roads to direct the motorist from the freeway to the facility.

5. **TRAFFIC GENERATORS WHICH QUALIFY TO BE INCLUDED  
AS A DESTINATION ON SUPPLEMENTAL GUIDE SIGNS**

- a. Supplemental guide signs shall not be provided for those traffic generating facilities listed in Table I nor shall they be included as destinations on any existing guide signs.
- b. Supplemental guide signs may be provided for those traffic generating facilities listed in Table II provided that the specific facility meets the criteria shown in the table for traffic generators of its type.

Special signs not meeting any of the above criteria may be considered and installed upon recommendation of the Department and approval of the Federal Highway Administration.

**TABLE II**  
**CRITERIA FOR SIGNING FOR TRAFFIC GENERATORS**  
**ON INTERSTATE & FREEWAY SIGNING**

Type of Generator	Specific Criteria	Major Metropolitan Areas	Urban Areas	Rural Areas
Airports	Number of Regularly Scheduled Movements (One-Way) Per Day	40	30	20
	Mileage	10	10	10
Colleges Universities	Full-time Enrollment (Prime Criterion)	10,000 Up to 4,000 part-time students on a 2 for 1 basis may be used in meeting this criterion, i.e., the maximum credit for part-time students shall be 2,000.	8,000	6,000
	Off-Street Parking Stalls	500	200	200
	Mileage	3	4	5
Military Bases	Employees or Permanently Assigned Personnel (Prime Criterion)	5,000	5,000	5,000
	Mileage	3	4	5
Arenas	Seating Capacity	5,000	5,000	5,000
Auditoriums				
Beaches				
Convention Halls	Parking Stalls	500	300	200
Dams				
Fairgrounds				
Lakes				
National Historical Sites	Annual Attendance	200,000 people plus 20,000 per mile of distance from freeways up to 5 miles plus 300, per mile for each additional mile over 5 for all population groups. Only those days with 1,000 or more attendance will be considered.		
National Parks				
Recreation Areas				
Stadiums				
State Parks				
State Police Stations	Mileage	1	1	2
Toll Highways and Bridges	Direct access from exit and part of the state highway system.			
Business District	Direct access and not more than 5 miles from the interchange.			

## SOUTH CAROLINA

## SERVICE SIGNING CRITERIA

On conventional highways, commercial services such as gas, food, and lodging are generally within sight and available to the traveler at reasonably frequent intervals along the route. Consequently, there is not expected to be any need on this class of roads for special signs calling attention to these services. It is likely, however, that general motorist service signs will be desirable on rural controlled access facilities where such services are infrequent and are to be found only on an intersecting highway or crossroad.

General motorist service signing, which will identify the availability of gasoline, food, lodging, camping, telephone, hospital, and tourist information centers, may be erected on controlled access facilities in rural areas. Such signs will not be used on conventional highways other than where necessary to direct motorists from the interchange (at which the major service sign is posted) toward the service. No service signs other than hospital will be used on controlled access highways within suburban or urban areas nor at any interchange where the motorist cannot return to the controlled access highway and continue in the same direction of travel.

Signs designating a motorist service may be installed when the following conditions are met:

- A. Gas
  - 1. Located within one mile of interchange.
  - 2. Vehicle services such as fuel, oil, lubrication, tire repair and water.
  - 3. Continuous operation at least 16 hours per day, 7 days a week.
  - 4. Rest room facilities.
  - 5. Drinking water.
  - 6. Telephone.
- B. Food
  - 1. Located within three miles of the interchange.
  - 2. Permit to operate by the health authority.
  - 3. Continuous operation at least 16 hours per day to serve 3 meals a day, 7 days a week.
  - 4. Rest room facilities.
  - 5. Telephone.
- C. Lodging
  - 1. Located within three miles of the interchange.
  - 2. Permit to operate by the health authority.
  - 3. Continuous operation, 12 months per year.
  - 4. Adequate sleeping accommodations.
  - 5. Telephone.
- D. Camping
  - 1. Located within five miles of the interchange.
  - 2. Permit to operate by the health authority.
  - 3. Modern sanitary facilities.
  - 4. Drinking water.
  - 5. Overnight accommodations for all types of travel trailers, tents, and camping vehicles.
  - 6. Adequate parking accommodations.
  - 7. Continuous operation, 7 days a week.
  - 8. If operated on a seasonal basis, signs are to be removed or "Camping" portion of sign message covered if on a combination sign.
- E. Phone
  - 1. Located with a Rest Area or Welcome Center having direct ramp connections to the controlled access roadway.
  - 2. Continuous operation, 7 days a week.
- F. Hospital
  - 1. Located within ten miles of the interchange.
  - 2. Continuous emergency care capability, with service available and open 24 hours a day, 7 days a week.
  - 3. Doctor available 7 days a week to provide emergency care with:
    - a. Physician on duty within the emergency department, or
    - b. Registered nurse on duty within the emergency department, with a physician in the hospital on call, or

- c. Registered nurse on duty within the emergency department, with a physician on call from his office or home.

In any location, a hospital meeting condition (a) will be given sign priority over a hospital meeting condition (b); and a hospital meeting condition (b) will be given sign priority over a hospital meeting condition (c).

G. Tourist Information Center

1. Located in rest area on freeway, or within one mile of the interchange and on a direct route from the freeway.
2. Complete information on tourist facilities, such as lodging, eating, recreational, historical and scenic sites available in the State at no charge to the customer.
3. An attendant, with knowledge of tourist facilities in the State, on duty to serve customers during all hours of operation.
4. Continuous operation for at least 8 hours of the day, 7 days per week.
5. Housed in an appropriate building to provide an area, heated in winter and cooled in summer, of not less than 500 square feet of floor area for displays and lounge.
6. Adequate space for non-commercial public service materials and displays.
7. Rest room facilities.
8. Drinking water.
9. Telephone.
10. Adequate off-street parking at no cost to the customer.
11. If operated on a seasonal basis, signs are to be removed or "TOURIST INFO CENTER" portion of sign message covered if on a combined sign.

In determining distances from the interchange, roadway mileages are to be utilized. The mileage will be measured outward from the interchange, beginning at the points where the crossing roadway and off-ramp intersects each side of the controlled access facility. If the off-ramp terminal is channelized or there are two off-ramps, the measurement shall begin at the intersection furthest from the controlled access facility. Where there is an acceleration lane along the crossing road, the measurement will start at the location where the left edge of the pavement on the ramp joins the right edge of the pavement on the crossing roadway. The measurement will terminate at the location of the service establishment under consideration; and for camping facilities, the distance will be measured to the check-in office.

Recommendations - 11/21/73

#### POLICY FOR SUPPLEMENTAL GUIDE SIGNING ON FREEWAYS AND EXPRESSWAYS

##### Need for Policy

The selection of information to be presented to a motorist in advance of a specific interchange is critical to the safe and efficient use of expressways and freeways. The Manual on Uniform Traffic Control Devices provides mandatory requirements for certain aspects of this signing, particularly as relating to major guide signs. These signs normally indicate cities, towns, and communities located along the route. Also, other signs indicating the availability of certain services such as gas, food and lodging may be shown on service signs.

In addition to the information presented on major guide signs and on service signs, there is sometimes a need to provide supplemental signs to indicate other traffic generators. There is a wide range of facilities that may presently qualify for inclusion on supplemental guide signs and new facilities are constantly being constructed.

These criteria are needed for selecting from the competing generators those most appropriate (facilities which generate the greatest need for information on the part of motorists) for displaying on supplemental guide signs on expressways and freeways.

##### General Criteria

While these criteria indicate certain generators (other than cities and towns) that qualify for inclusion on supplemental signs, all such facilities should not automatically receive informational signing. Signing for the traffic generators is considered supplemental to the overall signing. Therefore, before a sign for a traffic generator is installed, sufficient longitudinal space should exist to accommodate the placement of the sign without interfering or conflicting with necessary traffic control devices.

Not more than one supplemental guide sign for a traffic generator should be provided in each direction along any one freeway. Signs for these facilities shall be located in advance of the interchanging conventional road that provides the most direct and best route to the facility. Supplemental guide signs for traffic generators should not be installed in advance of freeway-to-freeway interchanges.

TABLE I

## TRAFFIC GENERATORS THAT DO NOT NORMALLY WARRANT SIGNING

Businesses

Business District  
Shopping Centers  
TV/Radio Stations  
Theaters  
Motels/Hotels/Inns\*  
Trailer Parks\*

Cemeteries

Local or State  
Private/Public  
Military

Communities

City Centers  
Civic Centers  
Libraries  
Churches  
Subdivisions

Governmental

Research/Experimental  
County and City Police  
Facilities  
Courthouses  
Driver's License Centers  
Highway Buildings  
Jails/Prisons  
Civil Defense Facilities  
Maintenance Facilities

Schools

Grade/High  
Junior Colleges  
Vocational Trade  
Seminaries  
Technical  
Private

Historical

Homes and Buildings  
Sites & Monuments  
Privately Owned Facilities

Medical

Hospitals\*  
Mental Facilities  
Research Facilities  
Sanitariums  
Infirmarys or Treatment Centers  
Veterans Facilities  
County, Fraternal, or Nursing Homes  
Retirement Facilities  
Humane Facilities

Military

Sites or Detachments  
Armories  
Arsenals

Recreational/Conservational

Country Clubs and Golf Courses  
Fish Hatcheries, Game Farms,  
Preserves, and Refuges  
Tree Nurseries/Arboretums  
Points of Interest  
Aquariums, Museums, Zoos, and  
Planetariums  
Camps: Scout, Church, 4-H, Youth  
and YMCA/YWCA

Transportation

Bus Terminals  
Railroad Stations  
Truck Terminals  
Parking Facilities

\*Items may in some instances be included  
on Motorists Service signs (GAS-FOOD-  
LODGING-CAMPING-HOSPITAL)

In the event there are two or more freeways within the vicinity of the generator, information relating to the traffic generator should normally be displayed along the freeway that is nearest to the facility. Supplemental guide signs should not normally be erected for a traffic generator that would require a motorist to travel on the interchanging minor road beyond a second freeway.

Information relating to not more than two places (cities, towns or traffic generators) may be displayed in advance of an interchange. In the event there are more than two qualifying traffic generators, the two traffic generators that greatest exceed the prime criterion and are of most significance to non-local motorists should be shown, except where a city or town is to be indicated; then only the most significant generator should be shown along with the city or town. If there is information relating to two traffic generators on a permanent supplemental guide sign in advance of an interchange, a temporary guide sign should not normally be installed to indicate a generator that is open for a limited time period each year. Preference should be given to the traffic generators shown on the permanent signs.

Information relating to traffic generators should not be displayed on a supplemental guide sign until signing has been installed at the ramp terminals and along the interchanging minor road and other roads as necessary to direct the motorist from the freeway or expressway to the facility.

#### Specific Criteria

Table I provides a list of traffic generators for which signing shall not be provided on supplemental signs along freeways. This table is not all-inclusive but provides an indication of the type of facilities not normally warranting signs.

Supplemental signing may be considered on freeways for any other traffic generator that meets the criteria in Table II. Those criteria for which the qualifying values may vary with time, such as student enrollment and annual attendance, will be judged on the average value for the two previous years.

TABLE II  
GUIDELINE CRITERIA FOR SIGNING TRAFFIC GENERATORS

Type of Generator	Specific Criteria	Major (1) Metropolitan Areas	Urban Areas (2)	Rural Areas
Airports	Number of Regularly Scheduled Flights (One-Way Departures) Per Day	20	10	10
	Mileage*	8	8	8
Colleges Universities	4-Year Institution	Yes	Yes	Yes
	Enrollment (Full-time students) (Prime Criterion)	500	500	500
	Accredited	Yes	Yes	Yes
	Mileage*	3	4	8
Military Bases	Employees and Permanently Assigned Military Personnel (Prime Criterion)	5,000	5,000	5,000
	Mileage*	3	4	5
Arenas Auditoriums Convention Halls	Seating Capacity	5,000	5,000	5,000
	Parking Stalls	500	300	200
	Mileage	2	4	5
Stadiums	Seating Capacity	15,000	10,000	5,000
	Parking Stalls	500	300	200
	Mileage	2	4	5
National Historical Sites National Parks Recreation Areas (Publicly Owned) State Parks	Annual Attendance (Prime Criterion)	200,000	200,000	100,000
	Mileage	2	4	8

(1) 50,000 or more population in Central City of Urban Area.

(2) 5,000-49,000 population in Central City of Urban Area.

\* Maximum distance from freeway interchange.



## WISCONSIN

GUIDELINES FOR DIRECTIONAL SIGNING  
FOR  
PUBLIC AND PRIVATE FACILITIES AND INSTITUTIONS

**I. SCOPE**

These guidelines are intended to set forth the criteria and general standards for signs to be erected on the State Trunk Highway System for the following types of public and private facilities and institutions.

**A. Airports****B. Parks****C. Sports Stadia, Fair Grounds, Zoos****D. Hospitals****E. Educational Institutions**

1. Universities and Colleges
2. Vocational Schools and Technical Colleges

**F. Motorist Services**

1. Motels and Hotels
2. Restaurants
3. Service Stations
4. Campgrounds
5. Telephones

**II. GENERAL**

It is the purpose of these guidelines to describe all types of facilities and institutions for which signs may be erected on State Highway right of way. It shall be assumed that signs will not be permitted for any type of facility or institution not mentioned herein. (For example, elementary schools are not mentioned and directional signs for them will not be permitted).

The basic supposition is that the facility or institution as a class is of interest and concern to a sufficient number of motorists to warrant the special directional signing. It is also a basic assumption that the purpose of this signing is guidance and not advertising. For this reason, no sign may carry any logo or message other than the identification of the type of facility or institution except as hereafter specifically permitted. It is also for this reason that directional signs for shopping centers, industrial parks or privately owned recreational facilities will not be permitted. (However, the latter may have directional signs of the type provided by Chapter Hy 10, Wisconsin Administration Code if they meet the criteria in Hy 10.)

Direction signs for a facility or institution will not be erected at an intersection of two State Trunk Highways unless such facility or institution is the only logical and reasonable destination on one of the State Routes, or it is close to the intersection and is a substantial traffic generator.

### III. SIGNING FOR SPECIFIC TYPES OF FACILITIES AND INSTITUTIONS

#### A. Airports

##### 1. Signing by type of airport facility

- a. Except as provided in Section 2, below, directional signs will be provided on the State Trunk Highway System for all airports having regularly scheduled air service (including commuter service).
- b. Directional signs will be provided on State Trunk Highways other than Interstate Highways for all other publicly-owned airports included in the State Airport System Plan.

##### 2. Number and Location of Access Points to be Signed

- a. Airport directional signs may be erected, as detailed herein, only at the point or points giving access to the airport by the most direct route.
- b. Signs will normally be provided only at one point for traffic in each direction on a given highway. Thus, signing for both directions of traffic may be provided at one access point on a given highway, or signing may be provided for one direction at one access point and signing for the other direction of traffic at a second access point.
- c. Where it is established that there are exits from two different highways on the State Trunk Highway System which reasonably serve an airport, directional signs may be erected for one or both directions of traffic on both highways.
- d. Airport directional signs shall not be erected on the State Trunk Highway System more than 5 miles from an airport unless specifically authorized by the Central Office.
- e. Where an airport is located adjacent to a State Trunk Highway directional signs may be erected for the entrance thereto.

##### 3. Responsibility for Airport Directional Signing

- a. The Division of Highways will be responsible for the furnishing, installation and maintenance of all airport directional signs erected on the right of way of the State Trunk Highway System, except as set forth in paragraphs 3c and 4c below.

- b. The Division of Highways will not erect airport directional signs on State Trunk Highways unless all other signs deemed reasonably necessary by the District Engineer to guide motorists to the airport are in place on other highways forming the route from the State Trunk Highway System to the airport.
- c. Signs necessary to direct along local roads from the State Trunk Highway System to the airport (and back to the State Highway) are the responsibility of the authority in charge of the maintenance of the highway upon which the signs are erected.
- d. The Division of Highways will remove the airport directional signs from the State Trunk Highway System at any location where in the judgment of the District Engineer the signing by others of the route to the airport is not being maintained in such a manner that motorists can follow the route to the airport.

#### 4. Types of Airport Directional Signs

##### a. On Freeways

- (1) The design and installation of these signs shall conform to the general design and installation standards for freeway guide signs.
- (2) The airport name will be incorporated in the major guide sign where it is the only appropriate destination at that exit. Otherwise, the airport directional sign may be an additional guide sign placed at a suitable location in the guide sign sequence for the interchange.

##### b. On highways other than Freeways

- (1) These signs shall have the standard message, border and background colors for directional signs.
- (2) At the intersection of a State Trunk Highway with a County Trunk Highway, the standard airport directional guide sign shall be placed in an appropriate location in the sequence of directional signs for the intersection. When practicable it may be incorporated in the destination signs, otherwise it may be erected separately.
- (3) At the intersection of a State Trunk Highway with a local road and at an airport entrance, two airport directional signs will be erected for each signed approach. One sign should be from 1/4 mile to 1 mile (depending on conditions) in advance of the intersection, and should show the appropriate distance. The other sign should be at the local road intersection or airport entrance (normally on the right hand side immediately in advance thereof).

- (4) The details of the installation of airport directional signs shall comply with the standards for other guide signs.

c. Trailblazers

- (1) Signs to direct motorists from the State Trunk Highway System to the airport may be the type described in paragraph 4b(1), above, or may be trailblazers consisting of the symbol sign shown in Fig. 1 together with appropriate auxiliary arrow signs where necessary.
- (2) These signs, used only on non-freeways, are to be placed at sufficiently frequent intervals to adequately guide and reassure motorists who are going to the airport. A trailblazer with appropriately bent arrow shall be placed in advance of each point where the airport route changes from one highway to another or where there may be confusion as to the direction which the route takes. A trailblazer with appropriate straight arrow shall be placed at the point of any such turn. Similar trailblazers, consisting of the State Highway Route Marker, a TO auxiliary plaque and arrows as appropriate shall be placed to direct motorists back to the highway from the airport.
- (3) The Division of Highways, in the case of State Trunk Highways and the authority in charge of the maintenance of other highways, may issue a written permit to a municipality, county or other governmental authority for trailblazing between a scheduled air transport airport and a municipality within a reasonable distance thereof, except that no such permit will be issued for a freeway carrying the marked route of a state highway. Trailblazers shall not be erected on a State Trunk Highway without such written authority.

B. Motorist Services

1. Motorist services are defined as being hotels and motels, camp grounds, service stations, restaurants and public telephones.
2. GAS, FOOD, LODGING, CAMPING, and PHONE signs may only be erected on the Interstate Highway System (and on other freeways of significant length after being authorized by the Central Office) when the following criteria are met:
3. A GAS sign is warranted where there is a business (garage, service station, etc.) which:
  - a. Offers fuel, oil, lubrication, tire repair and water.
  - b. Has restroom facilities and drinking water.

- c. Is in continuous operation at least 16 hours per day, 7 days per week.
  - d. Has a telephone.
  - e. Is located within one and one-half miles of the point of exit from the through roadway of the freeway.
4. A FOOD sign is warranted where there is a business, whether or not associated with another business activity, which:
- a. Serves complete meals.
  - b. Is in continuous operation at least between 7 AM and 7 PM, 7 days per week.
  - c. Has seating capacity for a minimum of 12 persons at a counter, in booths, or at tables or at a combination thereof.
  - d. Has a restaurant license as required by the State Department of Health and Social Services.
  - e. Is within one and one-half miles of the point of exit from the through roadway of the freeway.
  - f. Has a telephone.
5. A LODGING sign is warranted where there is a motel or hotel which:
- a. Has more than ten bedrooms for rent by the day.
  - b. Has a telephone.
  - c. Is licensed as a hotel or motel by the State Department of Health and Social Services.
  - d. Is within one and one-half miles of the point of exit from the through roadway of the freeway.
6. A CAMPING sign is warranted where there is a public or private camp ground which:
- a. Is registered by the State Department of Health and Social Services or is operated by the state.
  - b. Has not less than 25 spaces for one-night tent and travel trailer camping.
  - c. Has a telephone.
  - d. Has clean toilet facilities and drinking water.
  - e. Is within five miles of the point of exit from the through roadway of the freeway.



7. A PHONE sign is warranted when there is a telephone available where:
  - a. There is no other motorist service for which signs are provided.
  - b. The telephone is available to the motorist 24 hours per day, 7 days a week.
  - c. The telephone is at a location, such as in a state park or a Rest Area, where motorists might not expect a telephone to be available.
  - d. The telephone is within one-half mile from the point of exit from the through roadway of the freeway.

C. Hospitals

1. A HOSPITAL sign may be erected only after being authorized by the Central Office when the criteria in the following paragraph are met.
2. A HOSPITAL sign may be warranted for a public or private hospital which has continuous emergency care capability as defined by the American Medical Association categorization of hospital emergency capabilities.
3. A HOSPITAL sign may be warranted on a freeway when the hospital is within a community contiguous to or near the freeway, or not more than 15 miles from the freeway.
4. A HOSPITAL sign may also be warranted on a major highway which is not a freeway but which bypasses a community having a qualifying hospital.
5. HOSPITAL signs will not be erected on State Trunk Highways leading directly into communities having hospitals except as those highways are HOSPITAL Routes as described below.
6. HOSPITAL signs and trailblazers will be erected and maintained on the State Trunk Highway System (but not on connecting streets), by the Wisconsin Division of Highways but not until it receives written assurance from the hospital administration that the hospital will accept emergency care cases, nor until any Hospital Route signs required on local roads and streets have been erected.
7. On a freeway or other highway which bypasses a community having a hospital, the HOSPITAL signing will be erected:
  - a. Only at the point or points giving access to the hospital by the most direct route.
  - b. Only once for traffic in each direction on a given highway (See IIIA2b and c - Airport Signing).

8. Hospital trailblazing shall consist of the standard "H" symbol together with the appropriate arrow. Where there is more than one qualifying hospital within a community an appropriate message may supplement the "H" symbol.

**D. Sports Stadiums, Fair Grounds, Zoos and Exposition Centers**

1. Because of the small number of facilities of this type which would warrant special directional signing on Interstate Highway System and other major freeways, the Commission will review and make a determination on any application for signing such facilities. In general, only major facilities causing frequent high peak traffic generation will be considered for signing.
2. Directional signing for facilities in this category will not be erected by the Division of Highways on non-freeway portions of the State Trunk Highway System, but permits for their erection by others may be issued upon approval from the Central Office. Permits will generally be limited to signing for facilities which cause substantial traffic flows, and will require that the permittee erect or arrange for the erection of suitable trailblazers to and from the facility. Generally separate direction signs will not be authorized for sports stadiums which are located on or near the campus of the educational institution with which they are associated if signs for the educational institution are provided.

**E. State, County and Municipal Parks**

1. Direction signs will be erected on rural freeways only for such state parks as the Division of Highways and Department of Natural Resources mutually agree upon for such marking.
2. Direction signs will be erected for state parks on non-freeway State Trunk Highways at not more than one location for traffic in each direction on a given highway. Signing for both directions of traffic may be provided at one location or signing may be provided for one direction of traffic at one location and for the other direction at another location. Where it is established that there are two State Trunk Highways which serve a state park, directional signs may be erected for one or both directions of traffic on both highways.
3. Signs for parks shall conform to the standards for signing of recreational facilities which apply to the class of highway upon which they are erected.
4. Direction signs may be erected by the Division of Highways as provided in paragraph 2, above, for county parks within 2 miles of the State Trunk Highway at which off-highway parking and picnic tables are provided as a minimum. Tested and safe drinking water and sanitary facilities would be desirable. The facilities available shall be noted on the auxiliaries to the direction signs.

5. Direction signs of an approved type may be erected under permit from the District Office by a municipality on the State Trunk Highway System for any municipal park which provides picnic tables as a minimum, when no charge is made for the use of the park.

**F. Universities, Colleges and Vocational Schools**

1. Direction signs for educational institutions will not be erected nor permitted on urban or rural freeways.
2. Direction signs will be erected upon request on non-freeway sections of the State Trunk Highway System:
  - a. For educational institutions which are a part of the University of Wisconsin systems, and for private educational institutions conferring Bachelors or higher degrees;
  - b. For area vocational, technical and adult schools and colleges which are located in a rural or suburban area near a State Trunk Highway.
3. Direction signs for educational institutions will be erected on non-freeway sections of the State Trunk Highway System at not more than one location for traffic in each direction on a given highway. Signing may be provided for both directions of traffic at one location or signing may be provided for one direction of traffic at one location and for the other direction at another location. When it is established that there are two State Trunk Highways which serve an educational institution, directional signs may be erected for one or both directions of traffic on both highways. Signs will not be erected at locations where traffic can reach the educational institution by following signs directing to the city in which it is located.
4. Direction signs for educational institutions shall be erected only after approval by the Central Office and after a written agreement is received from the authority in charge of any local highway on which trailblazer or other appropriate signs establishing the route to the educational institution must be erected.
5. Direction signs for educational institutions shall follow the normal design standards for other directional signs on that class of highways.
6. Direction signs for educational institutions will not be erected by the Division of Highways on connecting streets, but may be erected by or with the approval of the municipality.

## REGULATIONS WITH RESPECT TO THE ERECTION OF SIGNS ON PUBLIC HIGHWAYS

*Extracted from Chapter Hy 10, Wisconsin Administrative Code*

### Hy 10.01 Authority for these Regulations.

(1) Pursuant to authority contained in Section 86.19 (2), Wisconsin Statutes, the following regulations are prescribed with respect to the erection of signs on public highways.

\* \* \* \* \*

### Hy 10.02 Authority for the Erection of Signs.

(1) The Wisconsin Division of Highways or its authorized representatives in the case of the marked routes of state trunk highways, and local authorities with respect to highways under their exclusive jurisdiction, may place and maintain such traffic signs and signals as they deem necessary to warn, guide, inform, and regulate traffic, and also such signs and signals as are expressly permitted or required by the statutes or by these regulations, subject, however, to such limitations and restrictions as are contained in the statutes and these regulations.

(2) The Wisconsin Division of Highways with respect to the state trunk highway system, and local authorities with respect to highways under their jurisdiction, may permit any department of the federal or state government to erect such signs as the respective authorities shall deem necessary for public information to inform and warn the public of federal or state laws and lawful regulations by any such department, and also such signs as the respective authorities shall deem necessary for the guidance, information, warning, and regulation of traffic.

### Hy 10.03 Guidance Signs for Resorts, Hotels, County Institutions, Etc.

(1) Any person or persons conducting a summer or winter resort, hotel, or any place of public entertainment or instruction, or any place of religious worship, or persons having charge of any county institution or of any scientific experiment for the furtherance of agriculture or other science or art may be permitted to erect guidance signs of a type approved by the Wisconsin Division of Highways subject to the conditions contained in this section.

(2) Only where such institution or business is located removed from the state trunk highway system may such guidance signs be erected.

(3) Such guidance signs may be erected at only two intersections of the state trunk highway system with county highways or town roads, and at such intersections of county or town highways as are deemed necessary by the local authorities having jurisdiction over those highways.

(4) One sign of an approved size and shape may be erected at the entrance to any of the enumerated institutions or businesses.

(5) No person or persons having an advertising sign in the immediate vicinity of the intersection where such approved guidance signs have been erected shall be permitted to erect guidance signs on the public highway under these regulations.

(6) All guidance signs erected on any public highway shall be of a type and design approved by the Division of Highways. No flashing, illuminated, or reflecting signs or installation shall be permitted.

(7) No guidance sign may be erected upon state trunk highway right of way at an intersection with the state trunk highway system until the location and manner of erection of the sign have the written approval of the Division of Highways. No guidance sign may be erected on the right of way of a county and town highway until the location and manner of erection of the sign have the written approval of the local authorities having jurisdiction over the said highway.

(8) All guidance signs and their supports shall be maintained in good condition. Signs or installations not satisfactorily maintained shall be removed by the officers in charge of the maintenance of the highway.



# APPLICATION FOR AUTHORITY TO ERECT DIRECTIONAL SIGNS ON PUBLIC HIGHWAYS

*Submit in triplicate*

To Wisconsin Division of Highways:

Application is hereby made for authority to erect and maintain directional signs at the locations listed below. I hereby certify and agree that these signs will conform to the approved design of the Wisconsin Division of Highways and that I will comply with all of the regulations under which authority these signs may be erected.

LOCATION NO. 1: Sign at junction of \_\_\_\_\_ Highway \_\_\_\_\_ with \_\_\_\_\_ Highway \_\_\_\_\_, in the \_\_\_\_\_ *Town-City-Village* of \_\_\_\_\_ County.

Wording on sign \_\_\_\_\_

LOCATION NO. 2: Sign at junction of \_\_\_\_\_ Highway \_\_\_\_\_ with \_\_\_\_\_ Highway \_\_\_\_\_, in the \_\_\_\_\_ *Town-City-Village* of \_\_\_\_\_ County.

Wording on sign \_\_\_\_\_

LOCATION NO. 3: Sign (at entrance to my establishment) on \_\_\_\_\_ Highway \_\_\_\_\_, in the \_\_\_\_\_ *Town-City-Village* of \_\_\_\_\_ County.

Wording on sign \_\_\_\_\_

REMARKS: \_\_\_\_\_

Signed by \_\_\_\_\_

My Resort Consists of:

Print name \_\_\_\_\_

Hotel \_\_\_\_\_

Address \_\_\_\_\_

Main Lodge \_\_\_\_\_

Date \_\_\_\_\_, 19\_\_\_\_

Cottages \_\_\_\_\_

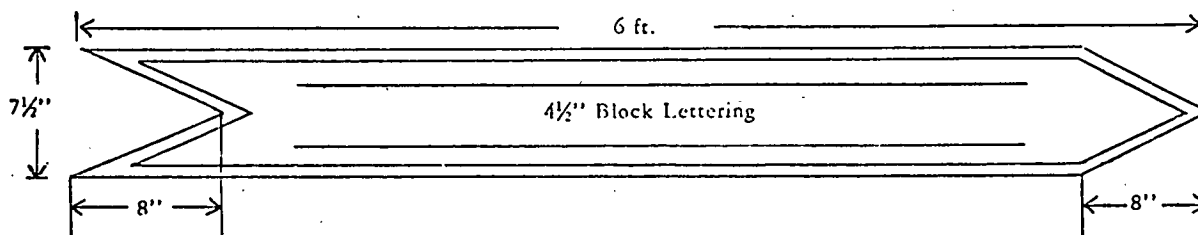
Cabins \_\_\_\_\_

*Do not write below this line*

Approved \_\_\_\_\_, 19\_\_\_\_

By \_\_\_\_\_

Detail of signs to be erected at intersections or entrances.



Detail of sign which may be used at entrances.

**THE TRANSPORTATION RESEARCH BOARD** is an agency of the National Research Council, which serves the National Academy of Sciences and the National Academy of Engineering. The Board's purpose is to stimulate research concerning the nature and performance of transportation systems, to disseminate information that the research produces, and to encourage the application of appropriate research findings. The Board's program is carried out by more than 150 committees and task forces composed of more than 1,800 administrators, engineers, social scientists, and educators who serve without compensation. The program is supported by state transportation and highway departments, the U.S. Department of Transportation, and other organizations interested in the development of transportation.

The Transportation Research Board operates within the Commission on Sociotechnical Systems of the National Research Council. The Council was organized in 1916 at the request of President Woodrow Wilson as an agency of the National Academy of Sciences to enable the broad community of scientists and engineers to associate their efforts with those of the Academy membership. Members of the Council are appointed by the president of the Academy and are drawn from academic, industrial, and governmental organizations throughout the United States.

The National Academy of Sciences was established by a congressional act of incorporation signed by President Abraham Lincoln on March 3, 1863, to further science and its use for the general welfare by bringing together the most qualified individuals to deal with scientific and technological problems of broad significance. It is a private, honorary organization of more than 1,000 scientists elected on the basis of outstanding contributions to knowledge and is supported by private and public funds. Under the terms of its congressional charter, the Academy is called upon to act as an official—yet independent—advisor to the federal government in any matter of science and technology, although it is not a government agency and its activities are not limited to those on behalf of the government.

To share in the tasks of furthering science and engineering and of advising the federal government, the National Academy of Engineering was established on December 5, 1964, under the authority of the act of incorporation of the National Academy of Sciences. Its advisory activities are closely coordinated with those of the National Academy of Sciences, but it is independent and autonomous in its organization and election of members.

**TRANSPORTATION RESEARCH BOARD**

National Research Council  
2101 Constitution Avenue, N.W.  
Washington, D.C. 20418

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