Planning for neighborhood traffic management

Introduction

An effective, well-organized planning process is the single most important element in the creation of a successful neighborhood traffic management program. It seems overemphasizing the point to say the planning process is more important than selection of the “right” device; more important than design; or more important than implementation technique. Yet experiences reported in cities contacted in this State-of-the-Art search feature some successful efforts and numerous failures. In virtually every case, the failure of a program can be traced directly to either a breakdown in the planning process or the failure to have a structured process at all.

For this reason, this chapter has been designed to illustrate the more effective technical, political and social techniques for achieving a successful program. The chapter begins with an illustration of specific problems which have been observed in the unsuccessful efforts. It then concentrates on technical evaluation and community involvement techniques which have been used in the more successful program. The planner should be aware, however, that each local situation is unique. His main task in using this chapter will therefore be to select those techniques, from the many presented, that are most applicable to his problem.

Some Problems with Previous Neighborhood Traffic Management Programs

The contacts with local jurisdictions across North American cities uncovered a number of basic reasons why neighborhood traffic management (NYM) programs were unsuccessful. These reasons are summarized here to alert professionals to possible pitfalls to be avoided. They
include:

- **Total lack of action.** Cases where no action whatever was taken can be traced to lack of procedures for receiving and recording citizen complaints, lack of perception by staff of the true nature of the problem or complaint, available data failing to confirm a stated problem, or lack of resources (staff, time and/or money) to deal with the problem.

- **Leaping to “obvious solutions”**. Seemingly obvious solutions usually had hidden impacts not discovered until after implementation; the true need were not completely known, or better solutions were passed over either in haste or ignorance. Eliminating the needs assessment and alternative evaluation steps usually caused difficulties which could have been avoided with more time, care and a step-by-step analysis.

- **Too limited focus.** Neighborhood traffic problems are frequently more complex and extensive than the complaint initially brought to the professional’s attention. If professionals react to the initial complaint or complaint site alone, they may overlook the systematic nature of neighborhood traffic problems and the potential systemic impacts of site-oriented solutions. As a result, the problem is not solved but simply pushed elsewhere. The problem identification and assessment stage must be broad-searching in initial examinations.

- **Lack of community involvement.** If the affected neighborhood is not involved in the planning process at an early stage, problems have developed because: (1) critical details which only community input can provide were not taken into account; (2) concern for the problem was limited to the original complainants who comprised a small segment of the community affected by the solution; (3) the solution involved secondary impacts unacceptable to the majority of those affected, or (4) those affected simply reacted adversely to a change to which they had no input and which took them by surprise. The planning process should include a well-orchestrated program for community information and involvement at all stages.

- **Discontinuity.** Gathering data, assessing the problems and conceiving solutions takes time. From the community’s perspective, this appears as brief flurries of activity interspersed among lengthy periods of delay and no action. During these periods the community’s support for the planning effort can melt away, or the community may in frustration and anger use the political process to institute inadequate solutions. The community involvement process must be organized to give a sense of continuous progress in planning activities during periods when technical progress cannot keep pace with public expectations. Newsletters, experiments and “early action” implementations are good ways of maintaining a sense of momentum while technical studies are ongoing.

- **Setbacks — Abandonment or Salvage?** When “solutions” didn’t work out, some communities simply abandoned the effort. Others were able to salvage the attempt by testing proposals temporarily, by modifying devices based on field experience or by recycling the study process to produce a better solution. A formal procedure for evaluation after implementation — including the possibility of test applications and plan modification — should be a feature of the planning process as should the possibility of repeating the entire planning effort.

- **No final resolution.** In a few communities, discussion of issues and modification processes have carried on for years without satisfactory resolution. This can ultimately have a deleterious effect on the community’s ability to carry out essential planning and engineering functions. The process should have limits so that, after a reasonable period for adjustments and reappraisals, any further appeals must move outside the planning process to decision making bodies such as a city council or the courts.
Structuring an Effective Planning Process

Planning for neighborhood traffic management is normally done in cognizance of but independent from the ongoing formalized city and regional planning process structure.

An effective planning process for a neighborhood consists of the following steps:

- Assessment of Problems and Needs
- Development of Alternative Plans
- Evaluation of Alternative Plans and Plan Selection
- Implementation of Selected Plan
- Evaluation of Selected Plan
- Modification of Plan and Recycling the Process

Each of these steps involves technical effort by the professional and involvement of the community. The sections which follow delineate the components of each of these steps, noting necessary technical and community involvement techniques. All of the techniques have been used to some extent by State-of-the-Art cities observed, though none followed the process exactly or completely. Thus what follows is an “ideal” planning process synthesized by the research team from current successful practice. The planner is again left with the task of choosing those techniques which best fit the local situation.

Why Community Involvement Is Necessary

Cities observed in this State of the Art review provide examples where well-intentioned efforts have failed because community involvement was inadequate or non-existent. The need for an effective community participation process is evidenced not only from a technical, but also a political or social standpoint. Engineers and planners may propose a technically correct solution relative to the data they have, but the solution may not solve the real problem because it does not address the unrecorded incidents observed by and of concern to the community. Or the community, distrustful of the professionals, may use political muscle to gain implementation
of a scheme which has overwhelming technical weaknesses. Community involvement allows the professionals to learn of residents' perceptions of problems, their depth of feeling about their needs, their ideas about what ought to be done and data items which only people as close to the situation as residents can observe, while professionals let residents know the physical, legal, financial and technical constraints on what can be done.

Local traffic schemes arouse powerful emotions and have widespread impact. Politically, neighborhood traffic management is controversial because inevitably some people gain and some lose. The public participation process permits assessment and exposure of potential trade-offs before implementation. Communication with potential opposition raises the possibility of working out compromises during the planning stage. And if adverse effects are not "advertised" in advance, the fact that they do occur might be used to discredit the planning process — it will be alleged that the process and the plan were defective because of these "unplanned" and "unforeseen" adverse impacts. People are also far more likely to accept a plan or take responsibility for making it successful if they have been part of the planning or design process.

The following section provides an assessment of reliable techniques and references for the community involvement process, highlighted by documented experience in some of the case study cities. Specific guidance for community involvement is also presented within each section describing the individual steps in the planning process.

Techniques For Community Involvement

A diverse array of community involvement techniques developed for other types of planning activities is potentially adaptable to neighborhood traffic management. Community involvement usually operates at two levels:

- **participatory programs** involve community "leaders" and "active citizens"
- **outreach programs** to communicate with the "silent citizens," normally the vast majority of residents.
### Table 7

**Community involvement purpose by program stage**

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<tr>
<th>Program Stage</th>
<th>Community Involvement Purpose</th>
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<td>Needs Assessment</td>
<td>Notify community that process is ongoing</td>
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<td>Receive community complaints</td>
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<td>Determine problems and assets</td>
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<td>Gauge level of concern and points of conflict</td>
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<td>Familiarize community with constraints and issues</td>
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<td>Focus data gathering activities</td>
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<td>Generating Alternatives</td>
<td>Obtain citizen ideas and suggestions for solutions</td>
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<td>Sound out professionals' solution ideas with citizens</td>
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<td>Test strengths and weaknesses of solutions</td>
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<td>Draw out points of conflict</td>
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<tr>
<td>Plan Selection</td>
<td>Advise public of likely effects of each alternative</td>
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<td>Obtain public's weighing of trade-offs involved in each alternative</td>
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<td>Test support for each alternative</td>
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<td>Work out compromises to potential conflicts</td>
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<td>Build a consensus and commitment for a single alternative</td>
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<td>Inform public of plan chosen</td>
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<td>Implementation</td>
<td>Ease acceptance of the plan</td>
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<td>Identify problems early and make responsive adjustments</td>
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<td>Evaluation and Modification</td>
<td>Inform the public of measured effects of the plan</td>
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<td>Learn of unforeseen problems or unexpected severity of unforeseen ones</td>
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<td>Conceive and assess potential modifications</td>
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Committees, commissions, councils, discussion groups and other small meetings are the principal form in which leaders participate. Larger meetings, public hearings, design-ins and workshops are the primary means by which public officials can relate with larger numbers of active citizens. The main instrument used to learn about silent citizens' problems is the survey. Outreach techniques to inform them include use of media announcements and articles (newspapers, radio and TV), posters at prominent locations and leaflets mailed out or distributed by hand. Table 7 shows the functions of community involvement at each stage of the neighborhood traffic planning process. Naturally, different types of involvement techniques are needed to meet the disparate objectives at each stage. Figure 87 presents a range of involvement techniques and indicates which ones may be useful at each planning step. Descriptions of these techniques are provided on Figure 88.* Many of the techniques shown may be more sophisticated, costly or time consuming than is appropriate in the context of the particular community and problem under consideration. The following are major factors to consider in selecting techniques most applicable to the particular situation and community:87

- The intensity and pervasiveness of the community's interest in the traffic problem. Where strong interest is limited to a few residents, outreach approaches are indicated. Where interest is broad based, direct participatory techniques can predominate.

- The community's attitude, positive, negative, or neutral, toward the traffic problem. When a community has already developed an attitude, more sophisticated techniques may be required to assure fair consideration of all alternatives.

- The community's cohesion which greatly determines the ease with which consensus can be reached on a proper course of action.

- The community's expectations of its role in the planning process, which can determine what techniques they will accept and consider legitimate.

- The community's past experience with citizen participation and particular techniques.

- The community's median education level which can influence success of techniques heavily relying on certain skills, such as reading and writing.

*Figures 87 and 88 are adapted from Effective Participation in Transportation Planning, a comprehensive survey of techniques used in overall transportation planning programs.87 Appendix A, drawn from the same source, summarizes resources required in using these techniques. Appendix B provides a listing of seven other comprehensive reference documents on community participation techniques and processes, with particular emphasis on transportation planning. Detailed discussion of techniques highlighted in this section may be found in these references. Further discussion and application of the community participation process to cities observed in this State-of-the-Art review is presented in other sections of this chapter.

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In general, esoteric techniques should be avoided and the simplest techniques which seem likely to produce satisfactory results should be tried.

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* Indicates a technique that may be useful at that step.


Figure 87. Citizen participation in the transportation planning process
PARTICIPATION TECHNIQUES

Public Information Program: The provision to the public of information on a particular plan or proposal usually over a long period of time.

Drop-In Centers: Manned information distribution points where a citizen can stop in to ask questions, review literature, or look at displays concerning a project affecting the area in which the center is located.

Hot Lines: Any publicized telephone answering service connected with a planning process and used to answer citizens directly, to record questions to be answered with a later return call, or to provide citizens a recorded message.

Meetings - Open Information: Assemblies held voluntarily by the agency to present detailed information on a particular plan or project at any time during the process to all interested parties.

Surveys: Structured questioning of a probability sample of citizens who statistically represent the whole population.

Focused Group Discussion: Small meetings (5-10) guided by a trained moderator using a prepared outline and based on the assumption that the group collectively has more information and insight than individual members (synergy).

Delphi: A method for systematically developing and expressing the views of a panel of individuals on a particular subject. Initiated with the solicitation of written views on a subject, successive rounds present the arguments and counterarguments from the preceding round for panelists to respond to as they work toward a consensus of opinion or clearly established positions and supporting arguments.

Meetings - Community-Sponsored: Assemblies organized by a community group, these meetings focus upon a particular plan or project with the objective to provide a forum for discussion of various interest group perspectives.

Public Hearings: A method usually required by law when some major governmental program is about to be implemented or prior to passage of legislation; characterized by procedural formalities, an official transcript or record of the meeting, and its being open to participation by an individual or representative of a group to present views for the official record.

Ombudsman: An independent, impartial official who serves as a mediator between citizen and government to seek redress for complaints, to further understanding of each other's position, or to expedite requests.

Advocacy Planning: A process whereby affected groups employ professional assistance directly with private funds and consequently have a client-professional relationship.

Glarets: A process which convenes interest groups (governmental and non-governmental) in intensive interactive meetings lasting from several days to several weeks.

Community Planning Centers: Ongoing local bodies which independently plan for their community using technical assistance employed by and responsible to a community-based citizen group.

Computer-Based Techniques: A generic term describing a variety of experimental techniques which utilize computer technology to enhance citizen participation.

Design-In and Color Mapping: A variety of planning methods in which citizens work with maps, scale representations, and photographs to provide a better idea of the effect on their community of proposed plans and projects.

Plural Planning: A method whereby each interest group has its own planner (or group of planners) with which to develop a proposed plan based on the group's goals and objectives.

Task Force: An ad hoc citizen committee sponsored by an agency which the parties are involved in a clearly-defined task in the planning process. Typical characteristics are small size (9-20), vigorous interaction between task force and agency, weak accountability to the general public, and specificity for accomplishment of its tasks.

Workshops: Working sessions which provide a structure for parties to discuss thoroughly a specific technical issue or idea and try to reach an understanding concerning its role, nature, and/or importance in the planning process.

Citizens' Advisory Committees: A panel of citizens called together by the agency to represent the ideas and attitudes of their groups and/or communities.

Citizen Representatives on Policy-Making Boards: The participation by citizens as either appointed or elected members of public policy-making boards.

Fishbowl Planning: A process involving citizens in restructuring a proposed plan before adoption. Fishbowl planning uses public meetings, public brochures, workshops, and a citizens' committee; the brochures provide continuity between successive public meetings.

Interactive Cable TV-Based Participation: An experimental tool utilizing two-way coaxial cable TV to solicit immediate citizen reaction; this technique is only now in the initial stages of experimentation on a community level.

Meetings — Neighborhood: Meetings held for residents of a specific neighborhood that has been, or will be, affected by a project or plan. Usually they are held either very early in the planning process or when plans have been developed and response is needed.

Neighborhood Planning Councils: A structure for obtaining participation on issues which affect a specific geographic area; the council serves as an advisory body to the public agency in identifying neighborhood problems, formulating goals and priorities, and evaluating and reacting to the agency's proposed plans.

Policy Capturing: A highly sophisticated, experimental method involving mathematical models of policy positions of parties-at-interest. It attempts to make explicit the weighing and trading-off patterns of an individual or group.

Value Analysis: A process which involves various interest groups in the process of subjectively ranking consequences of proposals and alternatives to articulate community goals against which alternative plans can be evaluated and consensus for one alternative be developed.

Arbitrative and Mediator Planning: The utilization of labor-management mediation and arbitration techniques to settle disputes between interest groups in the planning process.

Citizen Referendum: The choice by citizens between proposed measures via balloting, may be an official, statutory technique or unofficial.

Citizen Review Board: A structure whereby decisionmaking authority is delegated to citizen representatives who are either elected or appointed to sit on a board with the authority to review alternative plans and decide which plan should be implemented.

Media-Based Issue Balloting: A tool whereby citizens are informed through public media such as newspapers or TV of the existence and scope of a public problem, alternatives are described, and then citizen are asked to indicate their views and opinions in a ballot to be returned for counting.
PARTICIPATION PROCESS SUPPORT

Citizen Employment: The direct employment of client representatives; results in continuous input of clients’ values and interests to the policy and planning process.

Citizen Honoraria: Payments originally used as an incentive for participation of low-income citizens; honoraria differs from reimbursement for expenses in that it dignifies the status of the citizen and places a value on his/her participation.

Citizen Training: Instruction in technical issues, planning, or leadership for participants.

Community Technical Assistance: The provision of professional staff and/or technical information and explanations to interest groups so they may develop alternative plans or articulate objections to plans and policies proposed by the agency.

Coordinators or Coordinator/Catalysts: An individual who has responsibility for providing a focal point for citizen participation in a project, being in contact with all parties, and channeling feedback from citizens into the planning process.

Game Simulations: Experimentation by citizens in a risk-free setting with various alternatives (policies, programs, plans) to determine their impacts in a simulated, competitive environment where there is no actual capital investment and no real consequences at stake.

Group Dynamics: A generic term referring to either interpersonal techniques and exercises to facilitate group interaction or problem-solving techniques designed to highlight substantive issues.

Community Involvement And The Professional’s Role

Community involvement has been heavily emphasized herein because of shortcomings observed in programs to date. However, planners and traffic engineers cannot rely on community involvement alone to produce successful traffic management programs. Professionals have a vital role to play in assembling and interpreting technical information, in defining the full range of alternative solutions, in identifying technical constraints, in estimating the effects of alternative schemes, in acting as an intermediary between conflicting groups and in advocating schemes which appear most effective, beneficial and equitable. A program devoid of true professional analysis is as likely to fail is one in which the community has little or no voice.

Problem identification and needs analysis

Elements of a Community Needs Assessment

The planning process usually begins with citizen requests for action or with the professional’s perception that a problem exists. In either case, the planner must gain a thorough understanding of the problem both in technical terms and from the community’s point of view. With this background, a technical evaluation of need can be made to compare perceived problems with objective data that may or may not confirm the problem. Effective analysis at this stage of the planning process requires:

- **Searching for all possible points of view.** Attempts should be made to involve merchants, residents and commuters who may not actively participate in public hearings but who will be affected by any plan.

- **Outreach to silent citizens.** Although outgoing and active citizens easily become involved, the vast majority of people, even though they have strong feelings on an issue, do not write letters to editor, petition city councils or attend public meetings. If the community involvement process is to be effective and truly representative, it must reach out to these *silent citizens*. Early use of mass media, publicity and opinion surveys are good ways of gaining silent citizens’ inputs at the
start of the planning process.

- **Efficient utilization of citizen involvement or input.** Early involvement is vital to assure that the process is directed to citizen needs rather than following preconceived notions of officials. Citizen involvement must be sufficiently focused to provide useful input. Surveys which ask citizens to prioritize their concerns on a general level about neighborhood issues such as traffic, beautification, maintenance of housing stock, etc., do not address the problems which traffic management can solve. Usually more direction is required; any survey should seek reactions to specific issues such as: "heavy traffic on my street affects my walking pattern..." or "the noise of truck traffic keeps me awake at night..."

- **Proper weighing of viewpoints.** Recognition of different viewpoints and needs in the neighborhood should be acknowledged, as should determination of whether a vocal majority or minority is representing interested parties at public hearings/neighborhood meetings.

- **Sensitivity to special resident groups.** Residents most vulnerable to changes in traffic patterns include the elderly, handicapped and children. These groups are usually less vocal, less organized participants in the public or political process and their needs and concerns are different than those of other residents. Similarly, recognition should be given to different residential preference or lifestyle groups, e.g., those who spend a majority of their time at home versus those working during the day and often seeking relaxation and enjoyment outside their home.

- **Sensitivity to perceived as well as measurable problems.** The nature of traffic engineering as it is practiced on arterial and higher order facilities is usually to rely heavily on evaluation of objective and quantifiable data. On local neighborhood streets, a different approach is needed. Driver actions which citizens on local streets perceive as problems often "measure" to be quite normal when they are evaluated by arterial standards. The key to successful assessment of neighborhood traffic problems is to understand the residents' perception of the neighborhood, and to use measures which respond to the residents' perceptions and expectations rather than the drivers'.
Organized analysis program and relevant observations. Resources can easily be wasted collecting large amounts of irrelevant data or conversely critical data items may be overlooked. Once the issues and individuals involved become clear, an organized approach to the needs assessment is essential.

Proper staff and resource support. In the cities observed, traffic engineers often assumed responsibility for performing a needs assessment. While their technical input was complete and reliable, their handling of community participation was often ineffective or virtually non-existent. Planning departments can usually offer guidance in community participation techniques such as surveys, interviews, presentations and meetings.

Initiating The Needs Assessment

When should a formal needs assessment be undertaken? If the objective traffic statistics available or casual direct observation present direct evidence of a problem, there is clear indication that some sort of analysis should begin. However, the absence of such direct objective evidence in an initial screening is not a sufficient basis for concluding that no problem exists. As is discussed at length subsequently, data customarily collected by traffic and planning professionals or the way they customarily analyze and interpret that data may not be relevant to the actual concerns of residents and other street users.

If a sizeable minority of residents or users of a block, street or area complain about some condition, or if a majority of people in a particularly vulnerable or sensitive group (i.e., the elderly, parents with young children) complain, then there indeed is some kind of problem, even if not reflected in normal traffic data.

Techniques and Measures for Problem Identification and Needs Analysis

Community needs analysis has two points of focus, resident conditions and traffic service conditions. Resident analysis assesses the needs, problems and impacts of traffic on residents, and other institutions sensitive to it. Traffic and services analysis assesses the needs and problems of all those who wish to have access to or through the area.

The traffic analysis and resident analysis act as mutual checks, ensuring that there are grounds for community concerns. that solutions will be relevant to residents' concerns and that basic transportation needs will be met. Taken together they generate a "before" data base upon which performance of the "solution" eventually implemented can be evaluated.

Techniques used for resident analysis and traffic service analysis fall into five main categories: citizens direct inputs, traffic/service observations, environmental observations, observations of resident activities, and records. Table 8 presents a range of measures in each of these categories. The large number of measures reflects the diversity of traffic impacts and the limitations of individual measures. No single measure or small group of them is sufficiently comprehensive to reasonably relate to all of the issues of possible concern. And even where measures are relevant, reliability of the measure can be a problem.* Direct inputs of citizens are usually relevant but not necessarily reliable. Direct observations and records are usually reliable but not always directly relevant. For this reason Table 8 arrays measures by resident and traffic conditions each purports to assess, and rate each for relevance and reliability. The table also demonstrates why traffic counts are the most predominant measure in current use — volume counts are a highly reliable and at least somewhat relevant indicator on virtually every needs issue.

The needs assessment should not become an immense data-bound project. Table 8 provides a basis for organizing an analysis plan so that only those measures relevant to the specific problem at hand are used. Because neighborhood traffic concerns often involved microscale issues and impacts, data should generally be aggregated at the block level. Data should be assembled not just for the apparent problem site but for the full area likely to be impacted by the problem or by its solution.

*A measure is said to be reliable if different people independently evaluating a condition or event consistently coincide in rating it.
Table 8
TECHNIQUES AND MEASURES OF ASSESSMENT AND EVALUATION

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<td>walking, cycling, handicapped</td>
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<td>station and route inventories</td>
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- highly relevant and reliable
- highly relevant, somewhat reliable
- highly reliable, somewhat relevant
- somewhat relevant and reliable
- highly relevant, reliability varies
Citizens' Direct Input — Community Involvement in Needs Assessment

The techniques used at this stage include receipt of initial complaints, direct interpersonal communication, and outreach to the larger community. Neighborhood traffic management programs usually start with the receipt of individual complaints or petitions for action. This is a normal aspect of many governmental processes; the key element is that an efficient method of logging and analyzing the requests should occur, so that each complaint is fairly dealt with and so that repeated requests from a single area can be seen as a more positive indication that a problem exists.

When an agency decides to undertake a program in an area, interpersonal communication between the agency and the citizens is imperative. Contacts with the most concerned individuals can help focus on the greatest needs, and community meetings can produce more detailed viewpoints from a larger segment of the community. However, those who complain to an agency and those who attend public meetings often form only a small percentage of the neighborhood population.

To determine the needs of the silent citizens and to alert them at an early stage that actions are being considered, outreach techniques — including formal surveys, informational brochures and similar techniques — should be initiated. At this point no formal solutions which may appear as a threatened action should be put forth. However, the agency should have something concrete for the citizens to react to in order to stimulate reactions and new thinking. Lists of specific problems (e.g., noise, safety, visual quality) related to the citizens' own neighborhood and generic illustrations of possible solutions are most effective.

Figures 89 and 90 show two graphical techniques intended to stimulate reaction; Figure 91 is a typical questionnaire used in Seattle as part of an outreach program to determine neighborhood feeling. This questionnaire is especially good at searching for people's perception of problems as well as producing a preliminary indication of problems and inconveniences which the various control measures might produce.

<table>
<thead>
<tr>
<th>Traffic/Service Observations</th>
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<tr>
<td>This section summarizes the most important measures, including specific details on why certain data is needed and how to interpret it. These measurements are those primarily used in evaluation of alternatives and follow-up evaluation of implemented plans; thus a thorough initial data collection is vital to eventual &quot;before and after&quot; evaluation. The material which follows is pertinent to how the data is used in the needs assessment process. Additional details relating to what to collect is contained in Appendix C.</td>
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**Total Traffic.** Most jurisdictions today have a functional classification system which designates the general purpose a street should serve. Few have specified upper limits to the volume for each classification and used them as threshold levels above which a street can be considered a candidate for management. Daily volumes of 1000 to 2000 or peak hour volumes of 100 to 200 vph have been used for local residential streets, but no national consensus exists. Table 9 presents one attempt at this type of classification with desirable maximum volumes for each class.

<p>| Table 9 |</p>
<table>
<thead>
<tr>
<th>Street Classification</th>
<th>Usual ADT Range</th>
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<tbody>
<tr>
<td>Place</td>
<td>0 - 100</td>
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<tr>
<td>Lane</td>
<td>75 - 350</td>
</tr>
<tr>
<td>Local</td>
<td>200 - 1000</td>
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<tr>
<td>Collector (or higher)</td>
<td>800 - 3000</td>
</tr>
<tr>
<td>Arterial (or higher)</td>
<td>Over 3000</td>
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</tbody>
</table>

*Source: Reference 89*

Resident demands for changes in neighborhood traffic conditions do not seem in any way linearly related to the actual traffic volume. Rather, it appears that complaints about traffic occur whenever the actual conditions on the street differ from resident's expectations as to what

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*Traffic volume ranges in this section do not relate to capacity in the traditional traffic engineering sense. Most streets are physically capable of carrying much more traffic than the levels indicated on Table 9. Also note that volume ranges are expressed in vehicles per day (vpd) rather than average daily traffic (ADT) because when dealing with low volume streets most professional simply use the raw ground counts rather than factoring them to produce an ADT.*
TRAFFIC IN NEIGHBORHOODS

Prepared by the Department of City Planning to assist neighborhood planning programs

The traffic problem in neighborhoods

The traffic problem in neighborhoods say and the p=nln=ula. The, who live In the path of major traffic corridors bear the burden of both in-town and out-of-town commuters traveling to the downtown.

Changes in people & auto population 1960 to 1970

Total addition to San Francisco: 

- Population: 49,877
- Micromobiles
- Cycles
- Trucks
- Autos

Total reduction of San Francisco: 

Population: 24,642

Traffic into and out of the city every 24 hours

Fulton Street near Divisadero in 1936

The same place 38 years later in 1974

Many of our major arterial streets are congested with traffic. The result is often that cars overflow onto adjacent parallel streets as some drivers seek and follow shortcuts through residential neighborhoods. The invasion of neighborhoods by the commuting car driver is destructive of a good neighborhood environment.

Figure 89. San Francisco. A Newsheet, "Traffic in the Neighborhoods."
TO LIMIT TRAFFIC IN YOUR OWN NEIGHBORHOOD:

First, with the help of your city engineer, prepare a map of all the streets and allographic property, and ask him to help you estimate the amount of traffic. Walk and drive, talk to your neighbors, and if you can, and the city planning department will help you send around a questionnaire to see what problems and extra people feel they have. Show these on maps, and add some photos if you can, of some of the best and worst things.

Figure 90. An innovative approach to soliciting community input

Source: Jack Sidener, "Recycling Streets," November 1975
The Madrona Community Council is working with the Seattle Engineering Department and the Department of Community Development to study traffic problems and implement a system of traffic controls to solve those problems. The Community Council has been awarded $213,000 of Community Development Block Grant Funds to that end.

The following preliminary questionnaire will allow each of the residents of your neighborhood to provide us with more detailed concerns and information about your neighborhood street. Please feel free to qualify or explain your answers! The results of this questionnaire will be presented to the Community Council for our review.

PLEASE COMPLETE AND MAIL WITHIN 2 DAYS

1. How do you feel about the following:
   - Traffic Volume? Major Problem Minor Problem No Problem
   - Vehicle Noise? Major Problem Minor Problem No Problem
   - Vehicle Odors? Major Problem Minor Problem No Problem
   - Vehicle Lights? Major Problem Minor Problem No Problem
   - Comment on the nature of the problem (time, frequency, place, etc.)

2. Are the following safety concerns on your street:
   - Vehicles traveling at excessive speeds? Often Seldom Never
   - Obstacles which prevent full view of approaching traffic at corners, i.e., parked vehicles, shrubs, or fences? Often Seldom Never
   - Mark with "5" on map on opposite side.

3. In your opinion, how many of the vehicles are using your street for a shortcut through the neighborhood:
   - Less than one-fourth
   - About one-half
   - More than three-fourths
   - (This will be compared with scientifically collected data later)

4. Do you believe there are parking problems on your street? Yes No
   - If yes, why? (Mark with "5")
   - Parking problems
   - Close traffic supervision by Police Department
   - Other

5. How many cars do you own?

6. Which of the possible following inconveniences would you accept:
   - a) Making your street one-way Yes No
   - b) A stop sign at your corner Yes No
   - c) Special bumps to slow cars (undergoing legal opinion) Yes No
   - d) Special information signs (local access, etc.) Yes No
   - e) Regular parking causing a change in your route Yes No
   - f) Traffic circles in center of intersections to slow traffic Yes No
   - g) Angle (diagonal) diverter (similar to the one at 23rd and Spring) Yes No
   - h) Cul-de-sac (dead-end with turn-around) Yes No
   - i) Closer traffic supervision by Police Department Yes No
   - j) Regularly park in your garage or driveway Yes No

7. Mark locations on map (other side) of any accidents or near-accidents (mark with "A") that occurred on your street in the past 2 years.
   - Frequency of near accidents:

8. Comment in detail on any problems special to your block that are not covered in the above questions.

Address ____________________________ Name (Optional) ____________

If you have any questions, please leave a message for me at the Community Council Office, phone 329-0920 between 9:00 a.m. and noon.

Sincerely,
JAMES HAMILTON, Madrona Community Council

Figure 91. Madrona neighborhood questionnaire, Seattle
conditions on that particular street should be. This lends some support to the concept of using comparisons of actual traffic volume to desired range by functional classification as an indicator of need for traffic management action.

While there is not a linear relationship between complaints and traffic volume, there is a critical volume range in which resident expectations seem most likely to differ from actual conditions. This occurs on moderately traveled streets — streets serving from slightly under a thousand to roughly three thousand vehicles per day, particularly streets classified as “local” streets.

Below 800 vpd, conditions normally meet expectations though complaints sometimes occur when a large percentage of the volume is comprised of through trips. Complaints on lightly traveled streets most often focus on other concerns like occasional speeders or a site-specific hazardous condition.

In the 800-3000 vpd range, residents have the image and expectation of their street as a quiet, lightly traveled one. But this range appears to be a threshold at which residents generally become conscious of traffic as an irritant. They become aware of traffic noise, of occasional conflicts while entering or leaving their driveways, of the need to always be wary when crossing streets and increasingly concerned for the safety of children playing in or along the streets. Hence, in this threshold range conditions do not match expectations, and residents demand changes — in specific less traffic. And their demands for action tend to be most persistent and vocal.

At volumes above this “critical” range, more residents are concerned about traffic than on lightly traveled streets. But residents of these moderately traveled streets (above 3000 vpd) seem to perceive their street as an active rather than lightly traveled one. Hence, while more may be disturbed, residents’ expectations are for measures to control traffic’s most extreme impacts (i.e., eliminate speeders, provide safer crossings for children) rather than for large-scale traffic reductions.

Above 10,000 ADT, the numbers of people disturbed by traffic seems to stabilize (does not increase with increased traffic volume) and actually complaints about traffic tend to be fewer and less intense than on the light and moderately traveled streets. A number of factors may account for these observations. The 10,000 ADT level seems to be an upper threshold in the sense that if a resident is at all susceptible by traffic-related environmental conditions, the individual’s irritation level is likely to be reached before traffic reaches 10,000 ADT. Residents on streets above 10,000 ADT may concede that theirs is a truly busy street and traffic reasonably “belongs there.” Hence, they tend to complain only in the wake of major incidents (i.e., a child-pedestrian fatality). Also residents who are somehow insensitive to traffic impacts (the hard-of-hearing elderly person undisturbed by traffic noise or the single young-adult usually home only late at night when there is no traffic) or who accept not-particularly-desired traffic impacts as a trade-off for other considerations (the limited income family living on a busy street because of lower rent there) tend to comprise an unusually large portion of those living on heavily traveled streets. In general, while large numbers of people on busy streets may not like traffic conditions there, in most cases they do not expect or strive for improvements in those conditions through traffic restraints. In fact, busy street residents may not even perceive any changes in environmental conditions as a result of traffic volume changes which would cause large perceptible differences in conditions on the light and moderately traveled streets.

The conclusion that measures to reduce traffic volume should be concentrated on streets in the “critical” and moderately traveled ranges is a valid generalization. This strategy focuses on the volume range of greatest resident sensitivity and complaint. Potential productivity in terms of increasing resident satisfaction is high since relatively small reductions can put traffic below the threshold at which residents normally become irritated. And the size of reduction needed to cross the threshold is usually small enough that there is a fair prospect of achieving

*Actual numbers concerned about traffic on a street of any given volume tends to be a function of numerous variables — traffic speed, dwelling type and setback from the street, presence of children, and numerous resident demographic factors.
it without incurring major adverse impacts elsewhere. By contrast, a busy street's traffic could be reduced from say 18,000 ADT to 14,000 ADT without any meaningful change in the residents’ perceptions of conditions. Meanwhile, the amount of traffic diverted in this latter case is substantial enough that adverse impacts elsewhere seem likely.

Focusing traffic reduction measures on "critical volume range" streets should not be regarded as an absolute principle. Unwarranted through vehicles may comprise most of the traffic on a street still in the low volume range. Or a local street may be loaded not just into the "critical" range but well into the moderate or even busy range by overflow from a congested major street or overloaded intersection. Both these types of conditions may well warrant traffic reduction measures.

Through Traffic. The nature of some street patterns may be such that even though the "critical" volume range is reached on a street designated as local, the traffic is still composed of local residents accessing their homes. Or even on a relatively lightly traveled local street, the total volume of traffic may seem far more than what should be using the street for local access. Surveys or estimates of through traffic can help to determine if neighborhood intrusion really exists, and if so, how great a reduction can be anticipated by a management program.

Traffic Speed. The problem of traffic speed is as much a problem of perception as it is a problem of reality. The key point in measuring speed on residential streets is that the standard technique of determining the 85th percentile speed has little meaning. It is the speed of the highest 15%, or even less, that often arouses the fears, anger, and frustration of residents. It is the fear of the infrequent speeder, the possibility that a child might not be expecting a speeding car, and the insult that the speeding motorist represents to a homeowner enjoying a peaceful quiet afternoon, that causes much of the problem. This aspect should receive as much attention as those cases where the speed of all cars is a demonstrable problem. Perceptions of speed may also result from accelerating and braking actions.

Another key point is that traffic need not be "speeding" to be considered "too fast" for resi-
dential areas. European planning practice is aiming for speed ranges on local residential streets well below the 25-30 mph limit common in the U.S.

Traffic Composition. This measurement is needed only to confirm the presence of trucks, buses, and/or motorcycles when complaints are possibly caused by these particular types of vehicles are received.

Capacity Studies. The ability of designated arterial and collector streets to accept traffic diverted from local streets by traffic management measures is a fundamental constraint to be considered in the assessment. Consideration of major street capacity constraints as a causal factor in local street problems is also important.

Traffic Safety. Because of the low volumes involved, accidents on local streets are a statistically rare event. A neighborhood unit is rarely large enough to allow statistically significant measurements of accident rates. In this case, the evaluation must be a qualitative judgement of whether incidents, rather than accidents, are occurring; whether the potential for accidents (i.e., presence of children near speeding cars) exists; and whether resident perceptions of safety problems are valid or imagined. Figure 92 is an illustration of a real case in San Francisco where incidents rather than accidents define the perception of the problem. This is clearly a volatile issue in which resident opinion and professional opinion may diverge with little formal data on either side. Use of city wide accident data may be useful, but comparison with small local areas will still rarely be statistically valid. Other hard data measures are possible. In Berkeley, observations of obedience to traffic controls in residential street situations were used as an indicator of potential hazard. In Britain and Holland, counts of vehicle/pedestrian "conflicts" are used as indicators. Field observations of such conditions as sight lines at intersections, visibility of traffic, control signs and markings or absence of needed signs and markings, streetlighting, presence or absence of sidewalks, bikeways and handicapped ramps and similar considerations should be included in the safety assessment. Some cities have included a map on resident questionnaire surveys, requesting residents to locate and describe accidents and hazardous incidents in which they were involved or witnessed.

Service Access. Major routes used by regularly-routed services and emergency vehicles are essential data to be considered in needs assessment. An inventory of key routes (i.e., main egresses from fire, police and ambulance stations, public transit and school transit routes) and locations critical to operations should be compiled during needs assessment. Further details on this issue are presented in Chapter 5.

Resident Access. Travel time measures from residences to the arterials and collectors bordering a neighborhood and to key points in the community (the freeway entrance, downtown, the shopping center) comprise not so much a needs assessment measure as an essential "before" measure against which eventual conditions must be evaluated.

Environmental Observations

Measures of noise, air pollution, space occupancy, play, walking, cycling and parking conditions, visibility or visual quality or defenses against intrusion can be assessed by field observations and used as needs indicators. Some, such as noise levels, have been quantified more thoroughly than others; but it is important that those like visual quality be, assessed at least qualitatively.

Traffic Noise. Except in unusual cases, traffic noise measurements are rarely needed. The techniques in NCHRP Report #174 are usually sufficient to estimate noise from traffic volume, composition, and distance from the roadway. The more difficult issue is the level of acceptable noise. The Environmental Protection Agency has set an L_{eq} level of 65 db as their criterion for acceptable exterior noise in a residential area; FHWA uses an L_{eq} level of 70 db in the peak hour. These are roughly equivalent to the sound of a vacuum cleaner. There is considerable question as to whether these levels are acceptable to residents, and experience suggests that the acceptable level is in part a matter of personal experience and expectation. Figure 93 illustrates another part of the San Francisco perception of the problem. Additional research is needed to determine, in actual application, threshold levels of traffic noise in residential areas that are acceptable to residents.
TRAFFIC HAZARD

Figure 92. Resident defined traffic hazard on three streets, San Francisco
Source: Donald Appleyard, LIVABLE URBAN STREETS, 1976, (p. 14)
Air Quality. Residents express strong concerns about air quality. But in most residential areas, air quality problems stem from total regional traffic and other sources rather than from the presence of neighborhood traffic. While this is a problem for traffic and automobiles in general, a neighborhood traffic management plan will have little effect. Hence, a task for professionals involved in residential street projects lies not in measuring air quality conditions but in dispelling resident misconceptions about what effect neighborhood traffic management might have in improving air quality. Sometimes residents' complaints about air quality relate to fumes from individual vehicles — a phenomena also difficult to measure or affect by neighborhood traffic controls.

Visual Quality and Space Analysis. Neighborhood traffic management devices may achieve changes beyond the immediate objectives of controlling traffic. Traffic control measures offer inherent possibilities of beautifying the neighborhood through landscaping and other amenity features (i.e., miniparks, benches). These landscape and amenity features may become as important a motivation for implementing the device as is the desire to control traffic. To establish a rationale for such broad purpose actions, inventories of visual quality, dwelling maintenance and the amount of area in the neighborhood allocated to various uses are helpful. The analyst may attempt to assess visual quality and maintenance (Are gutters, sidewalks and lawns clean and tended? What are the characteristics of vegetation and landscape along the street? Is paint peeling off siding, windows broken or boarded up? Are derelict cars a feature of driveways and curbsides?) by simple rankings or by making a more sophisticated attempt (as in the Bath, U.K. work) using a specific checklist or grading matrix. Quantitative or qualitative analyses of outdoor space utilization (i.e., relative areas devoted to traffic, parking, sidewalks, yards and gardens, parks and play space) can help identify neighborhoods where space available for certain uses is deficient and point to traffic management controls most responsive to the deficiency. For instance, in a neighborhood short of private yards, parks and play space, cul-de-sacs might not only solve a
NOISE, STRESS AND POLLUTION

Source: Donald Appleyard, LIVEABLE URBAN STREETS, 1976, (p. 15)
traffic problem but also supply the needed play space by making the streets safe and useful for this purpose. On streets with parking deficiencies, chokers sheltering angle parking bays might increase the parking supply as well as serving a neighborhood traffic control function.

**Pedestrians, Bicyclists and the Handicapped.** Basic measures considering pedestrians, involve inventories noting presence or absence of sidewalks and sidewalk continuity, sight distance at crosswalk areas. Counts of pedestrians are normally warranted only at high activity locations where signalization or grade separation might be considered. Notation of delays or conflicts in crossing streets at key points (i.e., a route to school) is a key measure. For bicyclists, notation of key routes and destinations, points of conflict with traffic, inadequate widths, sight distances and site-specific hazards are basic considerations. For the handicapped, notation of locations (or absence) of ramps, sight distance (wheelchair height) at crossings and points where traffic poses particular conflicts for persons with impaired mobility are basic inventory items.

**Observations of Resident Activity.**

Observing resident behavior, walking, cycling, parking, or other street activities such as street play is perhaps the only accurate way to assess the impacts of traffic on street life, especially that of children. For this reason, behavioral observation is an increasingly common technique for assessing environmental conditions especially where there are significant numbers of people involved. Techniques are straightforward. For instance, simple notations of where street play takes place and where traffic appears to regularly conflict with street play is all that is required.

**Parking Conditions.** Simple parking use observations can quantify resident dependence on street parking and its use by outside commuters. This is classified as a resident observation rather than a traffic observation because in neighborhood situations, unlike most parking studies, the issue is not how much parking space is used, but who uses it, residents or outsiders.

**Records.**

Existing data files on traffic accidents, socioeconomic conditions and concentrations of particularly vulnerable population groups (from the census) land use surveys, crime and assessed values can be used where available. Analysts are cautioned that such data may be outdated or too coarse grained (i.e., not at block level).

**Synthesizing Community Input and Technical Measurements**

Given these community input and technical measurements, the professional or the community must decide if a problem exists, how large an area the problem covers, where the most severe problems are and whether neighborhood traffic management is applicable. While this is a highly judgemental process, the following questions may provide useful guidance:

- Does the technical data confirm the community perception? If not, is the community perception more important than technical data or vice versa? Even if there is no confirmed "problem," is there a reasonable opportunity to improve on existing conditions?
- Is the problem site-specific, or does it cover an entire neighborhood? If it is site-specific, will the solution cure the problem or merely shift it to another location? If the latter is true, would a site-specific solution do any real harm elsewhere or is a systemic solution advised?
- Does the problem exist throughout the day or at specific periods?
- Will a solution in one neighborhood cause resentment in another one? Will it stimulate
requests for similar action in other neighborhoods?

- Which neighborhoods should receive priority attention?

- Are complaints of traffic problems symptomatic of other problems such as crime, dirty streets, no place to play, etc.? Can neighborhood traffic management help to solve these problems, or is it irrelevant?

- Is the community united in its viewpoint of the problem, or are there internal conflicts? Are all views known well enough to define the problem?

These questions are illustrative of key considerations for the planner in needs assessment. Clearly, the more that is known about the community's perception of the problem, the more likely the planner will assess the area's needs accurately.

Generating alternative plans

The reasoned approach to neighborhood traffic issues recognizes the potential for more than one adequate solution. It also allows for orderly assessment of a variety of inputs, e.g., neighborhood groups, businessmen, traffic engineers/planners, and public officials.

In current practice, consideration of a full range of possible solutions may be the exception rather than the rule; i.e., needs assessment, definition of a solution, and implementation often are compressed to a single line of action. A neighborhood group may petition to City Hall that diverters be installed to discourage through traffic, and a resolution may be voted on and action mandated to the traffic engineering department — all within the course of one or two public hearings or city council sessions. Whether such a course of action, undertaken with little or no citizen input or technical analysis, will succeed or fail depends on good luck and good intuition. Cities studied in the State-of-the-Art review exhibited mixed results under such circumstances. For instance, Lake Oswego, Oregon's implementation of traffic diverters failed while Joliet, Illinois
succeeded in closure of one street at a large intersection.

The more conventional approach for analysis of alternative traffic control plans recognizes the need to accommodate a variety of inputs through a formal, and sometimes lengthy, evaluation process. Key elements of the alternative development process are:

- Plan development strategies
- Managing and arraying available data
- Developing the alternative plans
- Community involvement in plan development

Each procedure is addressed below.

**Plan Development Strategies**

Generating alternatives involves incorporating a number of objectives and wide range of information into responsive plan options. There are two basic strategies for achieving this — area-oriented and problem-oriented methods.

The **area-oriented method** involves definition of an easily recognizable planning unit, such as a neighborhood unit or "environmental area" (see Figure 94). Site-specific problems may initiate the planning process, but treatment is sought for the entire unit. In essence the strategy works from the "top down," from an end state vision for the entire area to a specific plan to achieve that state — e.g., a series of devices to "wall-off" a particular defined neighborhood. While conditions which spurred action are not specifically considered, the plans produced will hopefully resolve site-specific problems initially recognized. This method is the basic approach set forth by Buchanan, and is typically utilized in European "traffic replanning" efforts and in U.S. urban renewal schemes.

Application of this fairly simple concept may result in a clearly understandable scheme which generates community support and operates well in practice. The approach also eliminates need for extensive data on the specific nature of problems. However it suffers from these drawbacks:

- There may be difficulty in defining homogeneous environmental precincts or neighborhood units. Quite often there are isolated divergent land uses within neighborhoods such as corner stores, hospitals and schools within the unit which require special consideration. Frequently

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**Figure 94. Area oriented or "top-down" planning strategy**

Source: The "environmental area" concept from the Buchanan Report, 1963
Too, neighborhoods do not have sharply defined boundaries; the transition in land use character and neighborhood identity may be rather amorphous.

- In working from a broad scale vision, this approach may fail to satisfy micro-scale needs within planning unit, e.g., the one or two households near the device severely impacted by one device or location but not by another.

- The approach is one primarily directed to diversion of non-neighborhood traffic. It does not respond well when diversion is infeasible or when the residents themselves cause the problem — e.g., speeding on other blocks of their own neighborhood.

The problem-oriented method develops a traffic management scheme from analysis of an array of conditions in an area. The focus is at a micro-scale level, a “bottom-up” approach in which attempts are made to solve identified problems individually, while still considering the systemic effects and interrelations of separate problem sites, until a set of solutions is developed for an entire area (see Figure 95). This method requires a substantial array of data on the specific nature of problems to determine feasible and effective alternatives. This method is common to U.S. efforts at neighborhood traffic management. The Berkeley Neighborhood Traffic Plan is perhaps the most extensive example of this assessment strategy. A chief advantage of this approach is that it works well in dealing with problem situations internal to a neighborhood such as those created by a divergent land use or by the behavior of the residents themselves.

Potential drawbacks of the problem-oriented approach become evident when large areas are being treated. They relate to difficulties in gathering and effectively using large amounts of data and a tendency toward lack of cohesion among the solutions at sites which impact one another. These potential problems can be overcome by effective data management systems (see subsequent sections) and by subdividing the total study area into manageable sized units or neighborhoods for which data can be effectively organized and solutions to problems can be considered both in a site context and in a cohesive neighborhood context. Then alternatives for the individual neighborhoods can be matched with one another to develop cohesive plan alternatives.

Figure 95. Problem oriented or “bottom-up” planning strategy
Source: Grafton Hill (Dayton, Ohio) Neighborhood Identity Demonstration Program.
This discussion of strategic planning methods is emphasized out of concern for the tendency in current practice to overlook the systemic nature of most neighborhood traffic conditions and control plans. However, it is also possible to err by being "over-comprehensive." When traffic issues in a community are few and site specific, they can be successfully addressed on an ad hoc basis. Furthermore, the broad-focused approaches above can take considerable time and resources which in many cases may not be available. In such circumstance, consideration on an individual site basis of conditions or solutions recognized to be systemic in nature can be a responsible professional approach provided no serious and irreversible damage seems likely to result. At times, treading the fine line between over comprehensiveness on the one hand and too limited focus on the other may demand more clairvoyance than professional judgement. But it is as important to pursue ad hoc solutions when "half a loaf is better than nothing" as to resist incomplete schemes when well-thought out systemic approaches are indicated. Once an overall assessment strategy has been developed, the basic approach to traffic control must be determined. Control strategies are summarized in Chapter 2 and discussed in detail in the systems section of Chapter 3.

Managing and Arraying Available Data

Most communities observed in this State-of-the-Art review had no organized method for arraying and utilizing data. Yet this is critical in the problem-oriented approach which depends upon consideration of extensive micro-scale information for success. In Berkeley, probably the most extensive problem-oriented process undertaken to date, a system of overlay plots was used to array and assess information. Information plotted included citizen complaints, accidents, traffic volumes, speed studies, citations, public transit routes, truck routes, congestion points, neighborhood boundaries, site inspection field notes, community analysis, land use, and activity generators (see Figure 96). This process of recording and analyzing such information using this technique is outlined in detail in Appendix D. Locations where information from surveys, petitions, logs of letters or telephone complaints and suggestions of neighborhood residents is
available can also be overlay encoded for retrieval.

**Developing the Alternative Control Plans**

The overlay technique permits organized consideration of large amounts of highly detailed information. But solution schemes do not spring miraculously from a stack of data overlays. Developing solutions responsive to an array of problem conditions, and constraints of any complexity demands exercise of judgement and creativity by the planner (though the word implies a single professional, the planner could be a single person or a small group and include residents). While the control strategies discussed in Chapters 2 and 3 provide general guidance and Appendix D provides further procedural guidance, each alternative must be tailored to the peculiarities of the specific study area. It is inevitable that conflict of values and needs with each other and with constraints will occur. The responsible planner must define a set of alternatives which reflect the full range of technical possibilities and trade-off choices between benefits and undesired impacts, roughly estimating what the gains and drawbacks will be as each alternative is evolved through trial and error. Once a set of alternatives is reasonably developed, a more formalized projection of each alternative's potential effects and trade-offs is prepared as input to selection of one for action.

**Community Involvement in Plan Generation**

The purpose of community involvement at this stage is to guide development of schemes which seem to respond to resident perception of needs and constraints and assure that residents' schemes are somehow addressed in the analysis. Community involvement at this stage can range from residents taking full responsibility for developing their own alternatives to simply reacting to proposals developed by professionals. Either participatory process requires immediate clarification of the relationships and roles of professionals and different kinds and groups of public participants.

Communities observed in the State-of-the-Art review exhibited the full range of citizen involvement in generation of alternative plans from almost nil to full responsibility. In some cases, once citizen input on needs had been received, the professionals took sole responsibility for producing alternative plans responding to them. In Palo Alto, California and Rocky Mount, North Carolina, staff-generated schemes responding to community inputs on problems have proven highly successful upon implementation. In this type of program where technicians lead and carry out the process while the public acts as a sounding board, the process for review and reaction may take the form of citizen's advisory committees, citizen representatives on public policy-making bodies, public meetings and neighborhood planning councils. Surveys may be useful to collect supplementary information or to receive initial feedback on proposed alternatives. A public information program organized by the technical staff should inform the general public of the alternatives being considered.

In other cases, citizens provided general guidance on the strategic approach to the control preferred (i.e., indicating preference for physical barriers over STOP controls and increased enforcement; or for a limited peripheral barrier plan over an intensive internal one), leaving the professionals responsible for determining the specific details of devices and locations in each alternative plan. For instance, in Davis, California, a Citizens Safety Advisory Commission (SAC) meets once month to discuss problems and recommendations which are then passed on to the Department of Public Works.

In yet other cases, residents themselves developed specific plans which were taken under consideration together with those developed independently by staff. This was general procedure in Berkeley where most neighborhood groups were able to propose one or more plan alternatives responding to their needs. These were supplemented by staff-generated proposals. Other communities relied on a joint citizen-staff working group which collaborated in preparation of plan alternatives. Such is the case with Oakville, Ontario (Canada) where a Traffic Advisory Committee composed of citizens and technical advisors responds to complaints with staff-supplied traffic data.

Finally, in a few communities, citizens took
full responsibility for designing solutions to their problems which were then forwarded to decision-making bodies for acceptance or rejection. In Wichita, Kansas, a neighborhood association was told to develop their own design solutions to their traffic problems which was then presented to the Transportation and Planning Commission for approval. Rarely is this degree of responsibility assigned to community participants since few residents ordinarily have the technical skills required; and when staff are assigned to provide training and technical assistance, they tend to take on a dominant role. Also, because neighborhood traffic management involves conflicts among deeply felt personal interests, city officials are reluctant to give real power to individuals who stand to personally gain or lose. However, the technique worked quite effectively as early as 1960 in Richmond, California. The technician's or professional's role is to provide guidance in application of technical procedures and to act as "legmen" in gathering data. Initiative planning is usually conducted through public workshops or some other form of structured public sessions. Design-ins, color mapping techniques or model kits may be applied. These use maps, pictures or other visual tools to allow citizens to develop "sketch plans" of alternatives.

While there is a definite hierarchy in the level of citizen involvement at the alternatives generation stage — and strengths and weaknesses in each approach — the State-of-the-Art review appears to indicate that community involvement at the needs assessment and plan selection stages has far more impact than community input to the alternatives generation process. Nonetheless, involvement of a broad range of actors at those stages appears a key to success.

Plan selection

In neighborhood traffic issues, selection of one of several alternative plans for implementation is inevitably both a technical and a social/political process. Technical analyses help clear the potential impacts each alternative might have. However, the process of placing value on these impacts and weighing trade-offs is predominantly a social and political one. It involves individual citizens, neighborhood organizations and/or public officials. How these people perceive benefits and drawbacks of the alternatives ultimately has a large effect on what plan is selected. If the selection process is not carefully structured and technical information is not convincingly presented to the public, there is a good possibility that technical considerations which should not be compromised will be cast aside.

This section first presents guidance on technical information which should be available at the evaluation stage. It then presents, through illustrations from actual application, the various types of social/political selection processes which are possible. Individual planners must determine which techniques are applicable to their local resident and political situation.

Technical Inputs

The technical inputs needed to choose a neighborhood traffic management plan are primarily estimates of what changes are likely to happen relative to those qualities used originally to determine the needs of the neighborhood. In this sense, the selection process is a formal method of determining to what degree the needs will be met. But the technical inputs to plan selection must also attempt to estimate what other possible impacts (positive or negative) each alternative might have beyond its direct objectives. The technician's role at this stage of the process is to present for each alternative the best quantified or qualitative estimates for the measures listed previously in Table 8. Pertinent aspects in plan selection include:

- **Traffic volume.** What reductions occur on the protected streets? Is this enough to solve the problem? Where does traffic go? What are the specific increases on the streets gaining more...
traffic? Does this cause new problems? Do route changes cause particular hardships for the drivers involved?

• Traffic speed. Any meaningful change? If so, will this cause traffic diversion? If yes, see traffic volume considerations above.

• Traffic composition. Are problem type vehicles shifted off the streets in question? If so, where do they go? Does this cause a new problem on that street? Does it cause undue hardship for the drivers involved?

• Safety. What safety gains are expected in the protected area? Any safety compromises? What gains or compromises can be expected in the surrounding areas (i.e. to which the traffic is diverted)? What is the likely net safety impact?

• Noise. Using the techniques in NCHRP report 174, the impacts of noise in relation to volume and speed should be estimated for all streets for which changes in traffic volume or speed are projected.

• Visual Quality and Condition. What areas are likely to improve? What areas suffer?

• Neighborhood Accessibility. A block by block evaluation should be made of the degree of constraint each alternative poses relative to the existing situation. Possible measures of residential accessibility include the number of arterial/collector streets bordering the neighborhood which can be accessed using neighborhood streets only and the number of blocks out of direction travel necessary to access each border street.

• Emergency Vehicle Accessibility. As further detailed in Chapter 5, evaluation of emergency vehicle accessibility should consider accessibility to each block from the emergency vehicles’ most logical point(s) of origin.

• System-Wide Measurements. Calculation of expected volume and capacity of adjacent arterial intersections should be made to determine the degree to which the alternatives might create or increase levels of congestion.

• Parking. How does the scheme affect the availability of curb parking for residents? For outsiders?
• Level of Expected Violation. If comparisons are made between physical and passive devices, the expected level of violations should be projected, as noted in Chapters 3 and 5.

• Impact on Bicyclists. If any formal bikeway or heavily traveled bicycle route is affected, what modifications are needed to preserve continuity and improve bicyclist conditions? Is street space for cyclists limited below recommended minimums or is continuous and/or specific locational encroachment by motorists upon the cyclists path caused? Can devices which might obstruct cyclists passage be modified to serve the cyclist while maintaining desired effects on the motorist? Can this be done in a safe, formalized way or does it simply involve tacit acceptance of barrier violations by cyclists? Does any device cause any specific safety problems for the cyclist such as obstructing sight distance or affecting balance (as with a speed bump) or causing the cyclist to take a path deviating from normal operating expectations?

• Impact on Pedestrians. Do neighborhood traffic controls help meet any specialized pedestrian needs (i.e., site adjacent to an elementary school). Does the plan reduce the pedestrian/vehicle conflict, or does it merely transfer it to another location? If the latter is true, are the traffic controls at the new location an improvement over the previous condition? What effect does each device have on the pedestrian’s visibility and on his view of traffic? Does any device encourage unsafe pedestrian practices, particularly by the young? Does each increase or decrease safe play space for children? Does any pose any demands for quick reactions by pedestrians? Does any device form a barrier to the pedestrian or can it be designed to enhance pedestrian accessibility?

• Impact on the Handicapped. Does any device interfere with people using aids (canes, walkers)? Does any require difficult maneuvers by the wheelchair-bound or pose the potential for causing them to lose control? Does any device demand quick reactions by any of the above types or by elderly people who simply can’t react too quickly? Does any device cause any
form of disorientation to the blind? Does any device create any visibility problems for people in wheelchairs? Are there specific needs of handicapped persons in the planning area to which neighborhood traffic control devices can be designed to respond?

- **Construction Costs.** See Chapter 3.
- **Maintenance Costs.** Consider both maintenance of the control device and possible cost implications due to impacts on current maintenance operations.
- **Visual Quality.** What areas are likely to be improved? Are there any adverse appearances associated with the devices?
- **Space Utilization.** Does the device help remedy any existing deficiencies in allocation of outdoor space to various uses? Does it leave the situation unchanged? Or does it exacerbate existing weaknesses?
- **Costs of Added Driving Time, Fuel Consumption, etc.**
- **Number and Type of People Affected.** It is important to identify, by block, those people who will benefit by an alternative and those who will not relative to all of the other criteria noted above. An aggregate evaluation should be made to determine if the number benefiting are greater or fewer than those who are disbenefited. A scaled evaluation is normally desirable to determine if the level of impact is significant. Impacts might be rated strongly positive, somewhat positive, unnoticeable, somewhat negative and strongly negative. For example, if 500 cars can be diverted from a local street carrying 800 cars to an arterial carrying 5,000, the effect on people living on the local street will be strongly positive, whereas the effect on the arterial may be unnoticeable, even if the arterial has a residential population.

The measures listed above are quite comprehensive and may not be needed in all applications. They are presented mainly as a checklist for the planner to use in determining those issues which he believes will be important in his specific case. In large part, the importance of issues will depend on site circumstances and the concerns of those who are involved in the selection process, and at what point in the process they are involved, as illustrated below.

**Community Involvement in Plan Selection**

At this stage, community involvement must serve several purposes: to draw out citizens who won't participate until confronted with specific plans, eliminating the chance for "no one told me" arguments; to provide opportunity for all needs and constraints to be taken into account, to let the citizens decide the social trade-offs between alternatives, and to select a plan which has reasonable consensus or community support while meeting technical conditions and constraints. Normally, plan selection is a two phase process. In the preparatory phase the community develops a consensus. In the decision phase, officials confirm (or reject) the community's choice.

**Preparatory Phase to Decision Making.** Citizen participation may vary in form from citizen review boards, where a small number of participants represent the whole neighborhood or community, to, in rare cases a citizen referendum where the affected electorate formally votes on a plan. The key issue is the degree to which the agency, the community, and elected officials agree to be bound by the results.

**Citizen Review Boards.** Representative panels are usually most effective in reaching decisions. The small group composition of the decision-making body makes it easier for its members to come to grips with all the issues and trade-offs involved and to effectuate compromises where the interests of segments of the community they represent come into conflict. But for representative panel decision-making to be successful, these elements are critical:

- Due representation must be provided to all significant interest groups and allowance made for interjection of an individual's interest when group representation is not possible.
- The representatives should be leader types to make reasonable decisions and compromises and to "sell" the selected plan to their constituencies, particularly where it involves compromises. The most concerned citizen gadfly from a neighborhood is usually not the best member of a decision panel.

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Community Hearings or Meetings. Decision-making mechanisms relying upon community hearings or less formal meetings provide a more open forum for individuals to voice concerns or have their specific questions answered. They also provide a final opportunity for educating the active public to technical considerations, conflict issues and other constraints (see Figure 97). If the meeting is small, professionals and the community can work together to develop compromises and consensus. Large group meetings rarely offer this opportunity. Important considerations in making such meetings work are these:

- In public meeting situations, citizens tend to state their own positions rather than to listen to others and work toward compromises. Productive meetings take a coordinated and disciplined effort by professionals and hopefully community leadership elements. This implies a working relationship of trust between the professionals and the community leadership, further implying a separate process to develop such a relationship.

- Since this is the last chance for “silent citizens” to affect decisions, substantial effort must be devoted to drawing the public to the meeting. At the problem identification stage, it was important that specific solutions not be put forward as a threatened action. Now, at the decision stage, announcements should convey the sense that something specific really is going to happen, that individuals have vital interest at stake, and this is their last chance to affect what will be done. Figure 98 is an excellent example of an announcement of this type from Seattle, Washington.

- If the planning area is sizeable, consideration of all the details of all the alternatives at an open meeting can be extremely cumbersome. One way of coping with this is to combine meeting announcements with an informational newsletter which presents information on each of the alternatives and what each is likely to achieve.

Surveys. Surveys can be an efficient way of reaching large numbers of people and can provide the definitive type of response which gives elected officials confidence. However, beyond
A 150-day demonstration traffic diverter system is being proposed for your neighborhood. If its installation is approved by residents of your neighborhood (a survey will be conducted) and by the Seattle Board of Public Works, traffic revisions would be made at those locations indicated on the map.

These revisions would include:

A) Channelization to prevent through traffic (locations 1 and 2)
B) Street closures (Locations 3, 6 and 7)
C) A one-way street and traffic island (Location 5)
D) A traffic circle (Location 4)

The purpose of these revisions is to reduce traffic volumes, speed, noise and accidents throughout your neighborhood.

You are invited to attend a Public Meeting to discuss the details and impacts expected from the proposed traffic diverter system. It is important that you attend this informational meeting because a survey will be conducted during the following week to determine neighborhood support for the project.

Meanwhile, if you have any questions, please call Noel Schonman, Project Engineer, at 625-2347, or Linda Aro, Neighborhood Planner, at 625-4492, or Linda Fitzpatrick, West Woodland HIP Committee, 783-4921.

WHEN: Wednesday, February 23, 1977
WHERE: West Woodland Elementary School
5634 5th Avenue N.W.
TIME: 7:30 PM

Figure 98. Effective announcement form for community meeting — Seattle, WA.
the common survey problems of sampling, language and reading comprehension, the points specific to their application in choosing among neighborhood traffic alternatives should be taken into consideration:

• Generally, surveys should be used to measure public preferences only after the range of alternatives has been narrowed to just a few by other processes. Otherwise, unless very sophisticated attitude-preference measurement techniques are used, the solution indicated as favored may not be the best one. The best solution usually is the one acceptable to the largest number of people or absolutely unacceptable to the least number, not necessarily the one the largest number of people ranked as their “first choice.”

• The survey instrument does not include allowances for compromises. Any needed compromises must be developed within each alternative prior to the survey. Schemes which would impose intolerable impacts on small numbers of people must be eliminated or modified before the survey.

• Considerable information on the alternatives and their effects must have been previously disseminated or accompany the survey. Respondents have no opportunity to ask clarifying questions which might affect their response unless an information phone is set up.

Figure 99 shows an example of a survey to test resident reactions to various alternatives.

Referenda. Plebiscites are normally effective only when the range of choice has been already narrowed to that between two options (doing nothing possibly being one of them). They offer no opportunity for compromises or rankings. They usually invite a larger group than those truly affected by the scheme to vote on it, and they give uninvolved citizens equal voice with those deeply affected. They sometimes exclude persons who have an important stake in what the community does to traffic but who are not voters from the decision-making — people such as non-resident businessmen and commuters to the area.

Informing Citizens of Plan Details. A problem common to this stage of the planning process is
effective dissemination of details of plan alternatives and their projected impacts. Media announcements and articles (newspapers, radio and TV), posters at prominent locations and leaflets mailed out or distributed by hand can be effective. Several cities contacted in the State-of-the-Art search had produced useful leaflets and broadsheets. San Francisco's *Traffic In Neighborhoods* newssheet explains in a few pages the traffic problems, offers an array of alternative solutions and tells residents how the planning process works. Seattle has produced color broadsheets of neighborhood improvement proposals showing, by plans and drawings over photographs, how proposals will actually look. In other cases, exhibits of proposals in model form or colored drawings have been displayed at public meetings (Melbourne, Stanley, Barnsbury). Videotapes showing community traffic problems and possible solutions have been shown in Detroit (Woodside) and in Berkeley. All these methods allow large audiences to learn of traffic problems and view possible solutions.

**Decision Making.** Ultimately, most community decision making is finalized at the city council level (or equivalent elected body). While the council is the ultimate decision-making body, what goes on before usually has strong impact on which alternative is selected and its likely eventual success.

If the decision process is truly initiated only at the council or Planning Commission level, virtually anything can happen. A well-organized interest group with political clout can gain their way, leaving important technical considerations and the legitimate interests of other residents and travelers ignored. Or, as more often happens, public inputs give officials nothing more than a sense of bitter conflict, leading officials to choose to do nothing or to decide issues
on the basis of narrow technical findings.

Decision-making by an official board works best when a consensus of citizens and techni-
cians has been reached to support a single alter-
native prior to consideration by the board. In
essence, this depends on an already established
process, either formal or informal, which is rec-
ognized as having status by the board. The offi-
cial body's decision-making provides both an
affirmation by authority of the prior work and a
point of last appeal for those who oppose the rec-
ommended alternative.

Implementing decisions

Once the traffic plan has been adopted by an
official political body and funded, staff must
proceed with the physical act of installing the
planned devices. While implementation may
seem straightforward — most city public works
or traffic departments have the resources, pos-
sibly with contractor assistance — implementa-
tion actions can have critical effect on the suc-
cess or failure of the plan. This section reviews
some of the significant implementation issues.

Permanent Versus Temporary Controls

There is widespread disagreement among
practitioners as to whether temporary or per-
manent devices should be used in initial installa-
tions of diverters, semi-diverters, cul-de-sacs,
circles and any other devices involving substan-
tial construction. In large and complex traffic
management schemes, it is inevitable that some
modifications will prove necessary after the
schemes are implemented. Temporary devices
provide flexibility for such modification. Since
they normally cost far less than permanent in-
stallations, an entire program can be imple-
mented immediately with temporary devices
even if funds are short. Individual installation
can then be upgraded to permanent facilities
after they prove successful and as funds become
available. On the negative side, foreknowledge
of the ease of modification may lead to incom-
plete and sloppy planning. And because of the
devices' inherent impermanence, issues are
never truly settled. The ready possibility of
change encourages opponents to continue the
controversy and leads others who might prefer
limited modifications to join the agitation.

As for immediate permanent installations, the very nature of their permanence seems to command more driver respect; hence better obedience and less vandalism. Residents readily accept permanent landscaped devices as enhancements to the beauty of their neighborhood whereas temporary materials are often regarded as eyesores. Because permanent installations involve sizeable funding commitments, professionals and the public hopefully ensure they have the "right answer" before deciding on a solution.

In the State-of-the-Art search, situations supporting all the arguments on both sides of the issue have been found. In Australia, a fixed experimental test period with temporary devices is mandatory before permanent installation. Palo Alto, California and St. Louis, Missouri, have had successful permanent installations approved after experimental periods with temporary devices. But in Lake Oswego, Oregon, residents displeased with the appearance of temporary traffic barrier devices joined those who totally opposed the concept in having the devices removed. Many cities with small-scale plans have had success with immediate implementation of permanent landscaped facilities. But in San Francisco, residents of the Richmond District who had little input to the plan's design caused immediate "permanent" installation of a large number of traffic management devices to be halted. Though many residents supported some form of traffic management, they saw the "permanence" of the construction as an overwhelming obstacle to ever making the plan more reasonably responsive to their desires and thus stopped the project in mid-construction. Directly across San Francisco Bay, Berkeley's extensive traffic management plan survived two recall ballot measures largely on the strength of arguments that modifications to temporary devices in use there were possible and were being made. Yet controversy over Berkeley's plan continues.

Choice between immediate permanent implementation or initial use of temporary devices should be based on the individual community's situation. In general, temporary installations might be favored in cases where plans are extensive and complex (where the possibility of some planning error is high) and/or where funds are short. Where temporary devices are selected, careful attention to their attractiveness is a must and a future commitment to make permanent those devices which prove themselves should be made clear.

Incremental Versus One-Step Implementation

Devices in an individual neighborhood should be constructed or erected as nearly simultaneously as available resources permit. But if the plan encompasses a large district and involves a significant number of devices, should it be constructed as a single short-term activity? Or is an incremental neighborhood approach more realistic?

The incremental approach allows staff to devote more attention to the details of individual installations and to assure that all necessary construction materials are on hand. In Berkeley, haste to install all devices at one time citywide led to initial problems with materials shortages and design oversights. But in a smaller scale scheme in Shaker Heights, Ohio, careful procurement and installation crew preparation permitted successful implementation of all devices in a single day.

With the incremental approach, lessons learned in early action neighborhoods can be applied citywide and repetition of mistakes avoided. Yet the incremental approach leads to a lengthy period of turmoil as traffic adjusts and readjusts to a continuing series of changes in street conditions. And public reactions to temporary adverse impacts of an early implementation increment can derail a plan at the outset even though a later staged step would have eliminated the impact. On the other hand, massive changes in traffic conditions resulting from several programs implemented at once can unite a large opposition. The planner must carefully review the individual situation to judge whether an incremental or one-step implementation approach is most appropriate.

Timing

Another helpful installation hint is to install devices at a time when the least number of drivers is likely to be around. For instance, in Hampton, Virginia, a beach resort area, devices were
installed during the winter “off-season.” This permitted year-round residents and motorists to adjust to the change before the summertime crowds arrived and summer residents and visitors were confronted with a fait accompli. Similarly, summer implementation would be appropriate in a campus town or winter resort area. Although not every city has the advantage of “off-seasons,” known major activity periods should not be chosen as a time for implementation.

Publicity

Publicity about the adopted plan’s features and its construction schedule are important components of implementation. Frequently, residents and motorists are rudely surprised by abrupt changes in their street system. The immediate result can be erratic or illegal behavior such as dangerous driving maneuvers or outright vandalism. In cases of large-scale plans involving barrier devices, maps showing features of the plan and its construction schedule should be distributed to residents, to commuters at their places of employment and to all firms operating routed services and deliveries in the city (see Figure 100). Notices warning of traffic control changes and dates of construction should be prominently posted on the control sites several days before construction takes place. Where barriers are to be constructed on internal neighborhood streets, similar warning notices should also be posted at the neighborhood entry points and left standing for at least a week after construction is complete.

Favorable First Impressions

When the first sign of a scheme is obtrusive and ugly without apparent purpose, people naturally react against it. Efforts to present an attractive appearance even with low budget temporary devices are rewarded. The extra cost of mature landscaping may be money well spent. A planter-bollard with tree or shrub may look very nice in the planner’s rendering, but in the field it may look like a small twig tied to a large stake stuffed in a fancy trash can if the community scrimps on the landscape budget. Devices initially perceived as ugly may be removed before landscaping matures.

Early Surveillance and Adjustment

Planners and engineers should anticipate the inevitable adverse reactions that accompany the installation of traffic control devices. Almost every city contacted experienced some unfortunate occurrence, ranging from illegal driving maneuvers to outright vandalism. Professional staff should be on the scene to observe deviant behavior in first-encounter reactions, to note if any design features are its cause and if design modifications can provide a countermeasure to unsafe or purpose-defeating behavior.

Additional police surveillance during the period immediately following installation helps to discourage erratic or illegal driving behavior, such as blatant violation and vandalism of barriers and one-way streets. The period of intense first-encounter reaction usually lasts no more than a week or so. After that time, drivers have adjusted their routes sufficiently to avoid the inconvenience caused by the new system.

Commitment to Specific Evaluation Period

While minor adjustments as a result of early surveillance findings are possible, a commitment to a specific evaluation period before major changes in the scheme are made should be established. This allows time for traffic and residents to adjust patterns, and for tempers to cool and permits evaluation to be based on longer-term performance rather than initial reactions.

Community Involvement in Implementation

Community involvement at this stage is passive, e.g., citizens receiving information on how plans will be implemented. The technical staff assumes the duties of informing the citizens of plans and schedules to minimize surprises. The continuing public meetings or public information program can serve as techniques to notify the public — particularly those susceptible to change or negative impacts — of the implementation schedule and work-in-progress plans if construction is needed. Negative reaction to any neighborhood traffic management project may be due to residents taken by surprise by actual implementation activities.

A process is also necessary for identifying problems created by work in progress. The process may be informal, e.g., directly addressing
E. REPUBLICAN ST. TRAFFIC DIVERTERS
STEVENS NEIGHBORHOOD

CITY OF SEATTLE
Funded by Forward Thrust, Department of Community Development

Here is a handy reminder for you to keep in your car or home:

Figure 100. Flyer distributed to businesses and residences in Seattle, Washington
complaints to the technical staff, or continuation of the more formal process of public meetings or workshops.

Evaluating the control plan's performance

State-of-the-Art Observations

Thorough evaluations of how neighborhood traffic control measures actually perform in use are the exception rather than the rule in current practice. This accounts in large measure for the paucity of hard data in Chapter 3. In rare cases where cities have deliberately set out to experiment with unusual devices or have undertaken particularly large-scale control programs, there have been some attempts at true performance evaluation. In most cases, if the devices implemented have the effect of silencing the original complainants and no significant opposition surfaces or serious operational problems result, the program is normally judged to be a success. Little hard data other than a few traffic counts is likely to be taken. If the complainants are not satisfied or substantial opposition does arise, no significantly greater efforts are normally made to collect hard data; the scheme is simply judged a failure.

If decisions can be made so simply, why evaluate? For one reason, evaluation of technical performance and community perceptions is needed to provide an unbiased basis for decisions as to whether a plan is kept or abandoned. Actual performance and impacts are often quite different from what opponents may believe or claim. Public reaction is often shaped by first impressions and observation of erratic initial performance characteristics. An evaluation can clarify issues, bring the more stabilized long-term performance characteristics into focus, and spotlight "hidden" gains and losses which may be significant. If traffic management opponents' allegations regarding traffic safety and congestion impacts were not countered by hard evaluation, Berkeley might well have abandoned its neighborhood traffic plan at an early date.

Secondly, evaluation makes modification pos-
sible. Decisions made without evaluation are typically all-or-nothing — retain the scheme or abandon it. Evaluation can point to opportunities for modifying a scheme to make it perform its intended function better or to lessen adverse impacts. It can also be used to determine if the plan should be expanded both in terms of devices and geographical area. Finally, only when evaluations are conducted will there be true growth in the State-of-the-Art in neighborhood traffic control. So little is known today, not because measures haven’t been tried, but because the measures which have been applied have not been evaluated.

**Evaluation Techniques**

Most of the measures described in connection with Needs Assessment shown in Table 8 and detailed in Appendix C are relevant to evaluation. Basically, measures taken during that planning stage constitute “before” conditions which can be compared to parallel measures of conditions “after” implementation to determine changes resultant from the control scheme. The conduct of the “after” measures and the comparisons comprise the evaluation. In addition, evaluation includes consideration of other data measures not studied in the assessment stage. Some of these measures may be relevant solely on an “after” basis (such as incidents in which traffic controls interfered with emergency vehicle operations); others involve “before” and “after” comparisons of information which was not relevant as an assessment tool but is affected by the plan (e.g., changes in residential property values). In preparing for before and after studies, analysts should take care that all important measures of perishable “before” conditions do get taken, even if some of these are not needed or useful in the initial program planning.

**Community Involvement in Evaluation**

Public inputs to the evaluation are obtained by continuing an active community involvement process. It is useful to maintain a means of communication between staff and public which is clearly recognized by both parties. The public can be helpful in providing feedback on their perception of how well the plan is working, details of problems, possibilities for improvement and any aspects overlooked in the initial planning process. The technical staff should provide information on technical measurements made to determine the project’s effectiveness. The staff should also address citizen complaints and suggestions.

Such communication between the public and technical staff may be accomplished through public hearings set for specific time intervals after implementation of the project or through a more informal means of direct contact with a representative of the technical staff or ombudsman as the need for contact is warranted. To evaluate in detail the acceptability — but positive and negative — of the project usually requires a more structured approach in the form of a survey or special neighborhood meetings where questions and reactions can easily be focused and addressed to all concerned groups and individuals.

Figures 101 and 102 are examples of survey instruments used in follow-up evaluations in Seattle, Washington.

**Timing**

In conducting the evaluation, three to six months after implementation should be allowed before “after” data measures are taken. This gives residents and motorists time to become familiar with the controls and make adjustments. With this interval, the “after” measures will be of stabilized reactions rather than first-encounter responses. For this same reason, three to six months would appear to be the reasonable period for application of experimental devices. In explicit experiments, a fixed period for application of the devices should be firmly committed in advance (Baltimore uses three months, Melbourne uses six). After the period, temporary materials can be removed while a final decision about the device is made.

This focus of the formal evaluation on stabilized long-term effects is not to suggest that first-encounter responses and early reactions should be ignored. In fact, these should be carefully observed from the start so that countermeasures to any serious safety problem or obvious defect can be quickly implemented.
Dear Citizen:

On August 31, 1976, two demonstration traffic circles were placed on 3rd Ave. NW - one at NW 90th Street and the other at NW 95th Street. This was done at the request of N. Greenwood residents who reported excessive traffic speeds on 3rd Ave. NW.

The purpose of installing demonstration traffic circles was to allow the Seattle Engineering Department to evaluate the effectiveness of these circles in bringing motor vehicle speeds down to the 30 mph legal speed limit. At the same time, the demonstration provided you with an opportunity to experience the circles for a period of time before having to express your opinion as to whether PERMANENT circles should be built.

The 60-day demonstration period of this project is now drawing to a close. The City Council and Board of Public Works will soon be faced with the decision of whether or not permanent traffic circles should be built on 3rd Ave. NW. It is important that you let the Board and the Council know how you feel about such a permanent installation.

The following information may aid in your decision:

1) The speed of southbound traffic on 3rd Ave. NW decreased to 24 mph at NW 90th Street and to 31 mph at NW 95th Street. The mid-block speeds were little affected by the 'circles' and remained at about 36 mph (See note below)

2) The speed of northbound traffic on 3rd Ave. NW decreased from 37 mph to 22 mph at NW 90th Street and to 27 mph at NW 95th Street. Mid-block speeds were reduced to about 30 mph near the circles, but climbed to about 33 mph after traveling 1/4 blocks. (See note below)

3) Although the 'circle' at NW 95th Street was damaged on 3 occasions, the only accident report filed involved a vehicle striking the 'circle' at NW 90th Street.

4) Permanent traffic circles have a fairly low profile and are landscaped (see sketches). If installed on 3rd Ave. NW, they would be substantially larger than the demonstration circles and they would be built along with the street widening project that is scheduled for Spring 1977.

5) The demonstration circles will be removed on or about Friday, November 5, 1976.

6) Automobiles would be allowed to make left turns around the permanent circles. This would remove some of the inconvenience associated with the demonstration circles. Trucks would not be able to make such left turns. Exceptions would be made for emergency vehicles such as fire trucks.

If you have any further questions, please call Noel F. Schonenman, Project Engineer, at 625-2347.

Please complete the attached questionnaire in behalf of your household and drop it in the mail by SATURDAY November 6, 1976. The postage has already been paid.

Thank you for your time.
Your Seattle Engineering Department
Traffic and Transportation Division

What is your opinion regarding the installation of PERMANENT traffic circles?
( ) Favor  ( ) Opposed  ( ) No Opinion

Comments ____________________________

Name ________________________
Address ________________________
ZIP ________________________

Figure 101. Survey to evaluate whether temporary devices should be made permanent, Seattle, WA.
The West End Planning Team and the City Engineering Department are very keen to have your personal opinion on the proposal to extend the present street barriers throughout the rest of the West End residential area.

As you may know the five existing barriers were erected to reduce the traffic flowing on what are purely residential streets in the West End, with the object of lessening noise and conflicts with pedestrians. These are also preliminary to placement of some mini-parks in the neighbourhood.

Experience with the barriers shows that they were successful and has encouraged us to propose the scheme shown in the map. It reduces the extent to which traffic may travel on the residential streets while still maintaining adequate freedom of movement.

Public reaction to our earlier publicity was scanty, and we need your opinion on how the proposals could affect you and your visitors before we can advise City Council. Please fill in the questionnaire and return it to us, by Feb. 31, 1974.

**QUESTIONNAIRE**

- Which block do you live in? (example: 1200 Jervis)
  - Yes □ No □
- Do you drive a car frequently in the West End?  
  - Yes □ No □
- Do you travel as a car passenger regularly? (more than 5 times a week)  
  - Yes □ No □
- Do you approve of the proposed additional barrier scheme?  
  - Yes □ No □
- Do you think it should be changed in some way?  
  - Yes □ No □
- If you think it should be changed, how? Please comment.  
  - Yes □ No □

If you need additional information before making your decision please phone the West End Planning Centre, 683-6681 or Jack Liman at City Hall, 612-7246.

Figure 102. Survey to determine resident reaction to expansion of NTM Program, Vancouver, B.C.
Modification and recycling the process

Minor modification to a neighborhood street’s protection plan is a common occurrence. Most modifications are physical changes to individual devices or application of a standard change to all devices of a particular type. Usually such changes are minor measures intended to improve the devices’ operation, eliminate some hazardous condition or counter some deviant driver behavior. Addition of reflectors and delineators to barriers or posts to prevent avoidance of them, or repositioning a stop sign for better visibility are examples of this type of modification. Most are undertaken by professionals on the basis of their own observations without any extensive formalized review process.

More important are situations where a plan is successful enough that abandonment is not a consideration, but its performance falls short of its intended objectives or it has some undesired side effects. Here significant modifications may be considered to fine-tune the plan.

The evaluation stage doubles as a needs assessment for such modification. In modifications of this nature which usually relate to a multi-device plan for a sizeable area, on some sites one type device may be substituted for another, some devices may be eliminated entirely or devices may be added, reoriented or shifted from one location to another. Normally, this type of modification involves a mini-version of the analytic and participatory processes used in needs assessment, alternatives development and selection. Because of all that has gone before, the actual activity can be extremely compressed in time and scope, though modification planning should be as thorough and deliberate as the original plan development. Major quick reaction modifications to large-scale schemes can create as much confusion and opposition as they were intended to cure.

When a plan is deemed to fail irretrievably, “recycling” can occur. In essence, the scheme tried is abandoned and the problem is either returned to the alternatives development stage for a fresh approach or one of the previously dismissed planning alternatives is resurrected for
implementation. In actual practice, when neighborhood traffic control schemes have failed, the process involved so much controversy and acrimony that there has been no energy or enthusiasm for a "recycling" process. Calls for modification and recycling can continue years after initial installation. In Berkeley, three years after implementation, opponents still attempt to eliminate some or all diverters while supporters aim for numerous modifications. In Barnsley, London the control plan was substantially recycled over a four-year period and two evaluation sequences, with nighttime control signs eventually replacing barriers.