

These Digests are issued in the interest of providing an early awareness of the research results emanating from projects in the NCHRP. By making these results known as they are developed and prior to publication of the project report in the regular NCHRP series, it is hoped that the potential users of the research findings will be encouraged toward their early implementation in operating practices. Persons wanting to pursue the project subject matter in greater depth may obtain, on a loan basis, an uncorrected draft copy of the agency's report by request to: NCHRP Program Director, Transportation Research Board, 2101 Constitution Ave., N.W., Washington, D.C. 20418

## Impact Assessment Guidelines for Evaluating the No-Build Alternative in Transportation

*An NCHRP staff digest of the essential findings from interim reports on NCHRP Project 8-11,\* conducted by David A. Crane & Partners, Inc., Boston, Mass. The Principal Investigators are Jonathan S. Lane and Lance R. Grenzeback.*

### THE PROBLEM AND ITS SOLUTION

In the context of transportation planning and engineering, the no-build alternative has generally been used to designate a default situation - the case occurring if a decision is made not to construct a transportation facility. As such, it has usually implied a transportation investment option that involves no construction and little or no expenditure of time and money. In recent years, however, the phrase "no-build alternative" has been widely applied to describe any one of a number of low-to-moderate investment options, including: no investment, no action, maintenance, the whole range of traffic operations and management strategies now classified as transportation systems management (TSM), and even some construction alternatives (such as road-widening and grade-separation projects). This generalized usage has confused both transportation professionals and the general public and has obscured the purpose of a no-build alternative.

The general objective of the research has been to strengthen the techniques and procedures available to transportation planners and engineers in three areas:

1. The definition of no-build alternatives.
2. The prediction and measurement of the consequences of no-build alternatives.
3. The use of no-build alternatives in plan evaluation.

\* In addition to loan copies of the interim reports, a limited number of copies are available for purchase as noted at the end of this digest.

This objective has been partially met with the development of a set of interim guidelines and a Phase I research report. The guidelines stand alone in their contribution to the practicing planner and do not have to be combined with the results of other research to make them useful. Furthermore, the guidelines are organized in a manual format to predict direct application to practice. An additional concern of the practicing planner, that of whether or not the guidelines have been evaluated sufficiently to assure success in use, will be answered in the near future inasmuch as the research is being continued to provide for field testing. However, the guidelines, as contained in the Phase I research report, have had comprehensive reviews by California, Maryland, and New York State personnel before undergoing substantial revision to their present format.

The Phase I research report, entitled "The No-Build Alternative: Social, Economic, and Environmental Consequences of Not Constructing Transportation Facilities," provides the back-up research findings that led to the guidelines. Included are the results of a survey among the states and the results from four case studies.

## FINDINGS

The guidelines are organized into five chapters and four appendices. The topics and conclusions of each chapter are summarized as follows:

### Chapter One - Introduction and Summary

### Chapter Two - The Role of the No-Build Alternative

The first section of this chapter reviews the role of the no-build alternative and recommends its use as a benchmark alternative to facilitate plan evaluation. (Plan evaluation techniques are discussed at length in Chapter Five.)

The second section reviews the legal requirements to assess the no-build option. It concludes that the legal and administrative mandates for inclusion of no-build alternatives in transportation planning are clearly established and have been upheld in a number of court decisions. Moreover, there is a clear mandate to study a wider range of minor alternatives that offer realistic choices in comparison with major alternatives.

The third section discusses when and where in the transportation planning process the no-build alternative should be used. A model of the project development process is used to specify key decision points where comparisons should be made between build and no-build alternatives. Three assessment cycles are defined within the process, each requiring successively more detailed information about the consequences of alternatives, including the no-build, as shown in Figure 1.

### Chapter Three - Definition of Alternatives

This chapter provides a standardized definition of the no-build alternative. The guidelines recommend - for purposes of establishing a benchmark for plan evaluation - that the no-build alternative be strictly defined as the continued maintenance of existing facilities; or, in the case of transit, the continued maintenance of existing services. This maintenance option is defined to serve as a benchmark alternative.

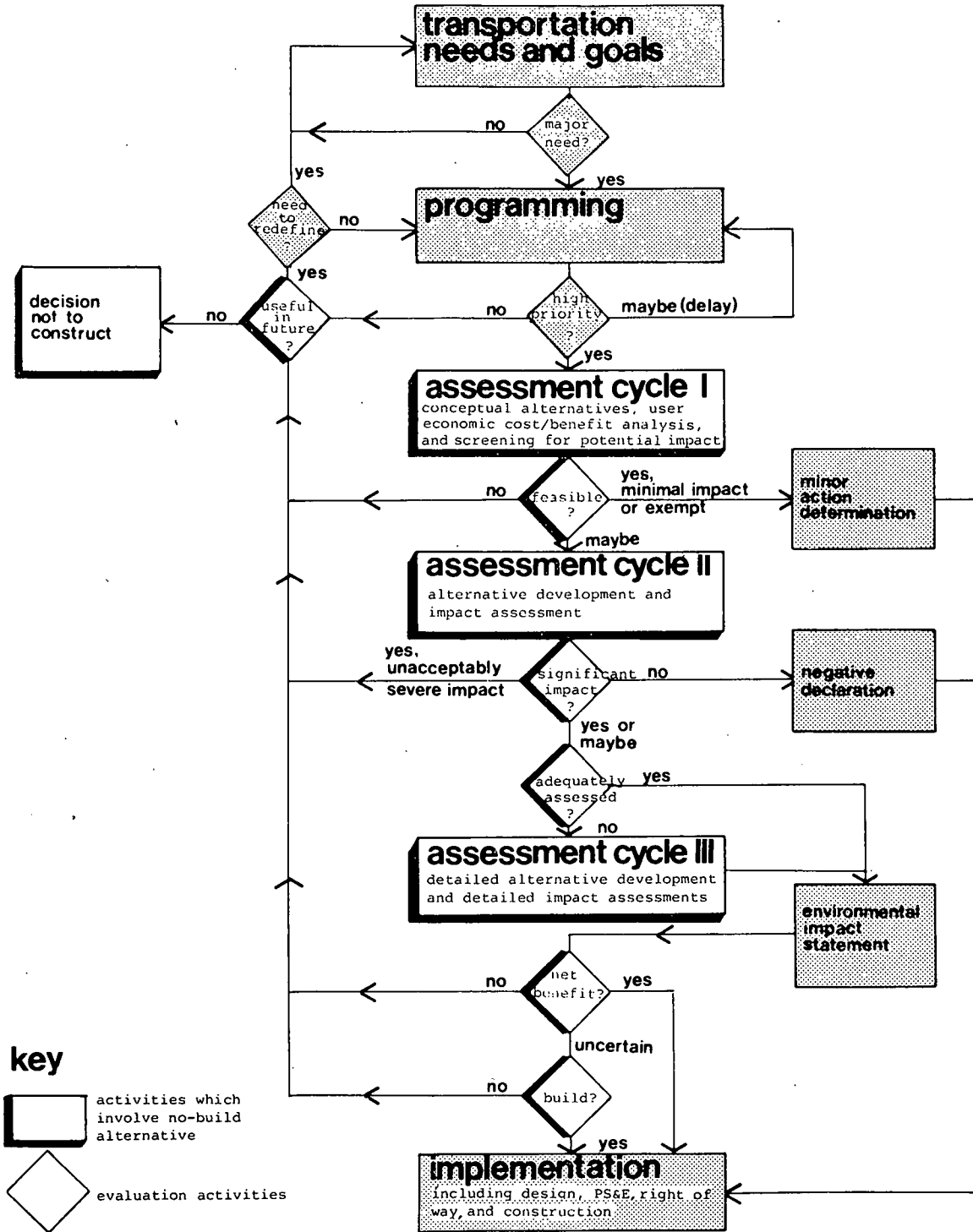


Figure 1. Project development process.

Alternatives involving modest investments are designated as minor alternatives; this group includes many of the alternatives that now fall under the general heading of "no-build alternative" or "transportation systems management (TSM)." The guidelines recommend that substantial attention be given to defining and developing minor alternatives during the project development process.

Finally, those alternatives which involve substantial investment, cause significant increase in capacity, or cause significant impact are designated as major alternatives. Included in this group are most of the primary construction alternatives.

#### Chapter Four - Impact Assessment

This chapter addresses the need for more informed and rigorous use of the techniques available for impact assessment.

Impacts may occur at the regional-scale, at the corridor-scale, or at local and individual levels. Specific impacts of concern for transportation projects are:

##### SOCIAL IMPACTS:

1. Community cohesion.
2. Accessibility to facilities and services.
3. Displacement of people.

##### ECONOMIC IMPACTS:

4. Employment, income, and business activity.
5. Residential activity.
6. Effects on property taxes.
7. Regional and community plans and growth.
8. Resources.

##### ENVIRONMENTAL IMPACTS:

9. Environmental design, aesthetics, and historic values.
10. Terrestrial ecosystems.
11. Aquatic ecosystems.
12. Air quality.
13. Noise.

The guidelines define four sets of conditions for which impacts should be examined:

- o Existing conditions.
- o Future conditions, assuming adoption of the benchmark alternative (maintenance); this is defined as the future baseline for plan evaluation (see Figure 2).
- o Future conditions, assuming adoption of a minor alternative.
- o Future conditions, assuming adoption of a major alternative.

Factors influencing impact have to be identified and forecast. Techniques are recommended for forecasting socioeconomic and transportation factors. The magnitude incidence and significance of each impact has to be measured and predicted in a step-by-step impact assessment process as follows:

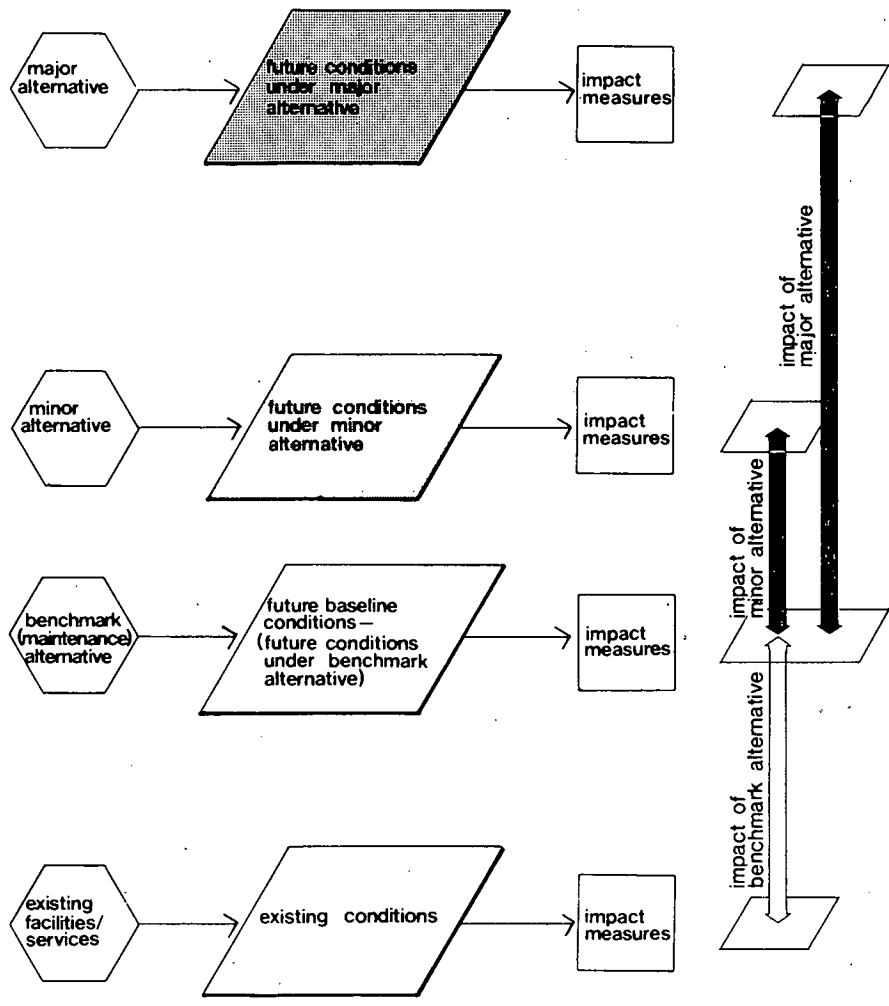


Figure 2. Role of the no-build alternative.

Step 1 - Identify and forecast those project attributes which cause the impact (measurement and projection). Project attributes that may cause an impact include physical design characteristics, maintenance characteristics, traffic characteristics, travel demand, and accessibility characteristics.

Step 2 - Identify and forecast external (i.e., non-project related) factors which influence impact (measurement and projection).

Step 3 - Identify and forecast intervening factors which influence impact (measurement and projection).

Step 4 - Determine the magnitude of the impact (simulation/modeling).

Step 5 - Identify and forecast probable receptors of the impact (measurement and projection).

Step 6 - Analyze the incidence of the impact (simulation/modeling).

Step 7 - Identify and forecast the standards, norms, or values related to the impact (measurement and projection).

Step 8 - Determine the significance of the impact (simulation/modeling).

Steps 1 through 4 are directed toward assessment of the magnitude of impact. Steps 5 and 6 assess the incidence of impact. Steps 7 and 8 assess the significance of impact.

Each of the 13 impacts of concern is reviewed and appropriate techniques are recommended for (1) assessment of existing and future conditions, and (2) each step of the assessment process. Recommendations are presented in tables and recommended techniques are cross referenced to a Techniques Dictionary. The dictionary provides a summary description of each technique and references to sources, user manuals, and other technical literature.

#### Chapter Five - Plan Evaluation

This final chapter deals with the need for comparison and evaluation of alternatives. Once the impacts of each alternative have been assessed, there is a need to clearly display those consequences in comparable terms so that they are intelligible to decisionmakers. This must be done at each key point in the development process. The guidelines recommend use of a "planning balance sheet" technique and offer guidance on approach and format.

Four technical appendices include:

#### Appendix A - Techniques Dictionary

This appendix provides summary descriptions of the impact assessment techniques recommended in Chapter Four. The characteristics of each technique are briefly described and references to further technical information are listed.

#### Appendix B - Glossary

Included are the terms defined specifically for these guidelines (e.g., benchmark alternative, baseline, project development process), as well as selected

specialized terms used in transportation and environmental planning.

Appendix C - Notes on the Impact Assessment Process

This appendix offers a conceptual model of the impact assessment process, showing how the various analytical activities relate to each other. The model provides the theoretical basis for the discussion of impact assessment techniques in Chapter Four.

Appendix D - References

This final appendix provides full citations of the works quoted or referenced in the text and the appendices.

APPLICATIONS

The guidelines will be of use to all professionals concerned with analysis of transportation alternatives. They are directed toward both highway and transit no-build alternatives and are keyed to state transportation planning processes. Transportation planners, environmentalists, sociologists and economists will find a convenient cataloging of methodologies to evaluate fully anticipated impacts of a no-build decision. All professionals will benefit from gaining an understanding of the role of the no-build alternative and how it may be structured. The basic principles should be valid for a wide spectrum of public policy problems.

These guidelines are interim in nature and are published to solicit comment from the professional community. Further work is in process to refine the guidelines.

The guidelines are supported by the agency's Phase I Research Report, entitled "The No-Build Alternative: Social, Economic, and Environmental Consequences of not Constructing Transportation Facilities." This report documents the research methodology, including the results of a survey among the states, results from case studies, and extensive descriptions of impact methodologies. The guidelines are available at a cost of \$7.00 and the Phase I report at a cost of \$9.50. Postage is additional if first-class mailing is desired. Copies may be ordered from:

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Review comments concerning the guidelines are encouraged and should be sent to the above address.

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