Citizen Participation in Planning and Designing Bikeways

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The United States has recently experienced a sharp resurgence in bicycling activities. Public agencies are actively planning and constructing bicycle facilities. However, these facilities may have some adverse as well as beneficial community impacts. More citizen participation in the planning of bikeways can help provide better facilities. Several citizen participation techniques are discussed, and an example of a bikeway planning program that incorporates citizen participation is also presented. The use of these techniques can help provide safer, more efficient, effective, and compatible bikeway systems.

The United States has experienced a sharp resurgence in bicycling activities that has brought into view the potential usefulness of bicycling for transportation—a usefulness that bicycling has known in many foreign countries. In response to the increase in bicycling, many bicycle facilities are being planned and constructed. Unfortunately, environmental impact analysis and citizen participation have not been adequately considered in the planning of many bicycle facilities.

From the experience of highway planners in 1950 through 1960, the importance of adequately incorporating environmental impacts into the planning of major transportation projects, especially in urban areas, was revealed. Moreover, planners found that it was difficult to adequately incorporate qualitative impacts and information into the analysis and decision-making process. Consequently, methods of citizen participation were implemented to acquire better planning information and produce more compatible, effective, and desirable transportation facilities.

The impacts of bicycle facilities are not as great as the impacts of highways. However, if bicycling is to be a safe and effective means of transportation that is compatible with the nature and goals of the community, the environmental impacts of bicycle facilities should be analyzed, and the citizens affected should participate in the bikeway planning process. Bikeways have both potentially adverse and potentially beneficial impacts.

Some of the adverse impacts are bicycle and motor-vehicle conflicts in traffic, loss of privacy to residents along the bikeway, decrease in business activity caused by bikeways eliminating street parking, replacement expenses for storm-sewer inlet grates, and expenses for major construction and maintenance. The beneficial impacts from bicycle use are providing an inexpensive short-range mode of transportation that is practical in good weather, reducing traffic congestion and air pollution, promoting a healthy activity, and creating a friendly, prosperous community atmosphere. Environmental analysis has shown that there is a potential for both adverse and beneficial impacts associated with bikeways. However, the degree of significance of these impacts cannot be completely determined. Bicycling is in its infancy in the United States, and this prohibits or hinders the gathering of significant data for determining demand, potential conflict, noise pollution, and other factors relevant to bikeway impacts. Although some impacts could be quantified by experimentation (e.g., delay to motorists caused by bicyclists in the roadway), most other impacts are not quantifiable because of the relative lack of experience with bikeways and the uncertainty of the popularity of bicycling, the values of the community, and the interaction of bikeways in communities.

COSTS AND BENEFITS OF CITIZEN PARTICIPATION

The agencies responsible for bikeway planning and implementation (including construction and maintenance) are typically traffic, public works, and planning departments. These agencies should be aware of the potential impacts that bikeways could have on communities and may be able to minimize certain impacts by design and route considerations. However, many of these impacts cannot be quantitatively measured but are still critical to an effective, environmentally compatible bikeway.
system. Failure to consider all the adverse impacts adequately can result in dissatisfied citizens with or without a project.

Thus, citizen participation in the planning process can provide a valuable input toward the environmental impact analysis and the planning of an effective bikeway system that is compatible with the environment and complementary to the community and community systems (i.e., the existing transportation system). There are many ways in which citizen participation can be implemented. (Those most applicable to bikeway planning are discussed in a later section.) Generally, the benefits that can come from citizen participation in the planning of their community systems can be described as follows.

1. Mobilization of idle resources (1)—In cities where there is a shortage of funds to perform tasks needed in the planning of bikeways, citizens can be mobilized to provide the people power for these tasks.

2. Use of sources of knowledge (1)—Citizens who represent various professions as well as levels of society and the community can and should provide corrective feedback to the planning professionals. This feedback can be achieved through various surveys, community meetings, and citizen committees.

3. Affirmation of the democratic process (1)—The American urban political culture is described by Colcord (2) as having three distinct characteristics: high value of local autonomy, direct participation in decision making by the elected officials, and direct participation in decision making by private civic leadership. The results of citizen participation can be described as people power (3).

4. Improvement in the quality of decisions (1)—The participation of the community in the planning process can enable all points of view to be considered and analyzed for their impacts. Those impacts that are most adverse to the citizens can be minimized and the benefits can be maximized (4).

5. Recognition of goals and priorities that affect citizens (5)—Citizen participation can enhance the likeliness of the agencies’ successes and also their responsiveness to community values (6).

Unfortunately, effective citizen participation is difficult to champion (1), and there are many costs or disadvantages associated with it. These disadvantages are discussed below.

1. Increase of separatism—Citizen participation tends to intensify the disparities that exist between citizen groups and between professional planners and citizen groups (5, 7). However, if managed properly, the process can be one of cooperation rather than antagonism (7).

2. Greater cost with less efficiency (5, 8)—Citizen participation requires more money and time from the agencies and their personnel respectively. The planning process usually becomes more complicated through consideration of alternatives, feedback loops, and larger numbers of people working in it. Consequently, it takes longer for the process to be completed.

3. Increase of influence of some citizen groups (3)—It has been difficult to properly measure the influence of the different groups involved or concerned with the project. This problem is partly due to the difficulty in maintaining citizen participation through the planning process of a project. Only those groups who have the highest stake (usually the most to lose) are active at any one particular moment. If this problem is to be counteracted, then nonreactive techniques of measuring are needed. (These techniques are discussed in the section on surveys.)

4. Incompatibility with the merit system and professionalism (3)—In the general case of citizen participation, the civil servant should play a subordinate role to politicians and citizen groups (2, 9). However, a new approach to professionalism in the transportation planning area is being promoted and practiced in certain highway planning projects in which the highway planner acts as a facilitator or coordinator-catalyst by his or her relation with the citizens and the highway planning department.

The costs associated with effective citizen participation in planning are substantial. However, these costs are small when compared to the potential costs of not implementing citizen participation (i.e., the potential costs to residents along a bikeway route or the potential costs to victims of bicycle and motor-vehicle accidents). Ir Rate citizen groups may even stop or reverse the plans for and construction of planned bikeways because of insufficient participation from citizens. Citizen participation increases the likelihood that the agencies' actions will be in consonance with community values and that there can be substantial, effective agreement on a course of action that is feasible, equitable, and desirable (10).

COMMUNITY PARTICIPATION TECHNIQUES

There are a number of techniques available to the traffic engineer or transportation planner who wishes to obtain citizen involvement in planning a bikeway system. Many of these techniques have been applied to other planning projects such as those dealing with regional transportation systems and local street uses. Other techniques have had application in various fields, while a few have had little or no application in real situations. This section discusses some of these techniques. The characteristics of bikeways and bikeway planning that should be considered when applying these techniques are

1. Bikeways are an intrusion into a neighborhood,
2. Bikeways are uncommon and difficult to visualize,
3. The degree of impacts to the environment is unknown,
4. Bicyclists do not often follow rules of the road, and
5. Bikeways are for recreational and transportation purposes.

The particular combination of techniques used for a community would depend on the characteristics of that community. Each community will have its own peculiarities or problems to which certain techniques would apply while others would be inappropriate.

As expressed by Manheim (10), the objective would be to "achieve substantial, effective agreement on a course of action that is feasible, equitable, and desirable." The planners must assess each community's needs and desires when selecting the techniques that would help the community realize its goal. However, it should be remembered that implementation of certain citizen participation techniques may entail more expense than could be justified for a bikeway planning program. The program may not warrant the hiring of professionals on a long-term, full-time basis in the area of citizen participation. On the other hand, other planning areas such as community redevelopment and highways are in need of more citizen participation and may be able to absorb a substantial portion of the efforts of such pro-
professionals. In any case, cities should take advantage of all available information (i.e., environmental impact reports) that can be used in their own efforts.

The city should follow certain guidelines in their interaction with citizens. These guidelines apply to all techniques and to all phases of the planning process (10) as follows:

1. Determine a decision-making process,
2. Establish and maintain credibility (honesty),
3. Establish and maintain open channels of communication,
4. Depolarize interests (strive for consensus), and
5. Establish the facts.

ADVISORY COMMITTEES

Citizen advisory committees are formed for the purpose of representing the public (10). The function of the committee is to advise the city (officials and staff) in their decision making. If the public is to be represented fairly, then the committee should have balanced representation from the community. In the case of an advisory committee on bikeways and bicycle facilities, the committee should have, at the minimum, representatives from business, residential, and education sectors and from bicycle-concern groups (both young and old and serious and recreational). I believe that members of the committee, who represent the community, should have knowledge of community values and bicycle facilities and systems. Knowledge of community values should be a crucial factor in the selection criteria for committee members. An understanding of bicycling can be acquired through studying references supplied by the city. Nonetheless, a thorough and previous knowledge of the state of the art for bicycling will help the committee understand the bikeway problems and render it better able to advise. Well-informed community representatives on the committee could act as resource persons to the city about the community and to the community about bicycling.

The committee can be vested with various degrees of power. Arnstein (3) discusses various levels of the citizen participation ladder in which citizens and citizens' committees can be given a range of power that varies from tokenism to citizen control. Zuccotti (11) presents the pros and cons of giving local community boards (of New York City, in this case) more power (i.e., veto power) over regional commissions. However, for the use of a citywide bicycle advisory committee, it is felt that the role of advisor to the decision makers, that is, to the planning commission or the city council, is sufficient, since these decision makers are also representatives of the community.

The committee can be given strength by its association with the city structure. If the committee were appointed by the council, the city would have more impetus for following committee recommendations. The committee should have the power to request that studies be made by the city (for example, gathering additional bikeway studies).

The several methods of selecting the citizen advisory committee include selection by the mayor, by the city council, by a planning commission, or through solicitation of volunteers. There are two concepts implicit in the formation of advisory committees: (a) The duly selected or appointed officials do not fully represent the public, and (b) a body selected for the express purpose of being representative of the public will be representative (10). Manheim argues that since the history of citizen advisory committees indicates that an appointed committee can be no more representative than the appointing body, and since the membership of the committee, to be fully representative, should be open to all citizens, then the city could forget the committee by "simply making the effort to interact with all the interests" (10). On the other hand, the city can and should delegate responsibilities to the committee; thus a better response is obtained (12).

The frequency of meetings for the committee should be in response to the evaluations and the recommendations requested by the city. Committee members should also individually attend working meetings.

SURVEYS AND QUESTIONNAIRES

One of the best ways to evaluate community values is by questionnaire surveys of the public (13, 14, 15, 16). In a questionnaire, it is possible for the planner to obtain data on the community that would be most helpful in the bikeway planning process. However, careful planning of the questionnaire is critical for ensuring the quality of data. Leading questions can often result in misleading results (3). For example, if the question is, "Are you in favor of pleasant bikeways?" then the answer may result in a survey concluding that a majority of those surveyed are in favor of bikeways. Actually, the question to be useful should be asked in several questions, such as

1. Are you in favor of bikeways in your community?
2. Are you in favor of bikeways on your street?
3. How extensive should they be? Circle areas that should be connected by a bikeway system: schools, parks, downtown factories, shopping centers
4. How should a bikeway system be financed?
5. How much should the bikeway system cost?

The answers to the preceding questions would give the planner better information on the type of bikeway the community desires.

The planner may want to conduct several surveys to obtain the most helpful type of information. For example, if the planner wishes to use the ideas of bicyclists in preliminary planning and those of the general public in the final plans, questionnaires to bicycle enthusiasts may be different from questionnaires to the general public. Since meaningful results from children are difficult to obtain because of their lack of maturity and impressionable nature, questionnaires to schools may require a different approach than those submitted to the public.

One can expect bias in the results of the questionnaire survey. These biases (16) are derived from errors by the subject (the awareness of being tested and the role selection), by the investigator (sex, age, nationality of interviewer, or interviewer's change in procedure), or by sampling imperfections (population restrictions and stability over time or area). In view of the complexity of questionnaire techniques, it is recommended (16) that the agency use professionals in that field to plan and conduct the survey(s).

The expense of the questionnaire survey may prompt the use of other types of surveys for validation of results or a less expensive method for obtaining the results. Some surveys that may be helpful in bikeway planning are bicycle counts on streets or at schools and parks, street-parked cars, off-street parking, accident records, complaints, bicycle retail sales, bicycle store maintenance volume, and presence of litter.

RANGE OF ALTERNATIVES

Citizens find it difficult to participate in activities in
which they do not see a vested interest. In addition, citizen participation appears to be stronger (at least emotionally) when the citizen has something to lose. To help initiate and maintain good response from citizens, the agency should present a range of alternatives as early in the planning process as possible. Once the citizens can see their potential interest in a project, whether it be for or against, their participation will be easier to maintain. Their selection of certain alternatives over others will also give the agency more insight into the values of the community (10).

In bikeway planning, it is important to present a range of alternatives (especially those that concern routes) to the community so that all the potentially concerned citizens can see and protect their interests early in the planning stage. The following list of alternatives are presented in chronological planning order for the bike-way system:

1. Routes or corridors,
2. Origins and destinations (bike traffic generators),
3. Type of facility (route, lane, or path),
4. Intersections, and
5. Combinations that include the null set.

COST/BENEFIT ANALYSIS

Cost/benefit studies used in early transportation studies are finding limited use in the decision-making process of today's society. The problems with the cost/benefit method stem mainly from the inability to properly quantify social values and environmental effects with respect to each other and with physical costs. Typically, a cost/benefit analysis for a highway route compared the costs of construction, relocation, maintenance, and right-of-way to the benefits of time and fuel saved over time. Often, the planners recommending the route with the best cost/benefit ratio would meet substantial citizen opposition on the basis of environmental or social values, which many times resulted in a completely different alignment and, according to studies, higher cost/benefit ratios.

In the case of conflict between the goals of two or more groups, i.e., costs and benefits for one group are not the same as those for another group, the traditional method of maximizing benefits to society by the cost/benefit analysis does not fairly account for the costs. According to Berry and Steiker (17), the maximizing of the net goal for society can place unfair costs on some parties. Although bargaining between parties appears to be a logical approach to determining a fair distribution of costs, those authors doubted that the results would be fair because certain groups often hold an unfair advantage over other groups. Their only hope rested in the tradition that publicly argued and decided problems is limited. Engineering drawings of the bikeway are too complicated for the average person to understand (10, 20). If the communication between agency and community or the planning of bikeways is to be assisted, then the bikeways in their various forms should be shown at least pictorially, if not on location.

Artistic renderings are commonly used to illustrate a new project for the community. However, too often the finished product does not turn out to be quite like the pretty drawing. Architects have used scale models as well as drawings to illustrate their projects. The use of models gives the viewer more perspective on the project, but the model may also be too pretty. Photographic representations of projects have recently been used to illustrate new community projects (21, 22). The California Department of Transportation uses retouched community photos to show residents what the freeway will look like in their community. Although this method exhibits less perspective than the scale models, it does give a truer representation of the project in the community.

Recently, a potentially effective method of using photographs in alternative selection has been tried experimentally by planners. The method involves comparing touched-up photographs of various project alternatives (22). This method of photocomparison has been used at large and small working meetings. The pictures are displayed from a slide projector for large meetings and from prints for small meetings. The photographic display of alternatives provides the citizens with the information necessary to formulate problems and to select from alternative solutions. Also, the citizen groups usually worked through their differences to reach a consensus and relied on each other to provide the information needed to understand the problems. One important conclusion from the experiment was that interdisciplinary teams were essential for both research and practice of urban decision making.

Other uses of photography include slide libraries—one is being collected to aid bikeway planners by the International Urban Bikeway Design Collaborative—and bikeway movies. But probably the best way to illustrate bikeways is to actually see them. Unfortunately, this can be done only if there are bikeways available for seeing. The agency could send a few citizens to a city like Davis, California, and while this method could be rather expensive, it would give a good perspective and feeling for what bikeways are actually like.

WORKING MEETINGS

Working meetings usually consist of a small group of professionals, who are involved with the planning of the project, meeting with a group of residents (10). These meetings are usually limited to from 15 to 20 participants, since larger meetings restrict the involvement of some community members. The purpose of these meetings is to provide an environment for professionals and citizens to interact.

There are several ways to conduct the meeting, and they should all be used, when appropriate, throughout the planning phases of a project. The early phases may be informational for both the citizens and the agencies. Later phases will probably take the form of planning, designing, and financing the project. For example, a meet-
ing in the early phases may take the form of role playing or charrette whereas in the later stages a meeting may consist of dialectical scanning and alternative selection.

To avoid interpersonal conflicts, the participants should focus on the subject of the discussion rather than on personalities. Also, agency personnel should be related to the planning and designing aspect of the project rather than the decision aspects of the project. This situation is desirable from two points of view: (a) to obtain better planning and (b) to avoid confrontation and ultimate differences.

The meetings require flexible hours for professionals, since they are often held in the evenings to accommodate the workday hours of the residents. The meetings should be held in places where it is most comfortable and convenient for residents, e.g., residents' homes (10). Youngsters should also be involved at these meetings since they account for a substantial proportion of the bicyclists. Arrangements for meetings may be conducted through local service and community organizations such as Parent Teacher's Association, Rotary Club, League of Women Voters, Sierra Club, and League of American Wheelmen.

Meetings should be recorded (i.e., taped or minutes taken), and copies of the records should be made available to the public. Follow-up meetings and action are essential to the success of these meetings. Again, the degree of citizen power is dependent on the responsiveness of the agency to the public.

Role Playing

Role playing may be used early in the planning process by everyone concerned with the project (i.e., planners and citizens). The process of advocating a different role helps people appreciate the fact that others see a given situation from a perspective different from their own. Because each group operates under a different set of needs and constraints (10). This technique can help create empathy and compromise between conflicting interests. An analysis of the underlying reasons for different views leads to dialectical scanning, which is discussed later.

Charette

A charrette is an intensive brainstorming process that produces plans within a strict, usually short, time period (10). This activity should be open to all community and agency members. However, participants of each charrette should be of similar opinions (i.e., bicycle club members and residents of a street) or the charrette may result in confrontations and criticisms rather than expressions of ideas.

Unless the charrette is considering rather specific plans (i.e., alternate routes), the participants' involvement is usually not deep (10). As a minimum, the preliminary bikeway system such as the corridors and destinations (modes) should be presented in the charrette process.

Dialectical Scanning

Dialectical scanning is a process that allows human interaction. The objective of this process is to focus on discussion and review of particular issues in which there is conflict so that these issues may be singled out for debate. This method, discussed in a recent article by Hudson, Wachs, and Schøfer (18), incorporates local impact evaluation of large-scale urban systems and seems readily applicable to small or medium-scale urban systems such as bikeways.

Dialectical scanning may involve only a blackboard and a recorder to jot down important points of the discussion. If used in the working meetings, the process first identifies critical points of disagreement and conflict and then attempts to resolve the differences by looking at the nature of the contradictions and selecting a form of analysis appropriate for each issue. Most conflicts will stem from factual misunderstandings, differences in assumptions about cause and effect relations, and differences in values (18). The process provides for a deeper analysis of the problems that arise between conflicting interests, which may not be appreciated through role playing. Dialectical scanning can be conducted in working meetings of conflicting interest groups and can help planners analyze citizen values.

Community Advocate

The city should provide the community with any requested information that is related directly or indirectly to a public project. The city's responsibility to the public includes acting as a facilitator and a coordinator-catalyst, described by Fielding (4). However, if the community desires the professional assistance of an advocate and funds can be made available, the city should provide the necessary funds to hire a community advocate. Although the city can provide professional assistance in areas such as traffic impact and public works assistance, the community may need special assistance in other areas such as social or health impacts. Also, the community may not trust the agency or may need assistance for their leadership with their plans. In these situations, a community advocate should be provided through agency funds and should have full cooperation from agency resources.

Difficulty arises, however, when two or more conflicting interest groups are involved with the project. Should advocates be provided for each interest group or should a mediator attempt to resolve the differences? The advocate does not eliminate the need for community members to interact. There is still a need for working meetings.

Mediating Between Groups

It is more than likely that there will be different interest groups involved in bikeway planning. These groups with different goals may have conflicting views on the bikeway plan. The agency could act as, or hire, a mediator in these situations in which the groups are unable to reach a consensus. Although this aspect of the planning process is very important it is beyond the scope of this paper.

PUBLIC HEARINGS

The initial citizen participation technique employed by government and prescribed by law was the public hearing on a project. It is at such meetings that projects may obtain formal rejection or approval from the planning commission or city council. Hence, all interested parties are allowed to voice their opinions on the project before a decision is made.

However, when the concerned parties are not aware of the important details of a project or surprising information is revealed at these meetings, these sessions are often turned into stages for confrontations between conflicting interests. Situations like these could be avoided by discussing the problems at the working meetings (20).

Public hearings often fail to represent those groups who are least well served (13, 15, 20, 23). Many people are intimidated by the formal proceedings while others
use them to their advantage. The agency can structure its planning process to accommodate those not well served or intimidated by formal proceedings; thus equitable participation by all parties is allowed. The results could be realized by using the public hearing for the summation of the planning process, which would lead to a formal ratification or rejection.

BIKEWAY PLANNING PROGRAM

Figure 1 shows the bikeway planning program and represents one way in which citizens can be involved in the planning process. The interaction among citizens, city staff, and city officials is shown. Citizen inputs are channeled into certain areas in which information, advice, or feedback is needed by the city.

For this example the decision to make a bikeway study is made by the elected officials in response to citizen demands. The elected officials then notify the city staff and the public, and the staff determines the planning strategy and needs. Meanwhile, the officials select a citizen advisory committee that provides advice and information to the city staff and officials.

The city, with the assistance of this committee, surveys the user population (bicyclists) of the community (i.e., bicycle clubs, registered bicycle owners, and schools) to obtain basic information such as potential demand, routes, and traffic generators. Once the results of the surveys are determined, the city designs and plans a bikeway system and alternatives to meet the demand. Cost/benefit and environmental impacts of the plans are analyzed, and illustrations of the plans are prepared.

The city then conducts working meetings with the citizens (including the committee) to introduce the plans (environmental impact reports, cost/benefit analyses, and photo-comparisons) and to obtain initial reactions (through role playing and charrette). Analysis of the system alternatives by citizens is obtained through techniques such as dialectical scanning, debates, studies, requests for information, and general public surveys.

With the citizen feedback from the working meetings and the committees, the city then revises the bikeway system, possibly by narrowing the number of alternatives. New or revised analyses of environmental impacts and costs and benefits are made. The new plans are then introduced to the citizens at working meetings for feedback. This loop is continued until the city feels that it has achieved "substantial, effective agreement on a course of action that is feasible, equitable, and desirable" (10). At this time the plans are presented in a public hearing, and recommendations are taken to the city officials for a final decision.

SUMMARY

Various techniques of citizen participation are discussed for their application toward obtaining better information on environmental impacts and for the preparation of bikeway plans that are compatible with the desires of the community. Although citizen advisory committees represent the public to the city officials, public surveys can be used to give a better evaluation of the values of the community. When citizens are presented a range of alternatives that are accompanied with environmental impact and cost/benefit analyses, vested interests are realized and facts are obtained about the proposed project. Various methods of education (role-playing, charrette) and interaction (dialectical scanning) are most applicable to the community's efforts in bikeway planning. This report can be used by the general public as well as the city government as a reference in future bikeway planning endeavors.

REFERENCES

Evaluating the Impact of Weather on Bicycle Use

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Weather is one factor that is believed to have a significant impact on bicycle use as a transportation mode. This paper presents a method for exploring the sensitivity of two types of bicycle use to variable weather conditions. The results of studies such as this one can be used in conjunction with previous findings to estimate the proportion of present-day automobile travel that could be transferred to bicycle travel, if appropriate bicycle facilities are provided. The study uses travel data collected in Uppsala, Sweden, over a 39-day period in the spring of 1971. The daily proportion of bicycle travel for discretionary purposes and journey to work is compared to daily weather data. Correlation and regression analyses were used to assess the impact of weather on bicycle use. The study indicates that temperature and cloud coverage do affect the proportion of daily travel made by bicycle and that the weather conditions have a different impact on each of the two types of bicycle travel. The study also examines the alternative modes used on the days when little travel is done by bicycle. The study reveals that a larger proportion of travel to work is done by bicycle than of travel for discretionary purposes regardless of weather conditions. When the temperature is below freezing, between 20 and 25 percent of all trips to work are made by bicycle.

During the past few years there has been a growing realization among transportation planners that the bicycle has a great deal of promise as a viable mode for urban transportation (1). As an inexpensive, energy-efficient, non-polluting, quiet, healthful means of transportation, the bicycle is becoming an increasingly attractive alternative, or at least a supplement, to the automobile for substantial portions of intraurban travel. However, when the potential of the bicycle is discussed as a transportation mode, the issue of the weather is inevitably advanced as a major deterrent to using bicycles as a serious transportation alternative. The usual argument, which has been unexamined, is that people cannot or will not ride bicycles when weather conditions are too cold, too hot, too wet, or too icy, and, therefore, investments in bicycle facilities in areas where there is a susceptibility to any of these conditions are unwise, since the facilities will essentially be unused when the weather is unsuitable.

The purpose of this paper is to present a method for empirically examining the impact of daily weather con-