



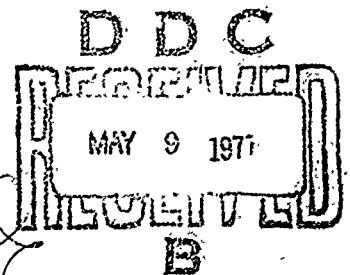
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ENVIRONMENTAL ASSESSMENT OF AIRPORT DEVELOPMENT ACTIONS



MARCH 1977
FINAL REPORT

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Prepared for
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
Office of Airports Programs
Washington, D.C. 20591

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16. Abstract This report provides specific step-by-step guidance on the preparation of environmental impact assessment reports and statements for a full range of airport development projects in accordance with DOT/FAA, EPA, CEQ, and other regulatory and reviewing agency requirements. Instructional material is included which extends beyond existing guidelines which focus on what impacts to consider. This report is designed to explain how each potential impact should be approached, analyzed, referenced, and presented. Included in this text are instructions on how to collect and analyze environmental impact data, so as to provide clear, responsive documentation in conformance with specific Federal, state, and local laws and regulations. Also included are all steps of the study and review process including assessment methodologies and report preparation, public hearing presentation, responses to comments raised by reviewing agencies and the general public, and final statement preparation. A separate Appendix Volume accompanies this report which contains specific laws, regulations and orders, noise and air quality data and other pertinent information referenced in the main text and needed in the assessment process.			
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**SECTION I
INTRODUCTION**

I: INTRODUCTION

A. PURPOSE OF THIS GUIDANCE BOOK

The purpose of this document is to provide specific step-by-step guidance on the preparation of environmental impact assessment reports and statements for airport projects in accordance with DOT/FAA, EPA, CEQ, and other regulatory and reviewing agency requirements. It is intended that this document provide instructional material which will extend beyond present guidelines which state what impacts to consider; the guidance book is designed to explain how each potential impact should be approached, analyzed, referenced, and presented. Included in this text are instructions on how to collect and analyze environmental impact data so as to provide clear, responsive documentation in conformance with specific Federal, state and local laws and regulations. This book covers all steps of the study and review process including assessment methodologies and report preparation, public hearing presentation, responses to comments raised by reviewing agencies and the general public, and final statement preparation.

A brief discussion of the major sections of the guidebook is presented here. Section I explains the purpose of the document and its relationship to four instructive model impact statements which were prepared concurrently to illustrate the guidance techniques.

Section II presents the broad base of environmental legislation by citing and highlighting those "authority" regulations which are applicable to airport development actions affecting the environment.

Section III then presents a series of those applicable supplemental laws and regulations which the preparer of an environmental impact statement will encounter and will have to consider.

Section IV of the guidance book identifies exactly what type of environmental report and review are required under various circumstances.

Section V comprises the major portion of the guidance book since it discusses the actual preparation of the component parts of the statement. This section basically follows the format of FAA Order 5050.2B (Instructions for Processing Airport Development Actions Affecting the Environment). Within the discussion of each environmental impact category, levels of analysis are suggested to aid in determining, for any airport situation, that depth of study sufficient to make a reliable evaluation of impact.

Section VI contains guidance pertaining to involvement in the statement review process.

Section VII deals with in-house procedures which contribute to the actual formulation of the environmental document. Section VIII is a Glossary of key terms.

Thus, the purpose of the guidebook is to provide general instruction as to the rationale behind, and the steps involved in, the environmental study, statement preparation and review process. Its content covers laws, regulations and procedures; identification of specific disciplines to be studied; and approved methodologies to be used in studying each discipline. It indicates suggested graphic presentations and step-by-step organization of the text, including the handling of alternative actions and the No Project Alternative. Finally, it specifies action to be taken in coordinating the study and review processes with governmental agencies and the general public. Four model statements provide concrete illustrations of applying guidebook instructions to specific airport development actions.

It is emphasized that this document is not the ultimate reference on environmental analysis and should not be used as a substitute for actual analysis. The guidance book is intended to serve as a tool to be utilized along with specific analysis and good judgement in each case.

B. RELATED MODEL IMPACT STATEMENTS

Four instructive model environmental statements have been developed in conjunction with the guidance book. These provide specific examples of how to apply a number of the specified instructions set forth in this book for the following airport development actions:

- Model No. 1 - Significant expansion of an existing major air carrier airport.
- Model No. 2 - Location and phased development of a new reliever airport serving a major metropolitan area.
- Model No. 3 - Location and phased development of a new general aviation airport in a rural area.
- Model No. 4 - Expansion of a general aviation airport which would not constitute a significant impact on the environment.

Each of the four hypothetical models includes problems which may be typically encountered in airport development or expansion projects. Examples include the overflight of parkland, the acquisition of low income or minority group housing, alteration of wetlands or floodplains, and infringement on habitat of endangered species or historic/archaeological sites.

The guidebook should be reviewed for specific information on laws and regulations affecting impact statement preparation, general format, content, impact categories to be covered, and methodologies to assemble and analyze data.

Model statements should be reviewed for two sets of conditions:

- Comparable or similar airport development actions.
- Specific problem or no-problem areas.

From a project point of view, a sponsor of a major expansion of an existing large commercial carrier airport in a large metropolitan community will find Model Statement No. 1 most relevant, whereas a sponsor of a new general aviation facility in a rural area will find Model Statement No. 3 most applicable. However, from an environmental point of view, any one model statement may not involve all the major impacts.

Sponsors encountering a particular problem -- regardless of the type of proposed development -- may find appropriate examples of the defined analysis of that problem in any one of the four model statements. For example, Model Statement No. 1 includes acquisition of low cost, minority housing, increased noise in residential areas, and runway construction within a floodplain. Model Statement No. 2 covers such items as alteration of wetland communities, potential degradation of water quality, and impact on recreation. Model Statement No. 3 addresses the problem of endangered species habitat, induced development, and the evaluation of historic and archaeological sites. Finally, Model No. 4 exemplifies the minimal impact which permits elimination of in-depth investigations for numerous disciplines within the study process.

In every case where potential problem areas are cited in the guidance manual, cross-reference should be made to the specific model statement sections dealing with this problem. Conversely, every complication or

conflict covered in a model statement is addressed in the guidebook sections dealing with that particular discipline's data requirements and analytic methodologies.

Thus, the guidebook and model statements provide clear and comprehensive direction on how to execute environmental study, statement preparation and review procedures for airport development projects. It is hoped that this documentation will help to insure timely compliance with the law and decrease unnecessary delays and costs in processing airport development programs.

SECTION II
PERTINENT LAWS, REGULATIONS, AND ORDERS

II: PERTINENT LAWS, REGULATIONS, AND ORDERS

The following section summarizes the laws, regulations, and orders directly affecting the overall content of environmental studies, statements, or procedures for airport development.

A. THE NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) OF 1969 (P.L. 91-190, AS AMENDED)

This law established environmental protection as a national policy and created the Council on Environmental Quality (CEQ). Section 101(b) charges that it is the continuing responsibility of the Federal Government to use all practicable means to improve and coordinate Federal plans, programs, and resources in order to carry out the national environmental policy. Section 102(2)(B) directs that all Federal agencies utilize an "interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts" in planning and decision making.

Section 102(2)(C) of NEPA specifies that any major Federal action that would significantly affect the physical or human environment be accompanied by a detailed statement covering the following points:

- The environmental impact of the proposed action.

- Any unavoidable adverse effect resulting from implementation of the project as proposed.
- Alternatives to the proposed action.
- The action's consequence on local short-term use of man's environment in relationship to the maintenance and enhancement of long-term productivity.
- Any irreversible or irretrievable commitment of resources involved in or resulting from the proposed action.

Subsequent to preparation of an assessment report and draft statement covering the above points, copies of the statement must be distributed to appropriate Federal, state and local agencies for their review and comments, as required by procedures set forth in FAA orders. The final statement must incorporate satisfactory responses to all comments prior to authorization to proceed with the action.

Airport development or expansion projects which require FAA approval are specifically subject to the provisions of NEPA. The act is reproduced in its entirety in the appendix of this document.

**B. AIRPORT AND AIRWAY DEVELOPMENT ACT
OF 1970 (P.L. 91-258, AS AMENDED)**

This Act recognizes the need to expand the nation's airport and airway systems in conformance and coordination with a national transportation policy.

Section 16 of the Airport Act specifies criteria for approval of development projects by the Secretary of Transportation, including reasonable consistency with local comprehensive development plans and objectives. Further, Section 16 (c)(4) stipulates:

It is declared to be national policy that airport development projects authorized pursuant to this part shall provide for the protection and enhancement of the natural resources and the quality of environment of the Nation. In implementing this policy, the Secretary shall consult with the Secretaries of the Interior and Health, Education, and Welfare [now with the Environmental Protection Agency instead] with regard to the effect that any project involving airport location, a major runway extension, or runway location may have on natural resources including, but not limited to, fish and wild-life, natural, scenic, and recreation assets, water and air quality, and other factors affecting the environment, and shall authorize no such project found to have adverse effect unless the Secretary shall render a finding, in writing, following a full and complete review, which shall be a matter of public record, that no feasible and prudent alternative exists and that all possible steps have been taken to minimize such adverse effect.

Section 16(d) of the Airport Act provides for the opportunity for public hearings for the purpose of considering the economic, social, and environmental consequences of any proposed development involving a new airport, new runway, or runway extension, prior to its approval.

Section 16(e) requires certification by the Governor of a state and/or the Secretary of the Interior and the Environmental Protection Agency that the proposed development will be located, designed, constructed, and operated so as to comply with applicable air and water quality standards.

In all cases where state standards exist, Governors will be the final authorities. In states where standards have not been approved, the Federal agencies will provide certification, as appropriate.

Section 16(c)(4) sets the precedent for a written environmental assessment, Section 16(d) for public hearings, and Section 16(e) for necessary water and air emission studies to document that the development will not exceed operative standards.

Section 18(a)(4) of the Act relates to land use compatibility and requires that assurances be given that appropriate action will be taken to restrict the use of land in the airport vicinity to those activities which are compatible with normal airport operations.

**C. DEPARTMENT OF TRANSPORTATION ACT
OF 1966 (P.L. 89-670)**

This Act established the Department of Transportation and included Section 4(f), which specified that all transportation plans and programs include measures "to maintain or enhance the natural beauty of the lands traversed." Further, Section 4(f) prohibits any project requiring the use of public parkland, recreation areas, wildlife and waterfowl refuges, or historic sites unless (1) there is "no feasible and prudent alternative"; and (2) the program includes "all possible planning to minimize harm...from such use."

A discussion of the interpretations of Section 4(f) of the DOT Act is contained in Section V. F. 11.

**D. DOT ORDER 5610.1B: PROCEDURES FOR
CONSIDERING ENVIRONMENTAL IMPACTS**

Promulgated September 30, 1974, DOT Order 5610.1B establishes procedures for preparing and processing environmental studies. The Order states that environmental impacts should be assessed concurrently with initial technical and economic studies, that citizen involvement should be encouraged throughout the study process, and that the assessment report should be made available to the general public at least 30 days prior to the public hearing. The impact assessment also must be reviewed by appropriate agencies within DOT, other related Federal departments and agencies, state and local authorities, and the state- and area-wide A-95 clearinghouse prior to final review and filing with the CEQ.

Order 5610.1B permits negative declaration where the proposed project does not have a significant impact on the environment. This statement must include sufficient data to justify its determination as "insignificant", and, while study copies need not be distributed outside the originating office, written documentation must be available to the public on request.

Attachment 2 of the DOT Order provides guidance as to the form and content of the statement, assuring that an interdisciplinary approach be used to disclose all impacts to the physical and human environment.

Authority to approve final impact statements for airport projects is vested in the Administrator of the FAA or his designee. However, concurrence by the DOT Office of the Secretary for Environment, Safety, and Consumer Affairs (TES) is required in the following categories:

- Any new airport serving a metropolitan area.
- Any new runway or runway extension for an airport located, in whole or part, in a metropolitan area and either certified under Section 612 of the amended Federal Aviation Act of 1958 or used by large commercial aircraft (except helicopters).
- Any project opposed by a Federal, state, or local governmental agency on environmental grounds.
- Any project which TES requests an opportunity to review and concur in final statement.
- Any project which the Administrator of the FAA requests that TES review and concur in approval of final statement.
- Any project in the above categories that also falls within Section 4(f) of the DOT Act requires concurrence of both TES and General Counsel (TGC) prior to final approval.

Order 5610.1B is contained in the appendix of this document.

E. COUNCIL ON ENVIRONMENTAL QUALITY (CEQ) GUIDELINES

CEQ Guidelines on the Preparation of Environmental Impact Statements were published in the Federal Register of August 1, 1973 (Vol. 38, No. 147,

Part II). Directives cover policy, content and processing procedures applicable to all actions qualifying under NEPA Section 102(2)(c).

The Policy section (1500.2) states that environmental assessment should occur as early as possible and in all cases prior to agency approval of any legislation or action which may significantly affect the environment. Preferably, environmental studies should coincide with technical and economic feasibility studies while the project is still a contemplated rather than committed action. Draft statements must be coordinated with and circulated among appropriate Federal, state and local agencies for comment. The final impact statement must be responsive to these comments.

Section 1500.6 provides guidance on identifying and addressing major actions significantly affecting the environment. Section 1500.7 contains information on the preparation of statements and the requirement for public hearings.

Requirements on the content of statements as established by the CEQ Guidelines have served as the basis for all Federal agency directives on EIS preparation including FAA Orders. Section 1500.8 of the Guidelines recognizes that "attention given to different environmental factors will vary according to the nature, scale and location of proposed actions." Therefore, all draft statements do not have to evaluate all factors, only those factors appropriate to and affected by the project.

Appendix II of the CEQ Guidelines lists the environmental factors which must be considered and indicates under each factor those Federal, state, regional and local agencies with legislative authority or special expertise to review a draft EIS covering that particular environmental discipline.

The CEQ Guidelines are included in the appendix of this guidebook.

F. FAA ORDER 5050.2B: INSTRUCTIONS FOR PROCESSING AIRPORT DEVELOPMENT ACTIONS AFFECTING THE ENVIRONMENT

This Order establishes all study criteria and environmental assessment processing procedures for airport development actions. It defines sponsor and FAA responsibilities, use of consultants, methods to optimize citizen involvement, environmental action choices, special action considerations, assessment report content, and processing and coordination procedures.

Six types of environmental evaluation study documents or actions are defined. These are:

- Fully coordinated impact statements as specified in Section 102(2)(C) of NEPA.
- Change of draft impact statements to negative declarations.
- Negative declarations processed pursuant to Section 16(c)(4) of the Airport Act.
- Other negative declarations.
- Prior finding actions.
- Exempted actions.

Eligibility for these will be discussed in detail in Section IV of this guidance book. Procedures are established within the order to assess Section 4(f) impact, to comply with Section 16(c)(4) of the Airport and Airway Development Act, to obtain airport layout plan approvals, to evaluate master planning grants, to obtain air and water quality certification, and to obtain compatible land use assurances.

The content of environmental impact assessment reports and statements is indicated in some detail. This includes:

- A description of the proposed action.
- Project background and history of community support or opposition.
- Probable impacts of the project's construction and operation on the environment.
- Action to minimize unavoidable adverse effects.
- Alternative actions to accomplish development objectives citing the consequences of each, including the No Action Alternative.
- Relationship between short-term use of man's environment and maintenance and enhancement of long-term productivity.
- Irreversible and irretrievable commitments of resources.

The Order then details steps of the review procedure, including A-95 clearinghouse, public hearings, FAA submission, review of assessment reports and draft statements, and final impact statement preparation.

In essence, this guidebook is a detailed extension of FAA Order 5050.2B. It discusses in depth what responses are sought and acceptable as well as what methodologies are required to develop the necessary data for environmental evaluation. It is required that Order 5050.2B be followed in the preparation of environmental impact studies for airport developments. It is provided in the appendix of this document.

FAA Order 5050.2B is a revision of Order 5050.2A and has been incorporated by reference in Part 152 of the Federal Aviation Regulations. Order 5050.2B was published in the Federal Register on October 21, 1976 (41 F.R. 46472) and will become an appendix to FAA Order 1050.1B when finalized.

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**SECTION III
SUPPLEMENTAL LAWS, REGULATIONS, AND ORDERS**

III: SUPPLEMENTAL LAWS, REGULATIONS, AND ORDERS

This section includes brief descriptions of the major applicable supplemental laws, regulations, and orders which may affect the preparation and content of airport environmental assessment documents.

A. RIVERS AND HARBORS ACT OF 1899

This Act pertains to construction within navigable waters of the United States. A Department of the Army permit pursuant to this Act would be required prior to performing any airport development in or affecting navigable waters. Permits are required from the U. S. Coast Guard for bridges, causeways, and overhead pipelines in navigable waters.

B. FISH AND WILDLIFE COORDINATION ACT (P.L. 85-624)

Section 2 of this Act requires that "whenever the waters of any stream or other body of water are proposed or authorized to be...impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatever...by any department or agency of the United States, or by any public or private agency under Federal permit or license, such department or agency shall first consult with the United States Fish and Wildlife Service, Department of the Interior, and with the head of the agency exercising administration

over the wildlife resources of the particular State wherein the...control facility is to be constructed...". Reports and recommendations of the Secretary of the Interior and any other applicable officials must be included in the report prepared or submitted by the agency responsible for constructing the project to the Congress or other agency with authority to approve the project.

C. EXECUTIVE ORDER 11296, FLOOD HAZARD EVALUATION GUIDELINES

This 1966 Order requires Federal agencies to evaluate flood hazards in planning facilities, constructing buildings, disposing of lands, and land use planning.

D. NATIONAL HISTORIC PRESERVATION ACT OF 1966 (P.L. 89-665)

This Act establishes an Advisory Council on Historic Preservation and requires consideration to be given to the impact of Federally initiated or assisted projects on historical districts, sites, buildings, structures, or objects listed in the National Register.

Section 106 specified that prior to any Federal action or expenditure of funds, the head of the responsible Federal agency shall afford the Advisory Council "a reasonable opportunity to comment with regard to such an undertaking."

In effect, this statute requires research to verify the presence of historical sites. If any are located within, adjacent to, or in proximity to the proposed development area, impact must be assessed and ultimate disposition approved by the Advisory Council.

E. EXECUTIVE ORDER 11514, PROTECTION AND ENHANCEMENT OF ENVIRONMENTAL QUALITY, 1970

This Order requires all Federal agencies to "initiate measures needed to direct their policies, plans, and programs so as to meet national environmental goals."

F. CLEAN AIR ACT OF 1970 (P.L. 91-604)

This statute, strengthening the Air Quality Act of 1967, authorized research, regulatory actions, and programs to prevent and control air pollution. Responsibility for implementation of the Act is vested in the Environmental Protection Agency (EPA).

Section 107 assigned states the primary responsibility for developing and implementing regional air quality control programs. However, Section 108 authorized the Administrator of the EPA to establish national ambient air quality standards to cover stationary and mobile sources of emissions. Under Section 110, states are permitted to adopt Federal ambient standards or establish more stringent standards for Air Quality Control Regions

(AQCR) with serious problems. States are not permitted to promulgate more lenient standards than those established by the Federal Government. Where states fail to implement approved regional control programs, regulatory responsibility remains with the EPA.

Section 309 authorizes the Administrator of the EPA to "review and comment in writing" on the air quality impact of any Federally financed project or Federal agency action covered by Section 102(2)(c) of NEPA or other related Federal statutes or regulations. Further, it specifies that at the conclusion of the review, the Administrator's comments must be made public. Finally, if the Administrator determines that the proposed action will constitute air pollution hazardous to "public health or environmental quality, he shall publish his determination and the matter shall be referred to the Council on Environmental Quality."

Thus, airport development projects covered by Section 102(2)(c) of NEPA and Section 16(c)(4) of the Airport Act are also required to conduct air pollution studies consistent with Section 309 of the Clean Air Act.

As previously noted, the Clean Air Act authorizes each state to develop and operate its own air pollution control implementation plan. Provisions include the division of the state into Air Quality Control Regions (AQCR) by Federal authorities and the establishment of ambient standards for various pollutants. In addition, states may require special standards, monitoring, studies and permits for new construction in AQCR's where

ambient pollutant levels approach state standards. State implementation plans must be approved by the EPA prior to taking effect.

Due to Section 309 of the Clean Air Act, air quality studies for airport projects will be subject to review by both the EPA and state authorities, even in those states with approved implementation plans.

1. Transportation Control Plans

Clean Air Act amendments call for the development of coordinated transportation control plans to reduce vehicle miles traveled (VMT), whether by positive action, such as improved mass transit facilities, or regulatory restriction on new development which would generate additional traffic. The U. S. Department of Transportation has cooperated with the EPA in proposing guidance for national or state transportation control plans.

The surface traffic generating characteristics of new or expanded airport facilities must be analyzed in conformance with effective DOT or state transportation control plan regulations.

2. Indirect Source Review

Airports are primarily indirect sources of pollution in that they generate both motor vehicle and aircraft emissions.

The EPA has developed criteria for indirect source reviews and has urged states to require indirect source reviews for major developments.

While promulgation of indirect source review guidelines for parking-related facilities has been deferred, some states have included this provision in their approved implementation plans. Thus, approval of a new or expanded airport project in some states requires the preparation of an indirect source study evaluating increased automotive and aircraft emissions resulting from the development. A list of states which have their own indirect source regulations is provided in the appendix.

3. Parking Management Review

A 1974 amendment to the Clean Air Act established that construction or major expansion of parking lots constitutes a new source of pollution which may prevent the attainment or maintenance of AQCR standards. Therefore, prior to parking lot/garage construction or modification, a developer must submit to the state or EPA sufficient data to prove that the facility will not jeopardize maintenance of standards or violate VMT objectives of a transportation control plan.

Guidelines for parking management review procedures were published by the EPA in the Federal Register. As in the case of emission control standards, parking management requirements have been deferred pending the conclusion of Congressional hearings.

G. UNIFORM RELOCATION ASSISTANCE AND REAL PROPERTY ACQUISITION POLICIES ACT OF 1970 (P.L. 91-646)

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 is designed to establish a uniform policy for the fair and equitable treatment of persons who are displaced, or have their property taken for Federal and Federally assisted programs. The ideal goal of the Uniform Act is to match as precisely as possible, the characteristics of the displacee's original dwellings with those of their replacement units. The term "characteristics" refers both to the physical character of the units (for example, the number of rooms, area of living space, and type of construction) and to the character of the residential environment (for example, the quality of the neighborhood, social structure of the community, etc.).

The requirement of a comparable replacement dwelling states also that it be located in an area of comparable public services - both utilities and commercial facilities. Furthermore, it must be reasonably accessible to the relocatee's place of employment. A comparable replacement dwelling must be priced within the relocatee's financial means, and it must be available with no barriers on the basis of race, religion, sex or national origin. In order for a specific dwelling to qualify as replacement housing, it must in all instances meet each of the minimum requirements of decency, safety and sanitation established by the Federal agency sponsoring the project and by the local housing codes and ordinances. The Uniform Act

establishes maximum money amounts to be paid to relocatees so that they may obtain, without unfair costs, decent safe and sanitary replacement housing.

In those cases where the maximum available relocation payment is not adequate to obtain comparable replacement housing, Section 206(a) of the Uniform Act provides for housing replacement of last resort. Last resort housing may be purchased on the fair market and renovated or rehabilitated if necessary, or it may be constructed new in instances where fair market supply is deficient.

Public facilities may be functionally replaced so that the local affected agency receives equivalent compensation.

H. EXECUTIVE ORDER 11593, PROTECTION AND ENHANCEMENT OF THE CULTURAL ENVIRONMENT, 1971

This Executive Order states that the Federal Government shall provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation. Federal agencies are directed to initiate measures to direct their activities in such a way that properties of historical, architectural, or archaeological significance are preserved, restored, and maintained for the inspiration and benefit of the people.

I. WATER POLLUTION CONTROL ACT AMENDMENTS
OF 1972 (P.L. 92-500)

This legislation authorized national water quality and wastewater treatment standards and moved to combat water pollution by providing for the planning, financing, and development of critical programs on a regional basis.

Section 208 of Title II authorizes the development of area-wide waste treatment plans. Integral to the planning process is a regulatory program which controls the "location, modification and construction of any facilities...which may result in any discharge...and assure that any industrial or commercial wastes discharged into treatment works meet applicable pretreatment requirements."

Thus, new and expanded airport projects in areas with Section 208 programs in operation, planning, or progress must demonstrate that sufficient sewers and treatment plant capacity exist to serve the project's wastewater transmission and treatment requirements.

Section 303 authorizes each state to develop its own water quality criteria with the approval of the Administrator of the EPA. Waters are separated into basin systems to simplify management and are classified as to the acceptable degree of pollution. Subsequently, point sources of excessive pollution are identified and programmed for abatement or

elimination. New or expanded developments must show that they will not violate criteria established for their drainage basin.

Thus, new or expanded airport facilities must demonstrate that project construction and operation will not result in storm water runoff pollution that would exceed the established water quality criteria for their drainage basin.

Section 404 of the Act established the requirement for a permit from the Corps of Engineers for the discharge of dredged or fill material into navigable waters.

J. NOISE CONTROL ACT OF 1972 (P.L. 92-574)

This legislation authorized Federal noise emission standards and designated the EPA to coordinate all regulatory and research programs resulting from the statute.

Section 7 of the Act dealt exclusively with aircraft noise emissions. The EPA was authorized to investigate the adequacy of FAA flight and operational controls and the adequacy of existing and new aircraft noise emission standards together with recommendations on the retrofitting or phasing out of existing equipment. Further, the EPA was to evaluate noise exposure measurement techniques and additional actions to reduce noise levels in areas surrounding airports.

Section 611 of the 1958 Federal Aviation Act was amended to broaden FAA authority in controlling aircraft noise emissions and sonic boom.

While the EPA was empowered to propose noise criteria, the FAA was authorized to publish, hold public hearings, and determine further actions on the proposals.

K. COASTAL ZONE MANAGEMENT ACT
OF 1972 (P.L. 90-583)

Section 303 of this Act states that it is the national policy to preserve, protect and, where possible, restore or enhance the resources of the Nation's coastal zone. To achieve this end, Federal agencies should cooperate with and encourage state, regional, and local coastal zone management programs. All Federal or Federally assisted projects must be carried out in a manner consistent with state coastal zone management programs (Section 307). In addition, after final approval of a state's program, any applicant for a Federal licence or permit to conduct an activity affecting land and water uses in the coastal zone must certify that the proposed activity complies with the state's approved program.

L. ENDANGERED SPECIES ACT OF 1973
(P.L. 93-205)

This legislation requires that all Federal agencies shall, in consultation with the Secretaries of Interior and Commerce, carry out

programs for the conservation of endangered or threatened species listed by the Department of the Interior and insure that actions authorized, funded, or carried out by them do not jeopardize the continued existence of the endangered species or result in the destruction or modification of habitat of such species which is determined by the Secretary (of Interior or Commerce) to be critical.

**M. ARCHAEOLOGICAL AND HISTORIC PRESERVATION
ACT OF 1974 (P.L. 93-291)**

This legislation provides for notifying the Secretary of the Interior of activities which "may cause irreparable loss or destruction of significant scientific, prehistorical, historical, or archaeological data." Agencies may request the Secretary of the Interior to undertake the recovery, protection and preservation of such data, including preliminary survey or other investigation, as needed; analysis; and publication. The agency may also undertake the activity itself.

**N. 36 CFR PART 800, PROCEDURES FOR THE PROTECTION
OF HISTORIC AND CULTURAL PROPERTIES, 1974**

These rules establish procedures to ensure that historic and cultural resources are given proper consideration in the preparation of environmental impact statements. The procedures discussed include the identification of resources by an implementing agency, the consultation

process, Advisory Council procedures, and the application of the criteria of effect.

O. DOT ORDER 5660.1, PRESERVATION OF THE NATION'S WETLANDS

This Order provides information on the definition and significance of wetlands, and declares the policy to assure the protection, preservation, and enhancement of the nation's wetlands to the fullest extent practicable during the planning, construction, and operation of transportation facilities and projects.

P. TYPICAL REGIONAL, STATE, AND LOCAL REQUIREMENTS

In addition to the Federal legislation previously cited, many states, planning regions, and local governments have adopted their own environmental laws and regulations. These vary widely. Some affect only public projects, while others apply only to private development, and still others bind both.

For example, the State of California, pursuant to its Environmental Quality Act of 1970, established a set of guidelines for implementation of its Act (CEQA). These guidelines set forth the basic format for the preparation of an environmental impact report (EIR) and provides guidance regarding the types of projects for which an EIR is required. [The EIR is

differentiated from the more widely known EIS in that it addresses specifically the regulations in the CEQA, while an EIS is prepared pursuant to the National Environmental Policy Act (NEPA)] In cases where a Federal project is proposed within the state, the guidelines stipulate that if an EIR is required by a state agency and an EIS has been or will be prepared for the same project, all or part of the EIS may be submitted in lieu of comparable sections required for the EIR. However, when the Federal EIS is used, further discussion of growth-inducing impacts and mitigatory measures may have to be expanded, if not fully covered in the EIS.

Generally, states have broad laws governing particular aspects or impacts of development such as sedimentation and erosion control, and protection of wetlands and/or coastal zones. A number of states have enacted some type of legislation to protect air and water quality, and to regulate noise. For example, the State of Maryland has adopted the Environmental Noise Act of 1974, which mandated the State Aviation Administration to develop and implement limits, procedures, and regulations pertaining to the control of aviation-related noise. The Act requires adoption of noise abatement plans at those airports where noise impacts extend beyond airport property, development of procedures to prevent future incompatible land use around airports, and the adoption of an airport noise analysis method.

In addition, several states have comprehensive environmental policy or land use legislation under consideration or in effect. These statutes may require or authorize EIS studies for new developments. Table 1 indicates land use laws proposed or enacted for each state. More detailed information on states with specific comprehensive environmental legislation and EIS requirements is found in the guidebook appendix. This information provides legislative source guidelines and administrative contact within each state.

Regional regulations generally follow requirements resulting from Federal legislation. These requirements involve evidence of conformance with regional water quality basin management plans, area-wide wastewater treatment programs, or regional transportation plans. In addition, Regional Planning Councils (RPC) are usually involved in the A-95 review of all Federally funded projects within their jurisdiction.

Among local statutes, zoning codes are the most universal and critical. Most political subdivisions have zoning codes in effect. In addition, many local governments have statutes governing storm water and wastewater management. Noise propagation statutes are in effect in many major cities, metropolitan counties, and states. A tabulation of municipal noise ordinances is contained in the appendix. There is also a rising trend toward the enactment of environmental disclosure or legislation by local governments. These statutes, primarily directed toward private development,

Table 1

State land use programs ^{1M}

State	Type of program			Coastal zone management ¹	Wetlands management ²	Power-plant siting ³	Surface mining ⁴	Designation of critical areas ⁵	Differential assessment laws ⁶	Floodplain management ⁷	State-wide Shorelands Act ⁸
	Comprehensive permit system ¹	Coordinated incremental ²	Mandatory local planning ³								
Alabama		X		X		X	A		B	X	
Alaska		X		X		X			B		
Arizona		X				X			A	X	
Arkansas						X	A, B		A		
California		X		X		X	X		A, C	X	
Colorado		X		X	X	X	X	X	A	X	
Connecticut		X		X	X	X			A	X	
Delaware		X		X	X				A		X
Florida	X	X	X	X	X	X	A	X	A, C		
Georgia		X		X	X		A, B				
Hawaii	X	X		X		X		X	B	X	
Idaho			X	X			X		B	X	
Illinois		X		X		X	A, B		B	X	
Indiana				X			A, B		A	X	
Iowa				X			A, B		A	X	
Kansas							A, B				
Kentucky				X	X	X	A, B		B		
Louisiana				X	X	X	A, B		B		
Maine	X	X	X (LTD)	X	X	X	A	X	B	X	
Maryland		X		X	X	X	A, B		B	X	
Massachusetts				X	X	X	X		B	X	X
Michigan		X		X	X	X	X	X	C	X	X
Minnesota				X	X	X	X		B	X	
Mississippi				X	X	X	X		A	X	
Missouri							X			X	
Montana		X	X			X	A, B	X	B	X	X
Nebraska			X			X			B	X	
Nevada		X	X			X		X	B		
New Hampshire				X	X	X			B, C		
New Jersey				X	X	X			B	X	
New Mexico		X		X	X	A	A		A	X	
New York	X	X		X	X	X	X	X	B	X	
North Carolina		X		X	X	X	X		B	X	
North Dakota				X		X	A		A		
Ohio				X		X	A		B		
Oklahoma							X		A	X	
Oregon		X	X	X		X	X	X	A		
Pennsylvania				X	X	X	A	X	B		
Rhode Island		X		X	X	X	A		B		
South Carolina				X		X	A		B		
South Dakota							A, B	X	A		
Tennessee				X	X	X	X		B		
Texas		X			X	X	A		B		
Utah		X			X	X	X		B, C	X	
Vermont	X	X			X	X	X		C		
Virginia		X	X	X	X	X	A, B		B	X	X
Washington				X	X	X	A, B		B	X	X
West Virginia		X		X	X	X	X	X	A	X	
Wisconsin		X		X	X	X	A		A	X	
Wyoming		X		X	X	X	A		A	X	

¹ State has authority to require permits for certain types of development.
² State-established mechanism to coordinate state land-use-related problems.
³ State requires local governments to establish a mechanism for land use planning (e.g., zoning, comprehensive plan, planning commission).
⁴ State is participating in the federally funded coastal zone management program authorized by the Coastal Zone Management Act of 1972.
⁵ State has authority to plan or review local plans and the ability to control land use in the wetlands.
⁶ State has authority to determine the siting of powerplants and related facilities.
⁷ State has statutory authority to regulate surface mines. (A) State has adopted rules and regulations; (B) State has issued technical guidelines.
⁸ State has established rules, or is in the process of establishing rules, regulations, and guidelines for the identification and designation of areas of critical state concern (e.g., environmentally fragile areas, areas of historical significance).
⁹ State has adopted a tax measure which is designed to give property tax relief to owners of agricultural or open space lands. (A) Preferential Assessment Program: Assessment of eligible land is based upon a selected formula, which is usually use value. (B) Deferred Taxation: Assessment of eligible land is based upon a selected formula, which is usually use value and provides for a sanction, usually the payment of back taxes, if the land is converted to a non-eligible use. (C) Restrictive Agreements: Eligible land is assessed at its use value; there is a requirement that the owner sign a contract, and a sanction, usually the payment of back taxes if the owner violates the terms of the agreement.
¹⁰ State has legislation authorizing the regulation of floodplains.
¹¹ State has legislation authorizing the regulation of shorelands of significant bodies of water.

Source: Environmental Quality, The Seventh Annual Report Of The Council On Environmental Quality, 1976

often require the filing of environmental impact statements disclosing a project's effect on surface transportation, public water and sewer systems, schools, and other government-supported services. Under these statutes, airport projects might be required to evaluate not only primary but secondary impacts resulting from induced development attributed to the project. Sponsors are advised to contact local zoning, planning, and health agencies to determine if any additional studies, statements, or permit applications are required.

**SECTION IV
ENVIRONMENTAL DOCUMENTATION**

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IV: ENVIRONMENTAL DOCUMENTATION

The extent of environmental analysis, documentation, and statement processing required depends upon the type of project proposal and its overall level of impact. Minimal equipment (ILS, ALS, etc.) or subsystem (taxiways, apron) expansion may require only limited assessment, whereas new facility development will normally necessitate an environmental assessment of total development. The following section describes documentation requirements for various types of action.

A. ENVIRONMENTAL IMPACT STATEMENT: FULLY COORDINATED 102(2)(c) ACTION

Any Federal action significantly affecting the quality of the human environment requires fully coordinated EIS preparation. For all proposed actions which aren't exempted, a preliminary environmental assessment report is prepared. If the assessment discloses potential significant impact and/or if any of the following occur, comprehensive 102(2)(c) procedures are required.

- An effect that is not minimal on properties protected under Section 4(f) of the DOT Action or Section 106 of the Historic Preservation Act.
- Any action that is likely to be highly controversial on environmental grounds.

- Any action that is likely to have a significant adverse impact on natural, ecological, cultural or scenic resources of national, state or local significance, including endangered species and wetlands.
- Any action that is likely to be highly controversial with respect to the availability of adequate relocation housing.
- Any action that causes substantial division or disruption of an established community.
- Any action that disrupts orderly, planned development, conflicts with or is determined not to be reasonably consistent with adopted land use plans or community planning goals and objectives.
- Any action that causes a significant increase in surface traffic congestion.
- Any action that has a significantly detrimental impact on noise levels in noise-sensitive areas.
- Any action that has a significantly detrimental impact on air quality or violates local, AQCR, state or EPA national air quality standards
- Any action that may significantly degrade water quality or may contaminate a public water supply system.
- Any action determined to be inconsistent with any Federal, state or local law or administrative determination relating to the environment.

In evaluating whether a full EIS is required, both direct impacts resulting from the project and related secondary and/or cumulative

consequences caused by the project must be considered. This includes (1) induced off-site development and (2) further contemplated actions permitted by the project.

Most highly controversial projects require fully coordinated EIS procedures. If a project is "highly controversial" because of the unavailability of relocation housing or is opposed by a Federal, state or local government agency, or by a substantial number of persons on environmental grounds, it must be processed as a full NEPA Section 102(2)(c) statement.

If the responsible official has any doubt as to whether the number of persons voicing opposition is "substantial", the action should be processed as a fully coordinated statement. However, in cases involving housing or business relocation, the term does not apply to controversy over the amount of acquisition or relocation payments. The issue of taking housing or businesses represents a legitimate environmental concern; the equity of payments is not. If relocation is involved, the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 must be met.

Details of processing and approval of fully coordinated NEPA Section 102(2)(c) actions are contained in Chapter 7 of Order 5050.2B.

B. ACTIONS TO CHANGE DRAFT EIS TO NEGATIVE DECLARATION

During the processing of an environmental impact statement, the FAA may find that the proposed action is not a major Federal action significantly affecting the quality of the human environment and therefore does not require the preparation of a final environmental impact statement pursuant to NEPA Section 102(2)(C). In this case, the appropriate action choice is to change the action and prepare a negative declaration.

This type of situation will occur when the environmental circumstances that prompted the draft statement have been dismissed, avoided, or eliminated. This may happen because of a change in the project, a change in the nature or degree of impacts, an inaccuracy in the data, or a misunderstanding of the facts introduced in the draft statement. The reason for changing a draft environmental impact statement to a negative declaration must be specific, clearly established, and properly documented. It cannot be based merely on the absence of adverse comments by reviewing agencies. If the Section 102(2)(C) process was initiated because of opposition by a local, state, or Federal agency, written documentation must be obtained from the agency indicating that the opposition no longer exists.

Details on processing and approval for this action choice are found in Chapter 8 of Order 5050.2B.

C. NEGATIVE DECLARATION ACTIONS REQUIRING SECTION 16(c)(4)
COORDINATION

This action choice occurs when the proposed action involves the location of an airport, the location of a runway, or the major extension of a runway but does not have consequences bringing it within the scope of a fully coordinated statement. A negative declaration must be supported by an environmental impact assessment report substantiating the determination that the proposed action will not significantly affect the quality of the human environment.

Pursuant to Section 16(c)(4) of the Airport Act, the Department of the Interior and the Environmental Protection Agency (by transfer of functions from the Department of Health, Education, and Welfare) must be consulted in circumstances where a negative declaration is appropriate. Those agencies should be forwarded a copy of the environmental impact assessment report and advised that, although the project is not expected to significantly affect the quality of the human environment, they are being consulted pursuant to Section 16(c)(4).

Details on processing and approval of Section 16(c)(4) coordinated actions are contained in Chapter 9 of Order 5050.2B.

D. OTHER NEGATIVE DECLARATION ACTIONS

For actions which do not require coordination pursuant to NEPA Section 102(2)(c) or the Airport Act Section 16(c)(4), an environmental assessment report may be prepared in letter format by the sponsor to the appropriate FAA official. Content of the report must include:

- A description of the proposed action and its purpose.
- A discussion of the proposed methods to accomplish the action, including construction techniques and safeguards provided to minimize possible adverse environmental effects.
- A discussion supporting the assessment that the proposed action will not significantly alter the airport's impact upon its surrounding environment.
- A discussion indicating consistency with community planning.
- Alternatives considered and reasons for their rejection.

There is no formal Federal review prescribed for the assessment report. However, appropriate coordination must be completed and described for environmental consideration for which there are supplementary legislation.

Details on the content, processing, and approval of this action choice are contained in Chapter 10 of Order 5050.2B.

E. PRIOR FINDING AFFIRMATIONS

When a proposed action falls within the scope of a previously approved environmental impact statement or negative declaration, a prior finding affirmation may be in order. Applicability of this action choice depends on conformance with former plans and the validity of previously used data. Guidance on the use of the affirmation is given in terms of the approximate time period between the environmental approval of the prior action and the proposed action:

- If the action is to be taken within two years of the original environmental approval and if there is no substantive change in either the description of the action or the environmental impacts attributable to the action, no further assessment or prior finding affirmation is required.
- If the action is to be taken in a two- to five-year period after the original environmental approval, an affirmation of the prior finding may be made if a thorough analysis reveals that the action conforms with the prior approved plan and that the data and analysis in the prior environmental assessment, as they apply to the proposed action, are still substantially valid.
- If the action is to be taken more than five years after the original decision, normally a new assessment in the form of an environmental impact statement or negative declaration will be necessary depending on the scope and thoroughness of the initial assessment and current applicability. If, for example, the initial assessment has been done in conjunction with a

comprehensive and definitive long-range master plan, then a prior finding affirmation may be the appropriate action choice in lieu of a new assessment. This is applicable if the phases of development planned beyond five years have been thoroughly explained to the affected communities, if there is documented evidence of citizen involvement in the planning process, if compatible land uses have been established in the affected airport environs, and if the long-range airport plans are consistent with long-range community plans including ground access, utilities, and other necessary related development.

No Federal coordination of the prior finding affirmation is required except for such intradepartmental coordination as needed to obtain approval. Documentation should include a report containing a description of the proposed action and its relationship to the description of work in the prior approved assessment, and an affirmation statement.

Details on the documentation and approval of this action choice are contained in Chapter 11 of Order 5050.2B.

F. EXEMPTED ACTIONS

Some actions do not have the potential for causing a significant environmental impact and do not require an environmental impact assessment report. The exempted action category has been revised to reflect a detailed survey of Airports actions over a two year period which

revealed that a substantial number of airport development items were being covered by negative declarations. The revised language in Order 5050.2B allows most of these actions to be exempt from detailed environmental assessment without obviating this need when unusual circumstances or impacts exist. Paragraph 25(f) of Order 5050.2B states that all airport development actions are exempt unless they are identified in paragraph 19(a) or they fall within the categories identified in paragraph 20.

For example, a taxiway [not specifically identified in paragraph 19(a)] which does not affect 4(f) land, historic or archaeological resources, wetlands, or endangered species, and which is not controversial, does not require any further environmental assessment. It is suggested, however, that some record be kept in the project file to show that consideration of potential environmental impacts was given. This record may be in the form of a checklist structured after paragraphs 19, 20, 25, and 44.

3

SECTION V
PREPARATION OF ENVIRONMENTAL IMPACT STATEMENTS

V: PREPARATION OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS AND STATEMENTS

A. GENERAL CONSIDERATIONS

1. Purpose

The environmental assessment report provides the basis for the preparation of draft environmental impact statements (EIS) and negative declarations (ND). All environmentally oriented decisions affecting the proposed action are based on these documents. These include administrative determinations regarding coordination and processing to major determinations as to whether or not the proposed project is environmentally acceptable.

Therefore, it is essential that assessment study criteria be established to develop data that will clearly document the following types of information:

- The primary (direct), secondary (induced), and cumulative impacts of the project on its surrounding environment.
- A clear definition of the degree of impact analysis to guide administrative decisions as to whether a fully coordinated EIS, Negative Declaration, or Prior Finding Action is required.
- Proposals for protective measures and evaluation of alternative actions which may mitigate impact on the environment.

While environmental assessment procedures are necessary, it must be remembered that the overall environmental effect represents only one of several considerations affecting project approval. Therefore, implementation of environmental procedures must be integrated with all other applicable considerations such as operational flexibility, economic feasibility and FAA safety requirements.

2. Style of Presentation

The environmental assessment report should follow the format presently specified in FAA Order 5050.2B. The impact categories to be analyzed and the extent of detail required depend on the type of action proposed and its resulting degree of impact. Minor modifications may be exempt or may require limited verification that the project will not have a significant impact on the environment and/or is covered by previous EIS studies. New projects or major expansions will require comprehensive analyses.

Since environmental reports are subject to public review, information should be presented in a manner which can be clearly understood by the lay reader. Evaluation, methodology, and results should be explained in non-technical language, to the furthest extent possible. However, detailed technical documentation should be provided in the assessment appendix for professional review.

The assessment report should be written in a concise manner. Relevant technical documentation should be appended or referenced. Section 1500.8 (b) of the CEQ Guidelines states that in developing the EIS,

"...agencies should make every effort to convey the required information succinctly...giving attention to the substance of the information conveyed rather than to the particular form, or length, or detail of the statement."

3. Use of Graphics

Exhibits, maps, tables, and charts should be used throughout the report to supplement the text by illustrating project relationships to various study parameters.

Graphics must be clear and easy to read and understand. Titles must convey types of relationships expressed. Measurement units used to assess existing conditions and impact must be stated in tables or legends. Each exhibit should contain a scale and a north arrow.

It is important to maintain simplicity and clarity. The amount of information placed on any one base map should be limited to an amount practicable, so that cluttered exhibits are avoided.

Where graphics are used within specific sections, they should be referred to, explained and interpreted in the text. Further, they should be placed as close as possible to the relevant section of text.

Specific types of graphics required will be indicated by discipline within the subsequent sections on statement content within the guidebook. The importance of adequate and clear graphic presentations cannot be over-emphasized. Where graphic documentation is inadequate or unclear, it can raise questions, result in uncertainty, and cause delay in EIS processing.

More information on graphics and specific techniques is contained in Section VII of this document.

B. PROJECT DESCRIPTION

1. Clear Definition of Proposed Action

Each report should begin with a clear statement of the proposed action, including major project components. The current and forecast operational role (i.e., general utility, basic utility, etc.) as defined in the National Airport System Plan (NASP) should also be identified. A description of a new airport should indicate whether or not the facility replaces an existing one. The description should indicate any required land acquisition, road relocation, runway orientation and length, taxiways, apron areas, and navigation systems proposed in context with the project.¹

¹ Model EIS 1 provides an example of a project description for significant expansion of a major carrier airport; Model 2 for construction of a new reliever facility; Model 3 for a new general aviation airport; and Model 4 for minor expansion of a general aviation airport.

Related facilities and equipment (F and E) actions and air traffic procedure actions should also be identified.

Development of the complete project description at the very beginning of the assessment process promotes consistency throughout the analysis phase. In addition, a complete project description facilitates application of the prior finding action choice at a later time.

Exhibits are required to illustrate the proposed action and the project's relationship to its surrounding environment. At minimum, the following exhibits are essential:

- Location Map: indicating the project's relationship to its primary service area, major population centers, local political jurisdictions, and highway network.
- Vicinity Map: indicating the project's location in immediate vicinity of site. The map should indicate highways, major land uses, and local topographical and physical features.
- Layout Plan: locating all components elements of proposed action within the existing or proposed airport site.

Alternatives to the development of the particular project may be introduced and described at this point. Component alternatives involve different schemes to accomplish the same overall plan, such as different runway configurations.

Within the project description section, there should be identified all Federal actions involved in project implementation, i.e., where more than one agency: (1) is directly involved in an action through funding, licenses, or permits; or (2) is involved in a group of actions directly related to each other because of their functional interdependence and geographical proximity. These might include a Corps of Engineers dredge and fill permit, a U.S. Coast Guard bridge permit, or a Section 6(f) land use conversion by the Secretary of the Interior.

2. Phased Development

Phased development, if planned, should be indicated within the Project Description section. Discussion should indicate whether phased development is of a short-term or long-term nature. Short-term phasing includes specific plans for construction over a period up to about five years. Long-term phasing implies the flexibility for facility expansion beyond five years, which may be included in a general master plan to accomplish expansion on the basis of anticipated increased demand.

Where more than one phase of development is anticipated but approval is sought for phase one only, an additional environmental assessment rather than a Prior Finding Action will be required for subsequent approvals.²

² Model EIS 2

Where a two-phase development is proposed and the document seeks full approval, the second expansion can be evaluated under a Prior Finding Action.³ By seeking only first-phase approval, the need for detailed environmental analysis of future contemplated action is eliminated, though potential impacts should be identified. In fact, even though ultimate development plans may not be assessed in detail for the first-phase approval, it is still important to document the compatibility of surrounding land use with long-term airport projections.

Generally, the length of time anticipated to lapse between phases should guide the approval level sought. Environmental approval should be sought for short-term phasing. Approval should normally be deferred for long-term phasing where presently contemplated action could be substantially altered by numerous external factors and/or the sensitivity of the site would warrant environmental reappraisal.

When a proposed action falls within the scope of a previously approved Federal Finding or negative declaration, a prior finding affirmation may be in order. The circumstances to be reviewed when considering the applicability of the prior finding affirmation were presented in Section IV: Environmental Documentation.

³ Model EIS 3

C. PROJECT PURPOSE

1. Need For The Project

The need for the proposed action must be clearly stated. Much of the opposition to new public projects stems from misunderstanding of their need.

It should be noted, however, that the purpose of the EIS is not to justify the project. Emphasis should be placed on a straightforward presentation of aviation and community needs rather than on project justification. Statements of promotion for the project which tend to obscure objectivity should be avoided.

Content of this section should include the following:

- An opening statement summarizing the project's function in terms of maintaining and enhancing economy, mobility, and social opportunities of the community.
- Reference to and excerpts from earlier studies documenting the need for and objectives of the project.
- The project's relationship to local and regional development goals.
- Reference to the project's effect on increased safety, efficiency, and convenience, as well as the service area expansion to be achieved.
- Related data to document need and demand projections, including statistics on commercial and general aviation base, capacity, service

levels, delays, and economic studies indicating the relationship of airport facilities to the growth of local commercial/industrial base and/or tourism.

- Technical data to support determination of runway length, i.e., critical aircraft type, project elevation and temperature. This information is especially important where unusual runway lengths are required at higher elevations.

2. Initial Alternative Consideration

This section also provides the opportunity to introduce and eliminate unreasonable alternative actions to the proposed project. In citing the need for the project, it is possible to list and evaluate alternative methods to meet these needs, as well as to refer to adverse impacts resulting from the No Project Alternative.

Discussion of feasible alternatives depends on the scope of the project. Documents describing the impacts of minor improvements need not consider alternative modes of transport. However, where projects are broader in scope (as in the case of new facilities) or when the metropolitan surface transportation systems are extensive, alternative modes should be considered. In the latter case, the discussion should include an analysis of time schedules, access to cities, estimation of long-distance and short-distance trips, and proximity to intracity transportation terminals.

While implications of the No Project Alternative should be specifically noted at this point, more detailed discussion should be included in the Alternatives section.

Essentially, this section provides the opportunity to present a rational, concise, well-documented need for the project and to eliminate unfeasible alternative concepts from the study process.

D. PROJECT SETTING

This calls for a narrative description of "airport interfaces", i.e., connecting and surrounding areas. Reference must be made to: existing land uses; adopted or proposed land use plans and controls in the airport/community area; highway access; residential areas; public parks; wildlife and waterfowl refuges; recreation areas; historic sites; nearby schools; places of public assembly; shopping areas; and hospitals or comparable institutions. Specific reference should be made to any other Federal or Federally assisted activities in the affected area. The extent of interrelationships and cumulative environmental effects of all related Federal projects should be described.

Exhibits indicating existing and planned land use and sensitive areas should be provided here. More than one exhibit is usually necessary to differentiate between present uses and future plans.

Any conflicts between existing and planned land use and the proposed action should be noted with reference given to the appropriate section of the report where this conflict will be discussed in detail. Conformance and conflicts with the legislative constraints of local, regional, or national entities, such as zoning requirements, should be identified and discussed.

Directions on how and where to obtain land use, sensitive area, zoning and planning data are provided in the appropriate sections on individual impacts found later in this document.

A brief description on the natural environment, topography, and geology is desirable. Where the project does not include or will not significantly affect important topographic or geologic features, no further discussion of these subjects will be required in the document.

Reference to the human environment should include a brief and general description of the service area supported by the airport, noting its population, demography and economic base. Key industries, as well as cultural and educational institutions should be indicated.

The history of development patterns immediately surrounding the project site should be summarized to indicate whether the project conforms to zoning, land use goals, or other specific limitations.

E. BACKGROUND INFORMATION

The purpose of this section of the impact assessment is to update the reviewer on previous actions and circumstances associated with the project, as well as to provide general relevant information on the project's position within the context of the community. These include support or opposition by public officials or private citizens, bond actions, or any unique factors which are of interest in the history of the development of the project and/or its site.⁴

Sources of background information include the following:

- Sponsor's newspaper files.
- Previous airport studies and master plans.
- State Aviation Agency's plans.
- Transcripts or summaries of any public meetings covering preliminary planning of the project.
- Regional or local planning agency's goals and programs.
- Records of actions and/or commitments by local airport authority.
- Records of FAA involvement.
- Bond issues or other financial support, if applicable.

⁴ See Model EIS 1 and 2

• Documentation of citizen involvement.

Based on data provided from those sources, a brief chronological history of the project from inception to present should be provided. Any public agencies or citizen groups supporting or opposing the project should be identified by name, with reasons for their position summarized. Any unresolved controversy of preliminary public meetings should be cited. Finally, the dates and disposition of any bond actions should be noted.

Where previous conflicts have been reconciled, modifications should be indicated and a letter of concurrence by the opposing public or private group provided in the assessment appendix. Continuing unreconciled conflicts should be listed and reference made to appropriate sections of the report dealing with these issues.

It is critical that data development for this section be coordinated by both the local FAA (if a consultant is preparing the assessment) and Airport Authority offices. Both will have key information on file and provide valuable insight into potential resolution of problem areas.

F. PROBABLE IMPACTS

INTRODUCTION

Each of the major sections which follow pertain to a specific environmental category as it relates to airport development actions. For each category or impact discipline, the entire procedure of impact analysis is outlined, ranging from the initial gathering of background data to the preparation of the report text. The text of each section is accompanied by a flow chart which outlines the various steps of the impact analysis procedure.

It is obvious that none of the investigations can be performed independently, as all the impacts are related, in some form, to each other. Therefore, before conducting the impact assessment, it is important to be aware of which impact categories require the same background data, as well as which categories involve ameliorative measures that influence others. A table is provided on the following page which summarizes the types of information which should be obtained for the full range of impact categories. Much of the data to be used in the conduct of the technical environmental studies is derived from preliminary engineering studies. Coordination between the environmental study and preliminary engineering efforts is essential.

Each analysis suggests one or more thresholds of impact and investigation. These levels involve a decision pertaining to the depth of study

Table 2
Data Base Matrix

	Discipline												
	Vegetation and Wildlife	Water Quality and Water Resources	Hydrology	Flood Hazard	Wetlands/Coastal Zones	Noise	Land Use	Direct Socioeconomic Impact	Induced (Secondary) Socioeconomic Impact	Air Quality	Parks, Recreation, and 4(f) Lands	Historical and Archaeological Sites	Energy Supply and Natural Resource Development
Preliminary Engineering Data		x	x	x	x	x		x	x	x			x
Master Plan Data	x	x	x	x	x	x	x	x	x	x	x	x	x
Airport Operational Data							x			x			x
Economic and Forecast Data					x	x	x	x	x	x			x
U.S.G.S. Topographic Maps	x	x	x	x	x	x	x				x	x	x
Aerial Photos	x	x	x	x	x	x	x	x	x	x	x	x	x
Highway Maps and Volumes						x	x	x	x	x	x	x	x
Land Use Plans	x	x	x	x	x	x	x	x	x	x	x	x	x
Zoning Maps			x	x	x	x	x	x	x		x	x	x
Census Data					x	x	x	x	x				x
Special Ordinances	x	x	x	x	x	x	x	x	x	x	x	x	x
Parks, Open Space Maps	x				x	x	x	x	x	x	x	x	
Historic, Archaeological Resources					x	x	x	x	x	x	x	x	
Public Facilities Data					x	x	x	x	x	x			
Other Community Facilities Data					x	x	x	x	x	x	x	x	
Transit Routes Schedules							x	x	x				x
Property Tax Assessment Data							x	x	x				
Relocation Resources							x	x	x				
Soils Maps and Reports	x	x	x	x									x
Geology and Water Table Maps and Reports	x	x	x	x									x
Drainage Maps, Plans	x	x	x	x	x								
Wildlife Range Maps	x				x						x		
Rare/Endangered Species List	x				x						x		
Floodplain Maps		x	x	x	x								
Coastal Zone/Wetland Maps and Data		x	x	x	x								
Significant Landscape Features	x		x		x		x				x	x	
Water Quality Classification Lists		x	x	x	x								
Meteorological Data		x	x	x		x				x			
Air Quality Data										x			
Energy Consumption Rates								x	x	x			x

which is necessary. However, the use of any particular threshold level for the disciplines presented in this document must be considered within the context of the local situation. That is, a project which involves controversy in a particular impact category may necessitate a greater depth of impact analysis to provide more detailed documentation. The extent of the controversy and opposition could cause other impacts to be studied in more detail in order to provide much more supporting evidence for the project in general.

The interrelationship of impact categories or disciplines should be evident from the project description. All consultants or in-house personnel participating in the study should be aware that actions and/or ameliorative measures proposed for their discipline may affect other disciplines. These effects should be communicated and some form of consensus reached so that the draft document is consistent.

It is the responsibility of the project manager to coordinate all study efforts. The final document must be consistent in its conclusions and responsive to interdisciplinary problems. If any inconsistencies occur within the report itself, they must be resolved prior to publication of the draft document. Ameliorative measures must be coordinated and priorities established based on interdisciplinary validity and financial feasibility prior to inclusion in the draft document.

The order of presentation of impact categories is based on the following rationale. The section concerning noise is presented first, since, in

most cases, it is the major impact associated with airport development. The section on land use is presented next because it is so closely related to noise impacts.

Those remaining impact categories which deal with direct physical impacts usually on or near the site are presented next. These include vegetation/wildlife, water quality and water resources, flood hazards, and wetland/coastal zone impacts. These are then followed by those disciplines which deal with direct and indirect off-site impacts, i.e., air quality, social and induced economic, recreational, historical, archaeological, public service, and energy impacts.

It should be kept in mind that not all impacts need to be covered in every assessment report -- only those which are relevant. If it is not obvious why a particular impact is not relevant, this should be explained in the EIS at the beginning of the impact section.

The Council on Environmental Quality (CEQ) has expressed concern regarding the length and detail of many environmental statements. The CEQ Guidelines states in Section 1500.8 that the "amount of detail provided...should be commensurate with the extent and expected impact of the action, and with the amount of information required at the particular level of decision making...". In a recent CEQ memorandum, the following guidance is given:

"It is the Council's position, therefore, that descriptions of the existing environment and the proposed action should be included in an EIS only to the extent that they are necessary for a decision maker to understand the proposal, its reasonable alternatives and their significant impacts. The EIS should explain how the scope of the statement and its level of detail have been carefully delineated in accordance with the significant environmental issues and problems foreseen by the agency. Data and analyses in an EIS should consequently be commensurate with the importance of the impact as determined by the agency's environmental analysis. Less important material should be summarized, consolidated or simply referenced."

NOISE

1. Noise

a. INITIAL ASSESSMENT PROCEDURES

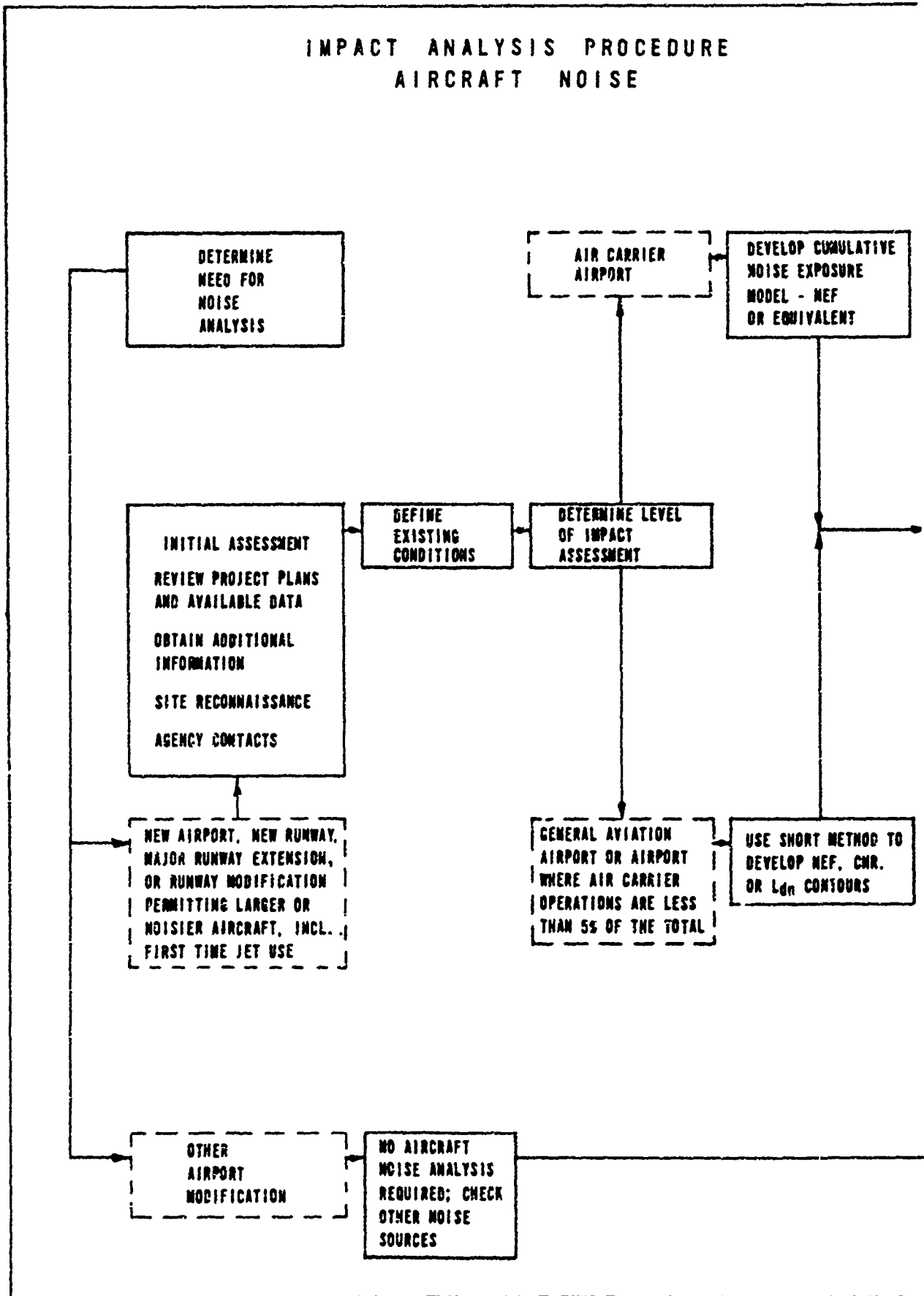
(1) *Determination of Scope of Project as it Relates to Noise*

Noise impacts must be examined when project actions individually or cumulatively involve airport location, runway location, major runway extension or runway strengthening which would permit operation by larger or noisier jet aircraft, including first time jet use.

Aircraft noise impact generally extends several miles from airport property. Therefore, the scope of the airport development action and its impact immediately expands to those centers of activity which lie beyond the immediate airport vicinity. The first step in the noise analysis then is to place the airport in its regional setting and identify the potential noise corridors. This initial assessment and subsequent tasks in the noise analysis procedure are shown in a flow chart in Figure 1.

This section of the guidance book deals primarily with the impact of aircraft noise and the various methodologies which are acceptable for assessing it. The level of noise impact and assessment is directly related to considerations of land use around airports. Since the topic of land use is itself so complex and important in the airport environmental impact evaluation, a separate section has been prepared to discuss land use impacts and assessment techniques.

IMPACT ANALYSIS PROCEDURE AIRCRAFT NOISE



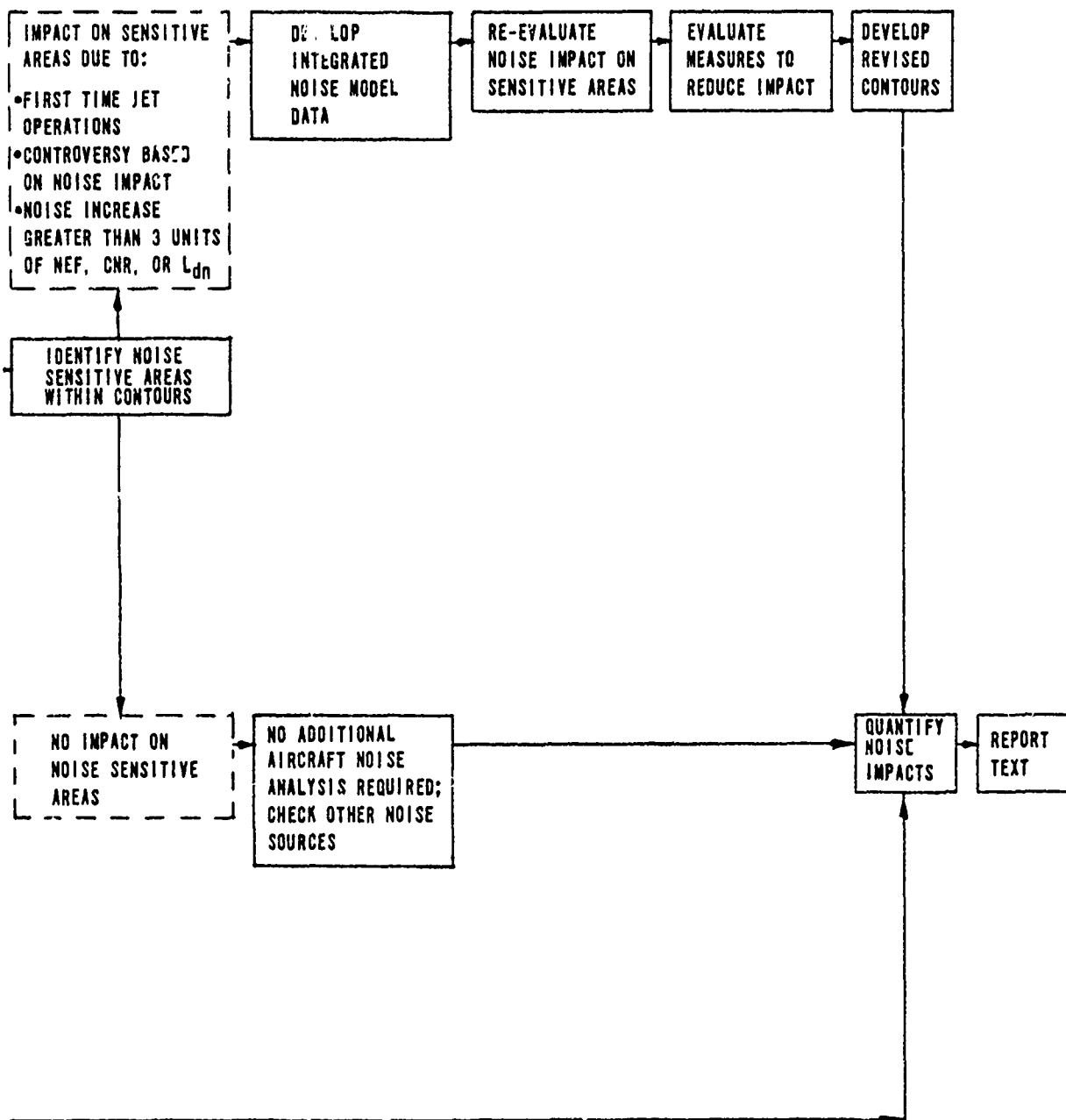


FIGURE 1

(2) Review of Immediately Available Data

The specific project plans or master plans for airport development will provide the first indication of the basic direction of aircraft noise impact by indicating the proposed runway orientations. Additional highway maps, aerial photographs or previous feasibility studies will provide initial information on sensitive areas and land uses in the airport vicinity, such as schools, hospitals, parks, residential developments, etc. Data on existing and forecasted airport operations will provide an indication of the frequency and intensity of daily activity and is a basic source of input to the noise analysis methodologies.

(3) List of Material to be Obtained

The most important set of data to be obtained is that which best describes the existing and proposed airport operations in terms of runway utilization patterns under normal operating conditions, the number of each aircraft type using each runway, and the various approach and departure flight tracks which the aircraft follow.

The basic runway utilization patterns depend on runway characteristics and wind coverage, FAA safety requirements, and operational considerations with respect to terminal and service area locations. The number of aircraft depends on given annual activity forecasts which can be reduced to yield daily operations of each major aircraft classification. The various flight tracks are based on air traffic control procedures that have been established or will be established at the airport.

All of the above information should be evaluated so as to yield the number of daytime (7 a.m.-10 p.m.) and nighttime (10 p.m.-7 a.m.) takeoff and landing operations for each aircraft type on each runway under normal airport operating conditions for the existing situation (if applicable) and for the future conditions, both with and without the project.

The extent of the breakdown of operational data required depends on the noise analysis methodology which is intended to be used. The basic methodology is related to the use of the subject facility. For example, where only general aviation aircraft are operating (or when air carrier operations are less than five percent of the total), operational data should be obtained in terms of total single engine piston aircraft and twin-engine piston aircraft, turbojet powered aircraft and turboprop powered aircraft (business jets), and the general type and number of any larger propeller or jet aircraft.

Where air carrier operations constitute more than five percent of the total operation, somewhat different methodologies would be utilized in the noise analysis. These basic methodologies (to be discussed later in this section) require a more detailed breakdown of air carrier operations. Air carrier aircraft should be identified by model or series designation (DC-9-30, 727-100, 727-200), gross landing and take-off weights, status of model retrofit program, if appropriate, and a designation of evening operations (between 7 p.m. to 10 p.m.).

Operational data can be obtained from the sponsor, any feasibility or forecast reports, the operations officer at the airport,

and control tower personnel. In fact, any estimates involving future runway utilization and flight tracks should be coordinated with the tower personnel.

In addition to operational data, it is necessary to obtain maps of existing land use and future land use plans for the jurisdiction to be impacted by noise. Maps indicating the locations of parkland, community facilities, and residential communities will aid in the early identification of noise sensitive areas.

Data should also be obtained on any local or state noise laws, criteria, or ordinances which may be applicable.

b. SITE RECONNAISSANCE

A field inventory of the potential noise corridors will verify land uses and locations of sensitive areas. It will provide an opportunity to obtain a feeling of the type and intensity of development in the airport vicinity. Characteristics of sensitive areas should be noted, such as size, level of activity, and type of construction.

Though not specifically required by Order 5050.2B, it is beneficial in some instances to obtain short-term noise measurements within potentially affected neighborhoods to obtain a general estimate of ambient conditions and other local noise sources. If airport expansion projects are considered to be highly controversial due to noise impacts, consideration should be given to establishment of an aircraft noise monitoring program to better evaluate existing exposure and provide the basis for comparison with anticipated impacts.

c. AGENCY AND COMMUNITY CONTACTS

Most of the material relating to zoning, land use, and locations of sensitive areas would be obtained in conjunction with other disciplines.

State, regional, and local environmental offices or health departments should be contacted to determine the existence of noise codes or ordinances.

The district FAA office should be contacted regarding the status of the various noise models and the general approach that is proposed for the current noise analysis.

If there is documentation of community opposition to preliminary or prior airport plans, it is advisable to conduct an open community meeting early in the investigation to establish reasons for prior opposition, explain the project scope, and offer some factual information about aircraft noise. Subsequent meetings can be held to present results of analysis and discuss measures to minimize any adverse impact.

d. CORRESPONDENCE REQUIRED

Correspondence is generally not required.

e. DETERMINATION OF EXISTING CONDITIONS

For a development action involving an existing airport, a noise analysis of existing operations will define present conditions. The methodology to be used will be discussed later in this section. The noise contours will describe the base noise condition to which projected or future

contours (based on expansion) will be compared. The assessment should at least include contours for existing operations and forecast operations with and without the project.

Where a totally new site is being developed, existing conditions can be described in terms of general land uses in the project vicinity and by a discussion of existing ambient noise levels and sources.

f. DETERMINATION OF LEVEL OF IMPACT EVALUATION

As mentioned at the outset of this section, noise impacts must be examined when the project actions individually or cumulatively involve airport location, runway location, major runway extension, or runway strengthening which would permit operation by larger or noisier jet aircraft, to include first time jet usage.

The noise analysis shall include the development of continuous contours of equal noise exposure using one of the following cumulative noise (or aggregated noise energy) methodologies:

- Noise Exposure Forecast (NEF)
- Composite Noise Rating (CNR)
- Day/Night Level (Ldn)
- Equivalent Noise Level (Leq)
- Community Noise Equivalent Level (CNEL)

As a minimum, such contours shall show the boundaries of all areas exposed to noise levels equal to or greater than NEF 30, CNR 100, Ldn 65, or equivalent for present noise conditions and forecast conditions with and without the proposed project. The effect on noise impacts resulting from related actions such as installation of navigation aids and air traffic

control procedures shall be considered. This minimum evaluation is required to establish the area which could be potentially sensitive to noise.

For those projects involving general aviation airports, the methodology contained in the report entitled Developing Noise Exposure Contours for General Aviation Airports can be used and will normally suffice. This is a non-computerized method of developing CNR, NEF, and Ldn contours for general aviation airports. This short method can also be used for those facilities which have a limited number of commercial air carrier type operations (less than five percent of the total operations). For air carrier airports, other noise exposure models as referenced should be used.

If, after the initial noise curves (NEF or equivalent) are plotted and analyzed, no sensitive community facilities are found within the contours and no opposition on the basis of noise has been expressed, the aircraft noise analysis is complete.

Additional analysis of noise impacts will be required where noise sensitive areas are identified within contours above NEF 30 (or equivalent) and the proposed action:

- Is highly controversial due to noise impacts.
- Exposes the sensitive areas to jet operations for the first time.
- Increases noise exposure by more than three units (NEF, CNR, Ldn) over that which would be created without the project. Such calculation of difference should include consideration of any noise abatement procedures that exist.

The additional noise analysis requires the use of the Integrated Noise Model (INM). This model, an improved form of the former Aircraft Sound Description System (ASDS), provides information on average noise levels above various threshold levels. When additional analysis is required, the average noise duration above 65, 75, 85, 95, 105, and 115 dBA must be provided for forecast conditions with and without the project. The average noise duration must be compiled for the complete day's operation and for the evening (7 p.m.-10 p.m.) and nighttime hours (10 p.m.-7 a.m.). It should be noted that the percentage of aircraft operations for evening hours must be developed prior to running the Integrated Noise Model.

The models described above express noise impact in terms of cumulative daily exposure and noise duration above a prescribed level. It may be important to the public to understand just how loud one aircraft operation would be. Though not required by Order 5050.2B, these peak levels can be indicated by also providing in the noise analysis a plot of the adjusted effective perceived noise level curve (EPNL) for each aircraft type. These data are available in published form and will be discussed in more detail in the following section.

g. IMPACT ANALYSIS

(1) Methodology

It is not the intent of this guidance book to duplicate the aircraft noise models' procedures. Rather, this book will describe what the models are, when they are to be used, what data is required as input, and how to use their output.

Non-computerized Method

The methodology for determining noise exposure at general aviation airports is contained in the referenced handbook, Developing Noise Exposure Contours for General Aviation Airports. Data requirements and use of this method have been discussed previously. This methodology yields noise contours which may have to be adjusted for proposed flight tracks and/or to match the scale of the base sheet used for the noise exhibit. Contours are generally developed for NEF values 20 to 40 (or equivalent).

An NEF value at a single point for one class of aircraft on one runway can be determined using a hand calculation. An explanation and example of the NEF hand calculation is given in the appendix.

Computerized Noise Models

References are also provided at the end of this noise section to indicate the source of these noise models. Basic input for the models was previously addressed in this section.

Output for the computerized models yields the appropriate noise data in a grid format. Similar noise values can then be connected to form contours. These contours should be developed for the existing condition (if applicable), and for future conditions with and without the project.

The contours should then be plotted as overlays on area base maps which show existing and proposed land uses and sensitive areas. Contours for the INM analysis will represent those points exposed to aircraft noise greater than 85 dBA for zero minutes and other amounts of time for the

24-hour day. In addition, the tabular printout of the INM will present the duration of noise exposure above 65, 75, 85, 95, 105, and 115 dBA for 24 hours, the evening period, and the nighttime period. The printout also provides Ldn values at various points throughout the area within the 85 dBA zero minute contour.

Peak Level Contours

The development of peak noise data is not required within Order 5050.2B. However, sponsors or the public have, at times, requested that such contours be developed. These data can be derived from EPNL values which are referenced in the appendix. It is advisable to adjust these values to decibels (dBA), which in turn can be used for comparison with field measurements and other community noise sources. Noise levels at specific noise sensitive areas could then be shown for the noisiest aircraft using the facility, the quietest aircraft, and the "modal" aircraft - the one with the most operations. This information could be shown on the same base map which was used for the previous model contours.

Presentation of Results

Once noise contours have been drawn, an analysis of the exposed lands should be made. Noise sensitive areas within the appropriate contours should be surveyed and impact evaluated with respect to established criteria. Information about each sensitive area, including identification of activity type, use of facility (by time of day and number of people), type of building construction (including use of air conditioning), and similar noise-related information should be obtained. The gathering of this information

will allow for a less subjective, more quantitative evaluation. Areas which would be considered noise sensitive include such facilities as schools, churches, parks, historic sites, hospitals, residential areas, outdoor stages, band shells, etc.

Noise impacts can be quantified in a number of ways:

- Impacts by Land Use

Impacts can be presented by quantifying areas of noise sensitive land uses exposed within the contour ranges. Measuring areas exposed within the contour range NEF 30-40, for example, before modification of an airport and after project completion, will quantify the comparative impact.

- Impact by Population Affected

Determine from available demographic data or population estimates the number of people within the contours before and after the airport modification.

- Impact by Sensitive Area

Show NEF or equivalent cumulative values at designated sensitive areas before and after the airport modification. Provide tabular output from the INM indicating, for each sensitive area, the duration of noise levels above the threshold levels of 65 to 115 dBA, as well as the Ldn values.

- Provide Comparative Tables

Provide a table of comparative noise levels indicating typical (dBA) values encountered in daily life and industry. A table of this type is included in the appendix of this document.

Analysis of noise from other than aircraft operations should be included when the additive effect is significant.

(2) *Identification of Short-term and Long-term Impacts*

Short-term noise impacts for airport development deal more with actual construction noise than with aircraft noise.

Long-term impacts are directly related to compatibility of land use and activities within the established noise corridors.

(3) *Impact Evaluation and Comparison With Laws, Standards, and Procedures*

A comparison of aircraft noise exposure with recommended criteria should be provided in any environmental assessment. Criteria has been established by various Federal agencies and are documented in the appendix. Housing and Urban Development (HUD) Circular 1390.2 relates directly to NEF and CNR values. Evaluations should discuss any inconsistencies with this criteria. In addition, Ldn output from the INM can be compared directly with EPA guidelines.

(4) *Determination of Measures to Minimize Harm*

As part of community involvement programs, the information and analysis performed to this point would receive public comment and additional noise sensitive areas not identified in field reconnaissance may be identified by the public. Concerns expressed by the public could provide the basis for modifying or establishing traffic control procedures or modifying layout configurations.

Input obtained from the public, governmental agencies, air traffic control, field reconnaissance, and land use evaluations, may have

identified areas of concern or conflict. Measures should be recommended to minimize noise impacts. Air traffic control personnel should recommend traffic control procedures. Procedures developed must be within aircraft flight capabilities, meet all safety requirements, and be established upon completion of the project.

Measures to be considered for mitigation of noise impacts have recently been compiled and discussed in the comprehensive document entitled Aviation Noise Abatement Policy, prepared by the Department of Transportation, Federal Aviation Administration. This document is included in the appendix of this guidance book. The noise policy document highlights the Federal action program and summarizes the key responsibilities of each of the parties concerned with aviation noise, i.e., the Federal government, airport proprietors, state and local governments, air carriers, aeronautical manufacturers, and airport neighbors.

Airport noise abatement strategy has to be approached on an airport-by-airport basis. Since much of the noise problem is site-specific, the airport proprietor plays a key role in the development and implementation of the strategy. The proprietor is the closest to the problem, with the best understanding of local conditions, needs, desires, and the requirements of air carriers and others using his facility. Actions which should be considered by proprietors in developing a noise control plan are presented in the Aviation Noise Abatement Policy in the following format:

h. WRITTEN AND GRAPHIC PRESENTATIONS

The presentation of the noise analysis should be developed to be technically complete, but at the same time be understandable to the lay reader. To insure technical completeness, there must be sufficient information presented, or available to the FAA, to allow the noise analysis to be conducted independently. Sufficient explanation of the noise descriptors must also be presented to lay readers to provide them with the means to make their own subjective analysis. To provide some information on the subjective response of the public to aircraft noise, the report Impact of Noise on People has been included in the appendix. This report presents the results of a number of studies on the public's attitudes and reactions to noise.

The graphic illustrations that should be presented include a layout plan of the present or proposed airport indicating the proposed development. In addition, maps of the airport vicinity should include information regarding runway location and orientation, present and planned land uses, noise sensitive areas, property to be acquired, zoning and other land use controls, and the noise contours.

If available, it is helpful if the contours could also be placed on an aerial photo base, so that actual points of reference can be identified.

i. SUPPORTING DOCUMENTATION TO BE APPENDED

Several items relating to aircraft noise should be placed in the appendix of the assessment or appropriately referenced. As a

minimum, the noise models used should be identified. A technical summary in the appendix, especially for the more complex cases or those with a high degree of public interest, is appropriate.

To help the general public in their understanding of noise, the document entitled Impact of Noise on People is provided in the appendix of this document. This document should be included or appropriately summarized in the appendix of the environmental assessment, depending on the extent of impact and degree of interest.

A breakdown of the operational data used as input should also be included in the text or appendix.

Such additional information as is necessary to allow for an independent review of the noise analysis which has not been presented in the text of the report, should be placed in the appendix or otherwise made readily available to the FAA.

j. CONSISTENCY WITH OTHER IMPACT EVALUATIONS

The noise analysis and impact evaluation are obviously very closely tied to the land use and social impacts. Where Section 4(f) lands are involved, the noise discussions should relate specifically to the affected sites.

k. LIST OF REFERENCES

Aviation Noise Abatement Policy, November 18, 1976, U. S. Department of Transportation, Federal Aviation Administration. Available in guidebook appendix.

Airport Noise Prediction Model (MOD 7), published in draft form April, 1975 by Transportation Systems Center, Cambridge, Massachusetts and available on written request.

This reference provides a documentation of a computer program containing the Noise Exposure Forecast (NEF), Day/Night Sound Level (Ldn), and the Aircraft Sound Description System (ASDS).

Developing Noise Exposure Contours for General Aviation Airports, published in December, 1975 by the Federal Aviation Administration.

This reference presents a short method for developing noise exposure contours (NEF, Ldn or CNR) for general aviation airports. The method is also applicable where a limited amount of air carrier service is also provided.

FAA Integrated Noise Model Users Guide, published by the Federal Aviation Administration.

This report presents the procedure for completing input sheets for the development of the Integrated Noise Model.

Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare With An Adequate Margin of Safety, published in March, 1974 by the U. S. Environmental Protection Agency, Washington, D. C.

This reference contains information on the effects of noise, computation of noise levels, definition of noise terms, and recommended criteria. Available through the Government Printing Office as Report Number 590/9-74-004.

Noise From Construction Equipment and Operations, Building Equipment and Home Appliances, published in December, 1971 by the U. S. Environmental Protection Agency.

This reference is helpful in estimating levels of noise that may occur from construction operations. Available through NTIS.

Highway Noise - A Design Guide for Highway Engineers, NCHRP 117, published in 1971 by the Highway Research Board.

This reference provides information to estimate vehicular traffic noise and provides tables giving general indoor/outdoor noise reduction information. Available from Highway Research Board, National Academy of Sciences, Washington, D. C. 20418.

Handbook of Noise Measurement, published by the General Radio Company.

This is a good reference for briefly explaining the "physics" of noise, the units of noise measurement and noise measurement techniques. Available through the General Radio Company, Concord, Massachusetts.

Airports and Their Environment - A Guide to Environmental Planning, published in September, 1972 by the Federal Aviation Administration, Washington, D. C.

This reference contains a chapter on Aircraft Noise which provides a considerable amount of airport related noise information. A discussion of noise abatement techniques and their limitations is provided.

Airport Master Plans, published in 1971 by the Federal Aviation Administration, Washington, D. C.

This reference briefly describes what is involved in preparing airport master plans and discusses its environmental relationships.

LAND USE

2. Land Use

a. INITIAL ASSESSMENT PROCEDURES

(1) Determination of Scope of Project as it Relates to Land Use

The analysis of a project's impact on land use is a major consideration in the environmental assessment. This importance is recognized because of:

- The close interrelationships of land use with other impact categories; and
- The potential for secondary or induced land use impacts.

Once the land mass potentially affected by noise has been identified by contours, investigation of the existing and future uses in that area will more specifically determine the extent of that noise impact. The land use analysis also provides a preliminary indication of 4(f) lands (parks, recreation areas, wildlife and waterfowl refuges, and historic sites) and other noise sensitive uses. In addition, the land use analysis will determine land requirements for project development and will identify areas of housing or business to be relocated.

The location or expansion of an airport may produce significant secondary impacts on land use in terms of induced airport development and/or public service demands. While these related impacts

are discussed within this Land Use Section, separate sections are provided for Noise, 4(f) Lands, Historic Sites, Socioeconomic Impacts, and Induced Impacts. Much of the initial data collection and preliminary analysis for these additional impact categories may be accomplished within the content of the land use analysis.

The first step in the land use analysis is to delineate a study area. The scope of the project will determine such items as land acquisition, noise contours, and utility and access requirements. The immediate study area would include the following:

- All land within the 30 NEF contour (or equivalent) under existing conditions and after proposed project is fully operational.
- All land served by new, increased, or improved utilities or access included in or resulting from the project development plan.
- Land contemplated for purchase or easements.
- Noise-sensitive areas within or immediately bordering the site or 30 NEF (or equivalent) area.
- Any land otherwise impacted by the project.

A broader study area extends to the airport's entire service area. The scope of the project will affect this area as it creates new service areas or expands existing regional service. The impact evaluation procedure is presented in Figure 2.

IMPACT ANALYSIS PROCEDURE
LAND USE

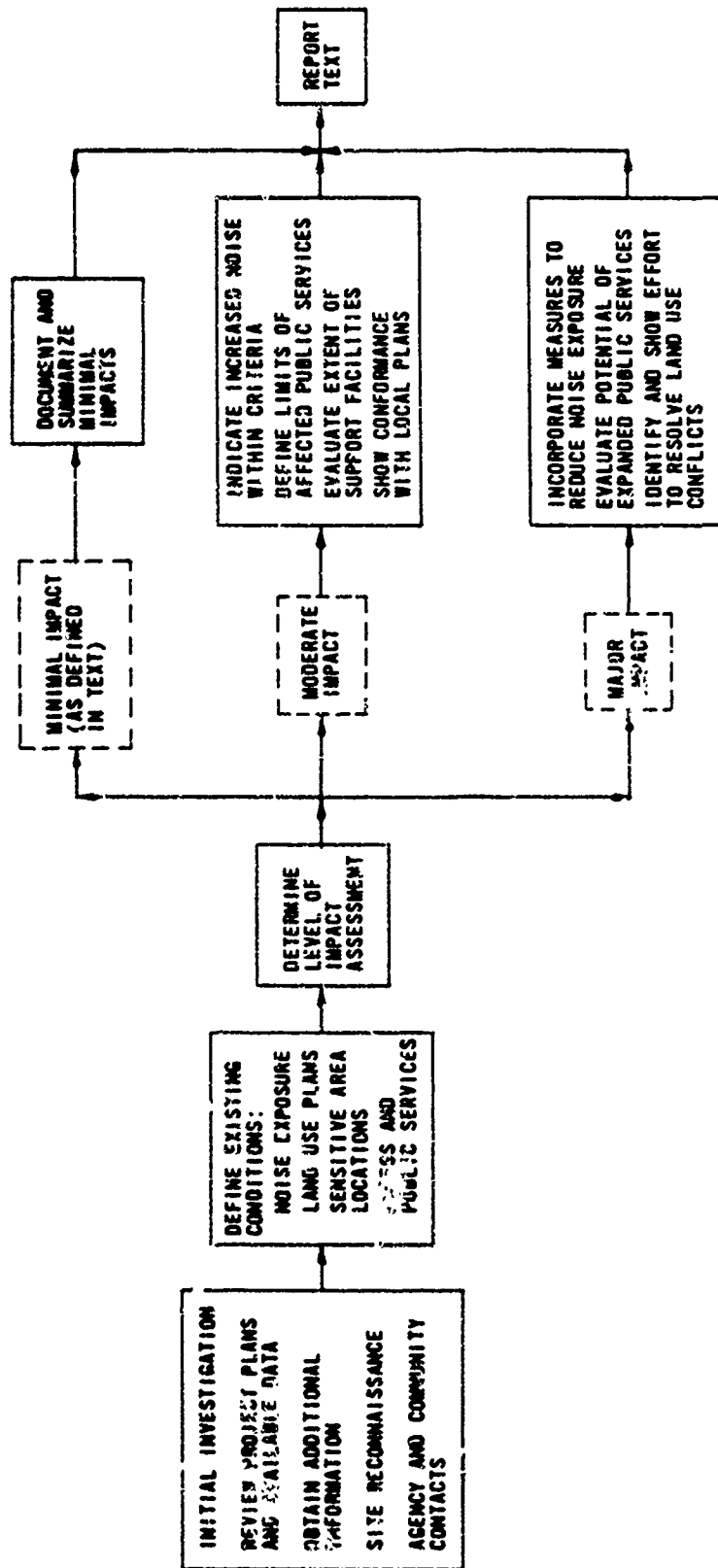


FIGURE 2

(2) *Review of Immediately Available Data*

Project plans will indicate whether land is to be acquired and whether it is presently developed. Detail as to number and type of structures to be taken may be provided.

The sponsor may have acquisition agreements or correspondence indicating opposition on file. He also will know if the project area is zoned and planned for airport use.

Further, the sponsor should be able to provide information on any public hearings, public support or opposition to the project, including any correspondence, transcripts, and newspaper clippings on file.

Evaluation of land use considerations should be scheduled when noise contour data is available. While other types of data retrieval and analysis may proceed without this information, final assessment in this category must be deferred until this noise data is obtained.

b. SITE RECONNAISSANCE

This step is necessary to identify number and type of structures to be acquired or those impacted by noise. Reconnaissance should verify the following:

- Actual land uses within the affected areas.
- General location of houses to be acquired.

- General location of businesses to be relocated.
- General location of institutions to be relocated or impacted.
- Location of 4(f) lands which may be affected.

Details on assessing the numbers and types of facilities relocated or impacted are discussed in the sections of the guidance book on Direct Socioeconomic Impacts and Section 4(f) Lands.

c. DATA REQUIREMENTS AND SOURCES

Agency and community contacts regarding land use may be made in conjunction with efforts for other study categories. Whether accomplished individually or jointly, land use contacts and data resources include the following:

- Local Planning and Zoning Office: Zoning maps; future land use plans and maps; census data; housing data; economic and population projections. Note: In some cases, airports or their influence areas fall within two or more political jurisdictions. All county and municipal planning and zoning agencies in the area should be contacted.
- Regional Planning Commission/Council: Regional comprehensive development plans, maps, and reports (if available); demographic and economic reports; housing studies listing available inventory.
- State Department of Transportation, Aviation Administration (if any), and Highway Agency:

Existing and future transportation plans to include air, rail, mass transit, primary and interstate facilities.

- Local Department of Public Works: Contact only required when significant water/sewer expansion is planned. Verify present and planned supply/treatment capacity to accommodate project plus any induced development.
- Local Department of Education: Enrollment and pedestrian/bus access patterns for any schools in the affected area.
- State or private Higher Education Authority: Necessary data for colleges in project area.
- State or local Recreation and Parks Department: User data for affected recreation and park facilities in the project area.

Community contacts will depend on the extent of dislocation, conflicts, and project support or opposition. If an established community falls within a 30 NEF contour (or equivalent), the civic association should be interviewed. The area Chamber of Commerce may be contacted to document the extent of project support or opposition from business/commercial interests. If minority or low income groups are affected and substantial numbers are dislocated, effort should be made to contact local public and private agencies concerned with the affected group's welfare.

d. ASSURANCES REQUIRED

When a project conforms with zoning ordinances and land use plans, assurances from the sponsor are required to confirm that zoning or other land use controls are approved, currently in effect, and will be enforced.

Where zoning is being promulgated, documentation from all affected jurisdictions must be submitted. Letters of agreement should include sufficient information regarding zoning and land use plan status to facilitate FAA review and approval.

Where no land use plans or zoning ordinances exist, letters of intent from responsible authorities should indicate that acceptable land use plans/controls will be set in motion and established in a reasonable time frame.

Under any circumstance, some assurance of local government concurrence and evidence of land use compatibility is required. Section 18(a)(4) of the Airport Act requires an assurance that appropriate action, including the adoption of zoning laws, has been or will be taken, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations. Appropriate assurances should be included in the environmental impact assessment report to document what is being done by the jurisdiction(s) with land use control authority. Reasonable assurance occurs when appropriate action has been or will be taken. What constitutes appropriate action depends on the jurisdictional land use control capability of the sponsor. It is recognized that not all airport sponsors have direct jurisdictional control. Depending on the sponsor capability, "appropriate action" could range from acquisition of land in fee to the extension of sponsor influence in the community.

e. *DETERMINATION OF EXISTING CONDITIONS*

The study area should be delineated based on the previously described criteria. The area should be assigned specific boundaries that reflect natural environment, property and land use patterns as well as legal political boundaries. Consideration should be given to define limits according to census tract boundaries (this makes data collection and interpretation easier).

Existing land use and zoning in the project area should be described and illustrated in an exhibit which should include identification of residential and sensitive areas within existing noise contours.

Existing compatible land uses should be noted. Compatible land uses are defined as those which (1) do not constitute a hazard to airport operations; and (2) are not degraded by airport operations. Existing land use controls, including zoning ordinances, can be directed toward the creation of compatible land use in terms of noise sensitive areas as well as airport safety.

Several studies have been conducted to identify compatible uses. The appendix of this document contains a "Land Use-Aircraft Noise Compatibility Classification" developed by HUD. FAA Advisory Circular Airport Master Plans, AC 150/5070-6 contains a listing of land uses and their compatibility with different levels of NEF and CNR. A study entitled

Compatible Land Use Planning On and Around Airports relates various land uses to tolerance levels for aircraft sound and also lists hazards to aviation which may be associated with each use. This information has been reproduced in the guidebook appendix. A new FAA Advisory Circular concerning "Off-Airport Land Use Planning" is currently being prepared and is expected to be available soon.

Compatible and incompatible land uses in the study area should be summarized. Reference should be made to the relationship of existing area land use and zoning to local and regional future land use plans. The assessment should include a discussion of relevant policies and controls affecting land use developed in response to the Clean Air Act, the Federal Water Pollution Control Act, as amended, and/or the Coastal Zone Management Act.

f. DETERMINATION OF LEVEL OF IMPACT EVALUATION

For purposes of airport project evaluation, three levels of impact evaluation exist which relate to land use considerations. These are:

- Level 1 - A minimal or negligible impact evaluation.
- Level 2 - A moderate impact evaluation.
- Level 3 - A significant impact evaluation.

The following criteria are used to determine whether a project falls within these levels.

Minimal Impact

Minimal impact may be associated with the expansion or improvement of an existing airport or with actions not requiring full EIS documentation, such as navigation aids, lighting, repairing, etc. This level of impact rarely applies to the establishment of a new airport site. Level 1 impacts are assumed to include the following conditions:

- No noise analysis required or no noise sensitive areas identified to be within the NEF 30 contour (or equivalent).
- No major utility or access road improvements are required outside the airport site.
- Expansion will not involve a change in the role of the airport in the service area economy or transportation system.
- The proposed development is compatible with local or regional plans and goals.
- No Section 4(f) lands are identified within the project area.

If the above conditions are present, it can be assumed that the land use impacts will be minimal and there will not be significant induced development caused by airport development.

Moderate Impact

Moderate impact implies the following conditions:

- Increase in noise exposure over that which would be created without the project is less than three (3) noise units.
- Expansion of existing utility service or access required will not significantly alter either existing access patterns or public utility availability or capacity.
- Improvement to existing airport or construction of new airport will not require extensive off-site support and can be handled by existing facilities.
- Improvements are not in conflict with existing local or regional plans.
- Identified Section 4(f) lands are only minimally affected.

Airport expansion at this level can be expected to require some new on-site or off-site support services. Induced development can also be anticipated if improvements permit increase in operations and enplanements.

Significant Impact

Level 3 primarily applies to the major expansion of an existing airport or the construction of a new airport where one or more of the following conditions would be present:

- Noise increase is greater than three (3) units over that created without the project, or the proposed action is highly controversial with respect to noise impacts, or sensitive areas are exposed to jet operations for the first time.

- New access roads and utilities required to serve the airport will also provide new or expanded service to areas off the airport.
- Potential development will conflict with local plans or ordinances.
- Off-site induced development is predicted, with potential impact on community services.
- Section 4(f) lands are adversely affected.

Expansion or construction at this level can be expected to have significant impact on the immediate area as well as the larger service area. Off-site support facilities and induced development can be expected.

The general criteria described above are fairly consistent with each other within that level of anticipated impact. It is possible, however, that any one impact could be of a much higher degree than the others for a specific airport development situation. In that case, the individual analysis should be intensified according to the methodology presented below.

g. IMPACT ANALYSIS

(1) Methodology

Four basic procedures will distinguish minimal impacts from greater impacts. These are:

- Use of Noise Evaluation Procedures as described in the Noise Section.
- Determination of the project's requirements for support facilities, and/or utility or access improvements that would induce off-site development.
- Relation of project to area zoning ordinances and land use plans to determine conformance.
- Evaluation of impacts on Section 4(f) lands as described in a subsequent section.

If the impact is minimal, only the following steps are required to complete this portion of the environmental assessment.

- Reference to noise text and exhibit indicating no noise sensitive areas within NEF 30 contour (or equivalent).
- Utility and access road requirements should be indicated, accompanied by statement that all service alterations will be primarily confined to the site.
- Overall project elements should be shown not to require off-site support or to induce off-site development.
- Documentation should be provided that airport operations are compatible with relevant local plans and ordinances and that zoning or other controls are in effect or will be soon implemented to insure compatible development around the airport. In cases where no controls on surrounding land uses exist, statements as to the long range development

potential of the project area should be included, areas of incompatibility identified, and, if the character of the area is expected to change, that controls will be implemented.

- Inclusion of statement that no Section 4(f) lands are affected by the proposed action.

If initial evaluation indicates greater than minimal impacts, the following steps should be followed to distinguish the extent of impact (moderate or significant):

- Refer to noise analysis results for each identified sensitive area.
- Include reference to discussion on relocation requirements and supply of replacement housing (covered under Direct Socioeconomic Impacts).
- Improved access and expanded utility service should be evaluated in relation to the inducement of incompatible or unanticipated off-site development.
- Increased airport activity resulting from the project must be evaluated to determine whether it will generate or require support services. Potential types of support services should be listed and existing zoning or land controls cited to regulate this type of growth.
- The relationship of the airport development to the goals and objectives of local/regional plans should be identified along with methods to control development around the airport and supporting documentation.
- Reference should be made to the evaluation of the use of Section 4(f) lands.

If the analysis indicates that the project severely impacts neighborhoods, takes noise-sensitive uses, affects access, and/or expands utilities so as to induce extensive off-site projects (significant impacts), the following methodology should be used:

- Provide full range of additional noise data using integrated noise model and information on human response to noise.
- Numbers of residences and businesses within the NEF 30 and 40 contours (or equivalent) should be indicated. Where existing areas are unoccupied, these areas should be compared to future land use plans to determine whether conflicts could occur.
- Describe and document land use assurances for compatibility.
- Provide reference to socioeconomic section and community effects and/or relocation requirements for the purpose of achieving noise compatibility.
- The impact of new or improved access roads and extended utilities must be evaluated in terms of inducing development in the project area. Future use of this land should be related to existing controls or future land use plans. Essentially, three types of off-site induced development may occur:
 - Commercial support facilities to serve passengers, air cargo and airlines needs.
 - Industrial and commercial facilities that require air cargo services for transportation.

--Urban development attracted by improved access, available utilities, and increased traffic generated by the airport.

- Provide reference to discussion of alternatives and measures to minimize harm on Section 4(f) lands.

The types of development which locate near airports due to their dependence on or benefit from close proximity to an airport include:

- Air freight terminals
- Trucking terminals
- Taxi and bus terminals
- Air cargo forwarders
- Wholesale distribution centers
- Aircraft and parts manufacturers
- Aircraft repair shops
- Aviation schools
- Airline schools
- Aerial survey companies
- Aviation research and testing laboratories
- Auto storage areas
- Parking lots
- Car rental agencies
- Gas stations
- Restaurants
- Motels and hotels
- Night clubs
- Convention centers
- Office buildings
- Banking services
- Shopping centers
- Selected recreational activities

Local planners, developers and airport officials may provide data for predicting induced development.

Several computer model programs are available to predict land use development near airports. However, extensive input and sophisticated computer capabilities are required to run these programs, and their application has had mixed results.

Predictions based on historic development trends in comparable study areas and/or consultation with local and regional planning offices are generally the most valid methods to assess induced impact.

The overall relationship of the development action to local/regional goals and plans should be addressed. Where conflicts exist, they should be explained and attempts to resolve them outlined. The sponsor, in most cases, cannot make all the decisions and guarantees himself. However, he should make a conscientious effort to develop recommendations in consultation with appropriate local officials at various stages of the project. Such meetings should be documented, with resultant agreements stated.

(2) Identification of Short-term and Long-term Impacts

Short-term impacts involve disruptions to the surrounding community resulting from road relocation and construction activities.

However, numerous long-term land use impacts are possible. These include noise impacts, induced development, and relocation requirements.

Some of the greatest hazards and environmental nuisances that exist today are related to incompatible development permitted to occur after an airport has been constructed. One of the greatest contributions environmental studies can make is to encourage communities to promulgate proper land use controls contingent to desired airport development.

An airport project can have primary and secondary positive long-term impacts on land use. First, it can stimulate desired compatible development, thereby enhancing the private economy and public tax base. Secondly, it can expedite rational land use planning.

*(3) Impact Evaluation and Comparison With
Laws, Standards, and Procedures*

The project must conform to existing or proposed zoning and comprehensive future land use plans. Relocation assistance for all residences and businesses taken by the project must conform to provisions established by the Uniform Act, as discussed in a subsequent section on Direct Socioeconomic impacts. Noise exposure should be evaluated in terms of existing conditions and acceptability criteria.

All incompatible development should be quantified by type in order to inform the reviewer of the project's potential long-term impact.

(4) *Determination of Measures to Minimize Harm*

Adequate zoning ordinances, comprehensive land use plans and other development controls are the major measures available to assure that airport development does not directly cause or indirectly induce incompatible land use.

Specific steps are necessary to ameliorate specific land use impacts within the project area. These include:

- Establishment of compatible zoning or other controls with assurances to promulgate them.
- Relocation assistance for families and businesses.
- Possible replacement of all public lands taken.
- Landscaping to ameliorate esthetic impact.
- In some cases, flight patterns may be adjusted to avoid overflight of homes or other noise-sensitive areas.

Alternative sites or actions should be considered where the project represents an irreconcilable conflict with existing zoning and future land use plans.

h. GRAPHIC PRESENTATIONS

Exhibits should relate the proposed project development to existing land uses (and/or zoning) and future land uses and controls in

the project area. Homes and businesses to be relocated, impacted 4(f) lands, and other noise-sensitive areas should be identified. Land use and sensitive areas within appropriately labeled noise contours should be indicated.

i. SUPPORTING DOCUMENTATION TO BE APPENDED WHERE APPLICABLE

Correspondence and information to be appended includes:

- Sponsor certification that the project conforms to approved land use plans and zoning regulations.
- Letters of intent from surrounding local governments that required zoning will be promulgated.
- Letters of intent from affected local governments that, in lieu of zoning, acceptable land use controls will be established within a reasonable time frame.
- Letters of agreement applicable to any acquisition of land or easements.
- Specific state, regional or local planning data relating to the need for the project. Examples include reference to or excerpts from master plan studies and reports.

j. CONSISTENCY WITH OTHER IMPACT EVALUATIONS

The Land Use Section must relate directly to the Noise Impact Section which will establish noise contours and indicate potential impacts in the study area.

Land use impacts must be consistent with analyses and conclusions presented in the Socioeconomic, Induced Impact, and 4(f) Lands Sections of the assessment report.

k. LIST OF REFERENCES

The Quiet Revolution in Land Use Control, prepared for the Council on Environmental Quality by Fred Bosselman and David Callies, December, 1971.

Report commissioned by the Council on Environmental Quality (CEQ) for the purpose of analyzing the innovative land use laws of several states and other laws dealing with special issues of key facilities and critical areas.

Available through the CEQ or the Government Printing Office, Washington, D. C.

The Taking Issue: An Analysis of the Constitutional Limits of Land Use Control, written for the Council on Environmental Quality by Fred Bosselman, David Callies, and John Banks, July, 1973.

A study of the constitutional limits of government authority to regulate the use of privately owned land without paying compensation to the owners.

Available through the CEQ or the Government Printing Office, Washington, D. C.

Airports and Their Environment - A Guide to Environmental Planning, CLM Systems, Inc., Cambridge, Massachusetts. September, 1972.

Designed to assist and guide airport and regional planners in identifying and resolving environmental problems associated with airport development.

Available through NTIS.

VEGETATION, WILDLIFE AND ENDANGERED SPECIES

3. Vegetation, Wildlife, And Endangered Species

This segment of the environmental study process focuses on the proposed action's impact on vegetation and wildlife within and adjacent to the project site. This section covers the sequence of actions, data sources and methodology required to assess whether and to what degree the total project with its component elements and alternatives will alter ecological systems. A flow chart indicating the sequence of tasks for the analysis is shown in Figure 3.

a. INITIAL ASSESSMENT PROCEDURES

(1) *Determination of Scope of Project as it Relates to Surrounding Ecological Systems*

FAA Order 5050.2B specifies that consideration be given to the project's effect upon wildlife in general, as well as wildlife and waterfowl refuges in conjunction with DOT Section 4(f). The Order notes that, while it may be assumed that displaced wildlife will relocate in adjacent areas, a long-term loss may result from the project's reduction of overall habitat. Special considerations are noted and consultations are required where the project has potential effects on a wildlife refuge or an endangered species. The relationship of this impact category with Section 4(f) lands should be clear so as to avoid excessive duplication within the assessment. Section 4(f) procedures are discussed in a later section.

**IMPACT ANALYSIS PROCEDURE
VEGETATION AND WILDLIFE**

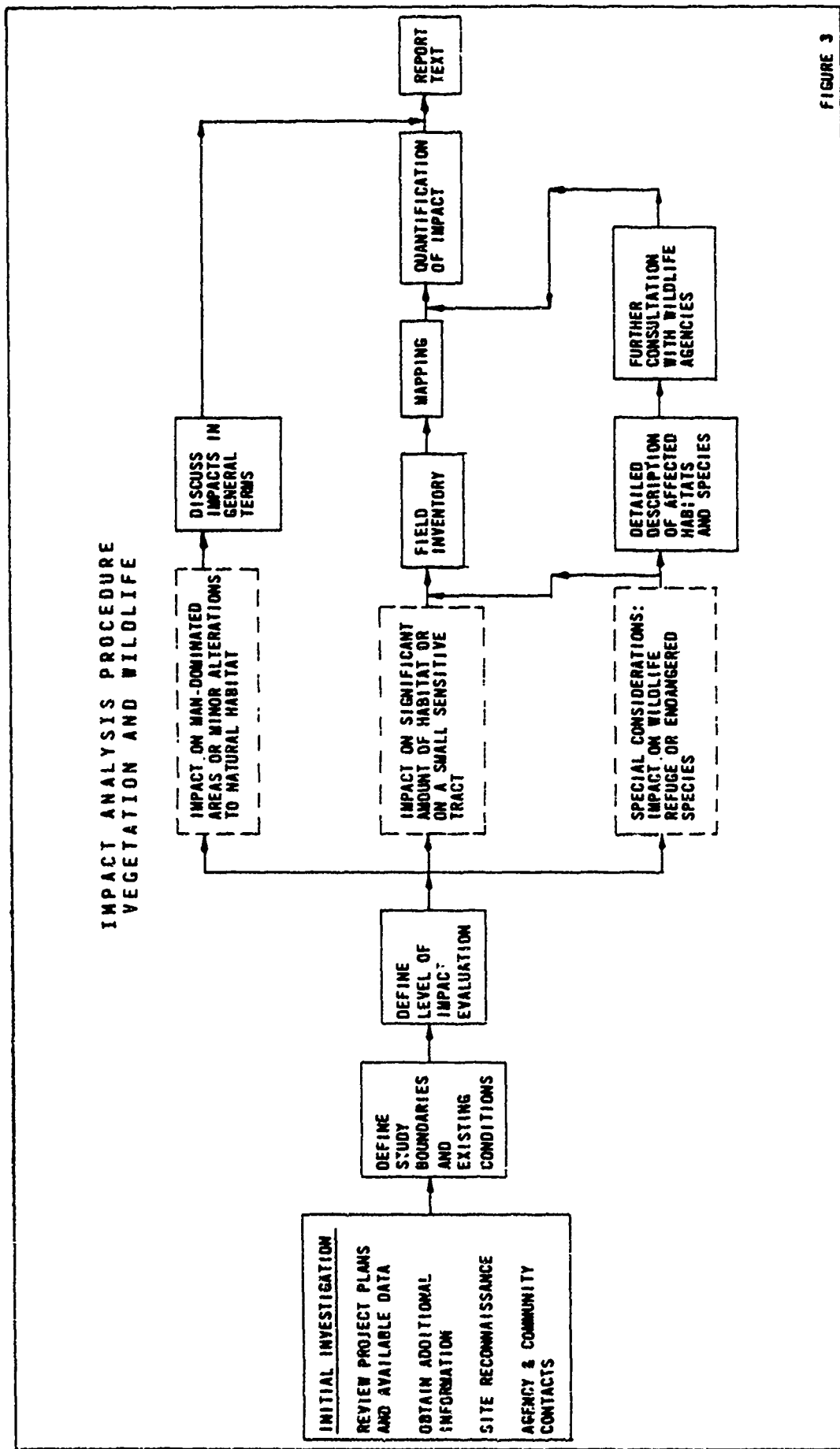


FIGURE 3

The first step in the study process is to determine whether the proposed action or its alternatives will result in the removal of any vegetation supporting wildlife. What, then, are the physical limits of the project? Will construction remove habitat? What habitat exists adjacent to the project site?

(2) Review of Immediately Available Data

Specific project plans, the sponsor's master plans, previous feasibility studies or other agency EIS's which cover the same area are examples of immediately available data. These, at least, will indicate the project's physical limits and actions which may result in the loss of habitat.

In addition, special studies and aerial photographs of the site or alternative site areas may be available in the sponsor's files. This information should provide basic orientation and indicate the general extent of anticipated ecological impact.

b. SITE RECONNAISSANCE

Field observation is necessary to identify biotic communities or vegetation associations when new projects are planned or when off-site improvements are proposed.

Field reconnaissance is important to verify the extent of natural habitat. Existing land use maps and/or aerial photography are not always up-to-date and may not present a true picture of the area.

The value of a site reconnaissance cannot be overemphasized. Not only will it enable the preparer of the statement to present first-hand knowledge of the site, but it will also improve one's relationship and credibility with the public when specific reference can be made to the local environment.

Field reconnaissance includes two elements: (1) verification of community types as indicated in aerial photographs; and (2) observance of wildlife or its traces. Actual observation within the study area is critical to document or refute judgment made from literature research and photograph interpretation.

c. AGENCY AND COMMUNITY CONTACTS

Data should be obtained from public and private sources when off-site natural habitat may be disturbed. The following is a representative list of typical materials available by agency:

- Soil Conservation Service - site area soils maps and aerial photographs.
- State Fish and Game Agency - wildlife species and populations lists; range maps.
- State Environmental or Conservation Department - list and location maps of conservation, wetland, coastal zone, refuge, swamp, marsh, or glacial areas; endangered species list.

- Regional or Local Planning Agency - list and location maps of existing or proposed local parks, recreation areas, designated sensitive or critical environmental areas; existing zoning and future comprehensive planning maps for study area.

In addition, it may be necessary to contact and consult with appropriate public agencies and private conservation/environmental protection groups as part of the study process. Obviously, discretion is required to limit the potential list to a workable number of key agencies, individuals and groups. However, contact and, where warranted, personal interviews should be made with the following:

- State and local conservation/environmental protection/fish and wildlife service agencies.
- U. S. Department of Interior, Fish and Wildlife Service - affects on terrestrial and fresh water species.
- U. S. Department of Commerce, National Marine Fisheries Service (NMFS) - affects on marine species.
- Personnel of local wildlife refuges.
- Most active local private conservation groups.
- Regional or local university-based experts on indigenous wildlife.
- Knowledgeable individuals.

d. CORRESPONDENCE REQUIRED

Documentation of consultation with the U. S. DOI, Fish and Wildlife Service (FWS), and/or the National Marine Fisheries Service and their comparable state counterparts is necessary when water bodies are affected and/or when an endangered species may be encountered. Early consultation with FWS, for example, should be encouraged (prior to draft EIS stage) and any documentation therefrom included in the assessment report or appendix.

Correspondence with other agencies and individuals listed above can be helpful in verification of ecological conclusions.

Fully coordinated EIS actions which are changed to negative declarations also require documentation from public officials, agencies or private groups, where the original controversy centered on ecological issues.

e. DETERMINATION OF EXISTING CONDITIONS

Where it has been determined that terrestrial or aquatic habitat will be disturbed, the existing ecological communities should be identified.

A clear understanding of existing conditions is necessary before impact can be assessed. In assessing ecological losses, the potential impact should be addressed in the context of a study area.

The study area should include the airport site and those affected areas adjacent to it which may supply supportive wildlife habitat. This study area will vary in size for each project depending on its scope and the extent of surrounding habitat.

The following methods are used to determine existing conditions within the study area:

- Interpretation of aerial photographs of study area to delineate vegetation associations (biotic communities) providing habitat, to include water bodies.
- Review of land use maps to verify presence or absence of wildlife or waterfowl refuges or bird sanctuaries.
- Verification of biotic community types and probable resident species.
- Review of rare and endangered species lists and range maps to verify probable presence of endangered species.
- Interviews with state and local agency representatives.

f. DETERMINATION OF LEVEL OF IMPACT EVALUATION

Based on accumulated data documenting existing study area habitat, it should be possible to determine the importance of project habitat in relation to habitat of the region or to endangered species. The relative value of impacted habitat will determine the intensity of study necessary to comply with environmental statutes and regulations.

For projects which impact only man-dominated areas (such as existing airport property or farmland) or which cause only a minor alteration of existing habitat, the analysis of impact can be presented in general terms. The definition of "minor alteration" is not stated here in terms of acreage; rather, it is based on the preparer's analysis of the facts which have been assembled during the initial investigation and agency contacts. It is suggested that "minor" impact be related to the removal of few acres of habitat which represents a small percentage of the area's inventory or which supports a limited variety or number of common wildlife species.

If, however, a significant amount of habitat is removed, as in the case of a new airport site in a rural area, a more detailed discussion of impact will be required. In this case, a second site survey should be instituted to conduct a field inventory of the various habitat types and supported wildlife. The significance of various habitats, the range of various species, and the location of potential nesting and breeding areas should all be discussed. An exhibit showing the location of various habitats is helpful in this discussion. This level of assessment would also apply to smaller areas which might occupy a strategic position in the project vicinity, or which constitute a large percentage of the remaining habitat of its type in the area.

In fact, it should be noted that due to the relatively large open areas of an airport, much of the remote areas may act as small game habitat. In accordance with the Fish and Wildlife Coordination Act, the Fish and Wildlife Service (FWS) and the state fish and wildlife agency should be consulted regarding protection of natural resources.

If, during the study, it is determined that the project involves impact on a wildlife or waterfowl refuge, an endangered species, and/or its critical habitat, further considerations should be made. A detailed description of the sensitive area or species is required, along with a discussion of measures to minimize harm and alternative measures for project development. Consultation with DOI/FWS or NMFS is required to determine if a critical habitat is affected by the project. The documentation must demonstrate that the project will neither jeopardize the continued existence of the endangered species nor modify its habitat.

It is emphasized that specialized skills are required to assemble and interpret detailed study data. An investigator's knowledge of the local animal ecology is critical in assessing impact and proposing ameliorative measures. Where extensive habitat is involved, professional field reconnaissance and interpretation of photographs are required to document conclusions. Where controversial areas exist, use of non-professional personnel may result in challenges or court action by opponents or conservation groups.

g. *IMPACT ANALYSIS*

(1) *Methodology*

Where it is determined that the project will result in only minor impacts on biotic communities, the losses can be discussed in general terms, i.e., the gross relationships to the regional inventory.

Where more detailed analysis is warranted, the following procedure should be followed.

The project configuration should be superimposed over site aerial photographs. Habitat types eliminated or irreversibly degraded as a result of development should be delineated and quantified to indicate study area impact. This acreage is compared to the general area's total inventory of that habitat type to indicate percentage of total acreage lost.

The style of presentation in the draft EIS should include a narrative description summarizing characteristics of each study area habitat type including typical examples of the community's flora and fauna. (All flora or fauna common to the habitat type should not be included in the main text, but provided as support documentation in the EIS appendix or referenced to a specific report.) A table permits clear understanding of impact by comparing habitat type taken by the project (in acres) to habitat type available in general area (in acres) and expressing loss of total habitat in percentage terms.

Impacts on terrestrial and aquatic wildlife resulting from habitat reduction or alteration should be estimated. Distinction should be made between transient impacts such as dislocation due to construction activities and permanent impact resulting from loss of habitat. The sensitivity and populations of resident species should be considered in evaluating significance. For example, loss of habitat for more common species is generally considered of less importance than loss of habitat which supports endangered migratory birds.

Where publicly-owned wildlife or waterfowl refuges are impacted, the assessment must include Section 4(f) considerations. These considerations are outlined in a separate section of this document.

As indicated in the previous subsection, potential impact on an endangered species or its critical habitat requires professional assessment and consultation with Federal and local fish and wildlife officials.

Certain other impacts should be discussed, where appropriate. Some smaller scale airport or associated F & E projects may require tree topping or limited ground disturbance. Normally, this alteration could be assessed in general terms. However, depending on the affected area's relative value to the regional inventory or its use by certain species, this action may have to be more fully evaluated in accordance with the aforementioned criteria.

Where appropriate, an assessment of the project's noise impact on wildlife should be made. Short-term construction activities could be expected to disturb some wildlife species in immediately adjacent areas. Recommendations regarding restrictions on construction activities during critical breeding periods may be made, where appropriate.

(2) *Identification of Short-term and Long-term Impacts*

Short-term impacts are generally associated with the construction period. Factors include movement and noise of construction vehicles, as well as transient increases in stream turbidities, which may briefly disrupt wildlife in areas adjacent to the construction site.

Long-term impacts include permanent loss of habitat, which may result in an overall reduction of certain species in the region, and/or any alteration of endangered species habitat or 4(f) refuges that cannot be replaced.

Conflicts involve the trade-offs necessary to gain the benefits accomplished by the project. These may include loss of public parkland, permanent reduction of habitat, etc. Where conflicts exist, it is necessary to clearly convey potential ameliorative measures and relate to socioeconomic benefits to the human community gained by alterations of the natural environment.

(3) *Impact Evaluation and Comparison
With Laws, Standards, and Procedures*

4(f) Lands

Section 4(f) of the DOT Act requires special environmental analyses for projects impacting wildlife or waterfowl refuges. The considerations under Section 4(f) are discussed in a separate section of this document.

Endangered Species

In response to provisions of the 1973 Endangered Species Act, special analyses should be provided disclosing the project's impact on endangered or threatened species or their habitat.

Where no endangered or threatened species or their critical habitat are known to exist in the area, a simple statement to this effect is sufficient, with reference made to the appropriate endangered or threatened species lists.

In the event that the project site and study area provide critical habitat for endangered or threatened species, additional information is required. As stated previously, this includes an accurate census of populations supported by site habitat; proposals to obtain and preserve adjacent habitat to permit relocation; and ameliorative design or site alternatives. Consultation with DOI (FWS) or NMFS is required to determine whether a critical habitat is affected by the project.

(4) *Determination of Measures to Minimize Harm*

Formulation of ameliorative measures is an integral part of the impact analysis process. Typical steps to mitigate impacts on vegetation and wildlife include the following:

- Design adjustments to avoid sensitive areas.
- Purchase of contiguous habitat as a preserve for dislocated wildlife or as a buffer zone.
- Phasing of construction to avoid breeding or nesting periods and to precipitate escape routes for mobile species.
- Erosion controls to protect aquatic communities or adjacent biotic areas.
- Landscape restoration and reversion plans to reconstitute existing habitat or create new habitat.

The practical and financial feasibility of ameliorative actions should be evaluated by the sponsor and the local FAA office during the study process.

In addition to the formulation of ameliorative measures for the proposed project, the ecological impact analysis must include evaluation of major alternatives to the project. Where alternate sites or runway configurations are involved, the same steps of photo interpretation and habitat quantification should be followed. The result, presented in table form, provides a clear comparison between habitat taken by the

proposed project and that taken by its alternatives. The tabulation should include habitat type and total habitat by acres for each alternate site compared in percentage terms against totals for the study area inventory of habitat types and acreage. These tabulations should be provided in the Alternative section of the draft EIS.

h. GRAPHIC PRESENTATIONS

When describing impact on habitat, an exhibit is desirable, delineating habitat communities within and adjacent to the project area. Each habitat type should be clearly distinguished and identified in the Exhibit legend.

The relationship of habitat types to the proposed project and project site can be established by using a scale drawing or photo of the airport layout plan and the site showing the proposed project, with different areas shown by cross hatching to distinguish habitat types.

i. SUPPORTING DOCUMENTATION TO BE APPENDED, WHEN APPLICABLE

As previously noted, all wildlife species observed or believed to be present need not be listed in the draft EIS text. However, species lists obtained from literature search and local sources, as well as Federal and state endangered species lists, should be provided in the EIS appendix or by reference.

Where extensive or unique habitat is disturbed, separate species lists should be provided for mammals, birds, reptiles, amphibians and fish. Lists should be given in tabular form and provide the following information:

- Scientific name
- Common name
- Whether on endangered or threatened species lists.
- Whether use of site is frequent, infrequent, rare or migratory.
- Whether actually observed on-site or only believed to use site.

Additional appended or referenced documentation may include earlier reports on study area ecology by independent experts or conservation groups as well as letters from Federal, state or local conservation or Fish and Wildlife officials indicating significance of site habitat.

Generally, appended or referenced material should include:

- Technical documentation to assist the professional reviewer in his decision regarding the proposed action.
- Relevant reports on controversial issues too long to be included in the text.
- Correspondence documenting statements or conclusions made in the text.

j. *CONSISTENCY WITH OTHER IMPACT EVALUATIONS*

Interdisciplinary coordination and communication is critical throughout the study process. Impact on vegetation and wildlife is directly related to impact on water quality, land use, and wetlands and coastal zones.

For example, does the project involve 4(f) lands? If the project requires significant fill material, where is this material being obtained? Will it impact off-site ecology? Will its transport and placement impact stream water quality?

k. *LIST OF REFERENCES*

Burt, W. H., and R. P. Grossenheider. *A Field Guide to the Mammals*. Boston: Houghton Mifflin Co., 1964.

Conant, Roger. *A Field Guide to the Reptiles and Amphibians*. Boston: Houghton Mifflin Co., 1958.

Eddy, Samuel. *The Freshwater Fishes*. Dubuque, Iowa: Wm. C. Brown Co., 1969.

Fernald, M. L. *Gray's Manual of Botany*. New York: D. Van Nostrand Co., 1970.

Memphis State University. *Effects of Noise on Wildlife and Other Animals*, prepared for the U. S. Environmental Protection Agency. Washington, D. C.: Government Printing Office, 1971.

Radford, A. E., H. E. Ahles, and C. R. Bell. *Manual of the Vascular Flora of the Carolinas*. Chapel Hill: University of North Carolina Press, 1968.

Robbins, C. S., B. Bruun, and H. S. Zim. *Birds of North America*. New York: Golden Press, 1966.

United States Department of the Interior. *Endangered and Threatened Wildlife and Plants*. Federal Register, October 27, 1976 (Vol. 41, No. 208).

United States Department of the Interior, Fish and Wildlife Service, *Guidelines for Review of Fish and Wildlife Aspects of Proposals in or Affecting Navigable Waters*. Federal Register, December 1, 1975.

United States Department of the Interior. *Wetlands of the United States*. Circular 39.

United States Department of the Interior, Fish and Wildlife Service, *Endangered and Threatened Species - Plants*. Federal Register, June 16, 1976 (Vol. 41, No. 117).

Report on Endangered and Threatened Plant Species of the U. S. - Presented to the Congress of the United States of America by the Secretary, Smithsonian Institution. Serial No. 94-A, U. S. Government Printing Office, Washington, D. C., 1975.

WATER RESOURCES – WATER QUALITY

4. Water Resources - Water Quality

a. GENERAL CONSIDERATIONS

Both the construction and operation of an airport facility may affect the quality and quantity of a region's water resources, both surface and subsurface.

This section of the guidance document will concern itself with presenting a methodology for evaluating potential water pollution actions which may occur as a result of airport development. In general, this section will discuss "quality" and not "quantity". Runoff quantities will be discussed under a separate Hydrology Section.

(1) *Determination of Scope of Project as it Relates to Water Quality*

The preparer of the environmental assessment must first be aware of the standards for the bodies of water into which the airport plans to discharge storm water, sanitary sewage, or other airport related wastes, as well as the effluent quality limitations. He also must be aware of the necessity for permit requirements of Federal and state agencies, i.e., the Corps of Engineers permits required for the discharge of dredged or fill material pursuant to Section 404 of the Federal Water Pollution Control Act Amendments (FWPCA) of 1972. In addition to dredge and fill restrictions, the FWPCA requires a Federal or state permit under the National Pollutant Discharge Elimination System (NPDES) for certain polluting discharges into

navigable waters. When the surrounding environment is a wetland area, certain airport practices involving the channeling of runoff into the surrounding environment may be considered to be discharges subject to the NPDES permit requirements.

The preparer must also be able to identify the possible ways in which construction and operation of an airport facility and any induced development affect the quality of area streams, waterbodies or wetlands. He must be technically qualified to evaluate the proposed procedures for the treatment and disposal of the various wastes generated by the project. Finally, he must be prepared to offer alternative solutions, if those initially proposed fail to produce an effluent of sufficient quality to meet state or local standards.

In order to determine the extent of the evaluation to be undertaken in evaluating the impact on area water quality, the preparer must first familiarize himself with the proposed plan, identify potential pollution sources, identify area streams and wetlands, and identify those measures which are planned to control water pollution. A flow chart indicating basic steps in the water quality evaluation is presented in Figure 4.

IMPACT ANALYSIS PROCEDURE WATER QUALITY

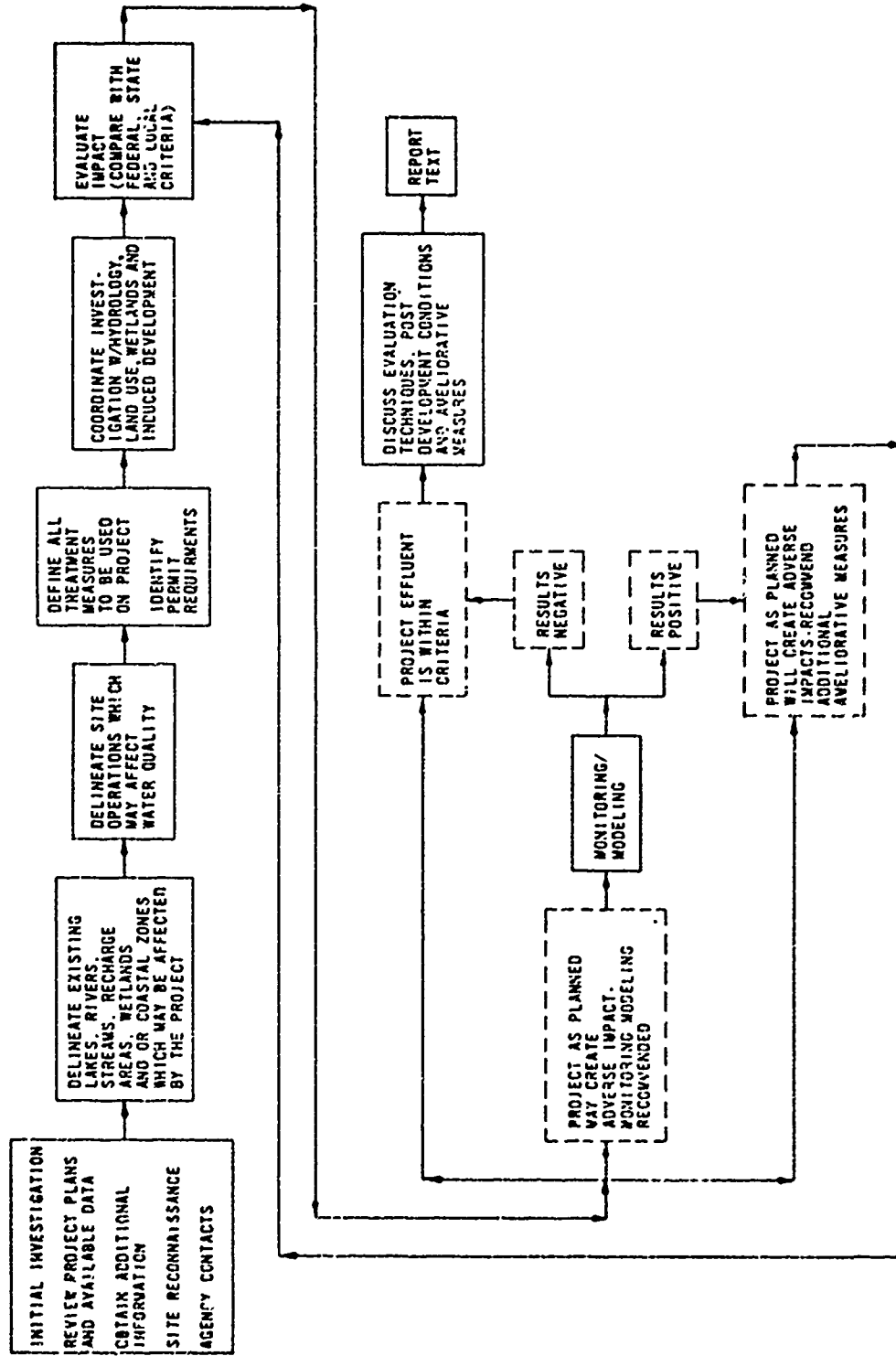


FIGURE 4

(2) *Review of Immediately Available Data*

The preliminary engineering studies, accompanied by the master plan, should provide much of the needed information in evaluating the potential impacts on area water quality. The following list of information is representative of what is normally contained in these documents:

- Existing streams, wetlands, and/or water bodies in the project area.
- Water Basin plans.
- Proposed stream relocations.
- Site drainage plans, both existing and proposed.
- Location of and design criteria concerning proposed permanent or temporary holding ponds.
- Sewage disposal plans.
- Water supply plans.
- Wastewater treatment facilities and disposal plans.
- Earthwork information.
- Soils investigations.

Sponsors' files are another immediate source of data.

These files may include:

- Memorandums of meetings with local water resource or regional watershed management agencies.

- Relevant local, regional, or Corps of Engineers (CE) reports.

Topographic maps from the U. S. Geological Survey (USGS) can also provide initial information about stream locations, water body locations, and possible wetland areas which may be impacted by the project or induced development.

b. SITE RECONNAISSANCE

A site visit in conjunction with reconnaissance related to other impact categories will verify the location of all watercourses, water bodies, springs, and wetlands which could be affected by the project. Initial observation will at least reveal any instances of existing gross pollution such as severe erosion and sedimentation problems, evidence of raw sewage, etc.

The need for field monitoring to determine existing water quality and assess project impact will depend on several factors. These are:

- Federal, state or regional requirements.
- Sensitivity of a particular water body.
- Availability of applicable monitoring data.
- The need to evaluate the effectiveness of ameliorative measures, such as erosion controls, during construction or on-site sewage treatment facilities.

Due to the numerous variables and costs involved in establishing and conducting a field monitoring program, the sponsors should consult with appropriate public agencies prior to initiating any field procedures.

c. DATA REQUIREMENTS AND SOURCES

In conjunction with data obtained during the initial stages of investigation relative to hydrology, land use, induced development and wetlands, as well as the assessment of the proposed project plans as it relates to water quality, the preparer of the water quality section should be able to make at least a preliminary estimate of project impact. The amount of additional information required to continue his investigation of project impact on water quality is a function of this preliminary estimate. The following list is not directed at any one type of project; rather, it is a generalized list of data requirements and sources from which the preparer can select that information to supplement previously gathered data, depending upon specific conditions encountered.

- USGS - topographic maps sufficient in coverage to indicate the project site, all alternative locations, and the watershed boundaries of the project and alternative areas; reports concerning aquifer and aquifer recharge areas located in proximity to the site; geologic mapping of area; well records for area, groundwater quality data.
- U. S. Army Corps of Engineers - permit requirements; proposed agency actions which may affect the watershed basin.

- State Water Quality Control Board or Agency - state water quality standards and criteria, regional basin maps and reports, information regarding areas which may be highly sensitive and require special attention, referral resource for regional basin authorities and local agencies.
- Regional, County or Municipal Water Quality Agencies (may fall under responsibility or jurisdiction of Health Department) - information regarding monitoring programs and available data; recent reports on study area conditions, problems and goals; local water quality regulations for streams, reservoirs, recreational waters, wetlands, and recharge areas, which may be more stringent than those established by state agency.
- Federal Water Resources Council - to be contacted if project impacts an interstate river, in which case the specific requirements and/or review must be provided by the area's River Basin Commission.
- Area-wide Waste Treatment Management and/or Planning Officials - where project lies within a designated waste treatment planning area, information can be obtained on sources, controls, and management plans.

d. CORRESPONDENCE REQUIRED

Official correspondence should be requested when approval is granted for on-site sewage treatment facilities, if applicable.

e. DETERMINATION OF EXISTING CONDITIONS

Existing conditions will be determined by review of all data indicated above and/or field monitoring.

All relevant on-site land use and/or master plan programs which might affect receiving waters should be summarized. These include defining all on-site operations which may affect water quality, i.e., runoff, sewage treatment facilities, water supply by groundwater development, sanitary landfill, industrial and cleaning wastes, fuel storage sites, fueling wastes, etc. In addition, regional wastewater management plans should be summarized and their relationship to airport development defined.

Affected surface and groundwater systems should be described. In addition, the classification and criteria established for site receiving waters should be specified.

In the case where a unique or sensitive water body exists nearby, or in the case of an area where it is felt that adequate historical data does not exist, a qualitative analysis should be made to include the following representative data:

Dissolved Oxygen	Dissolved Solids
Total Nitrogen	Iron
Total Phosphorus	Lead
Total Alkalinity	Calcium
pH	BOD
Temperature	COD
Oil-Grease	Total and Fecal Coliforms
	Turbidity

In addition to the basic water quality analysis which can be prepared with these data, the use of input from the hydrology, land use,

wetlands, vegetation and induced impacts sections will assist the preparer in making an accurate prediction of the project's eventual impact on area water bodies.

f. DETERMINATION OF LEVEL OF IMPACT EVALUATION

In the case of water quality, an evaluation of the effectiveness of each of the component parts of the proposed water quality control system must be made before the preparer has a clear understanding of the problems that may result from the project. Levels of impact investigation, as such, for this impact category arise when a part of the proposed water quality control system is determined to be inadequate and alternative measures are needed.

g. IMPACT ANALYSIS

(1) Methodology

The impact analysis for this category is usually accomplished by making a practical evaluation, using sound engineering judgement, to estimate the effectiveness of controls which are proposed for the project. The input required for this analysis would include a description of area water resources, a listing of potential pollution sources, an outline of proposed controls to include their operation and effectiveness, and, finally, area water quality standards and criteria. Potential pollution sources which should be investigated include the following:

- Sedimentation
- Wastes from fueling operations
- Wastes from cleaning operations
- Fuel and oil spills from apron, hanger, and motor vehicle parking areas
- Wastes from chemicals used in snow and ice removal and/or insect and vegetation control
- Metals from maintenance operations
- Detergents
- Solid waste disposal
- Sanitary wastewater from terminal/operations buildings
- Chemicals used for spraying of agricultural land by aircraft
- Saltwater intrusion from excessive ground-water development in coastal areas

These areas should be discussed for both the pollution of surface and subsurface water.

In general, water quality protection measures that are instituted to prevent the discharge of waste products into the area's water system are far more effective than the technical methods available to remove wastes once they have been introduced into the system.

This section has identified the pollution factors associated with airport development actions; the specific pollution sources

which should be investigated on a case by case basis; and the requirements for information and potential sources.

The methodology for evaluation involves an evaluation of the proposed design measures which are to be incorporated into the project to ascertain their net effect. This can only be done by evaluating the results of implementing the various type of measures planned for the facility.

(2) *Identification of Short-term and Long-term Impacts*

Short-term impacts generally relate to construction operations and are limited to such factors as increased stream turbidities due to sedimentation or transient pollution from heavy equipment spilling fuel, greases and oils, with these materials then being transported in site runoff.

Conflicts may occur when the proposed action cannot be accommodated within the regional water basin management plan, or when site operations or induced development degrade receiving watercourse quality or groundwater to the point that it fails to meet state and/or local standards.

The effectiveness of ameliorative measures must be considered in evaluating long-term impacts. Long-term impacts are adverse and conflicts irreconcilable only when ameliorative measures cannot

prevent, eliminate or reduce both point source and non-point source pollution to the point where it would be within criteria. In other words, the project may have the potential to degrade water quality, but proper treatment and controls can combat this hazard and bring the project into conformance with basin management plans and watercourse criteria, thereby mitigating long-term adverse impacts.

Effort should also be made to consider innovative actions related to project construction which might result in beneficial long-term effects on the water quality of the receiving waters.

(3) *Impact Evaluation and Comparison With
Laws, Standards, and Procedures*

Where state or local sediment and pollution control laws are in effect, it will be necessary to document that all required sedimentation and erosion controls will be provided during construction. In addition, it should be noted that necessary permanent controls will be incorporated into the project's design. Reference to requirements for water quality certification is contained later in this section.

The effectiveness of the ameliorative measures in eliminating or at least reducing the impact of water pollution should be documented. It will also be necessary to state whether receiving bodies of water will continue to conform to established standards. It must further be shown that the wastewater management plans established for the project

are in conformance with applicable state, regional (Section 208 of the Water Pollution Control Act Amendments of 1972), and local requirements.

Where required, the project's impact on waterways due to the discharge of dredged or fill material should be addressed in conformance with permit requirements under Section 404 of the FWPCA Amendments.

(4) *Determination of Measures to Minimize Harm*

Normally, an airport project includes the use of many kinds of ameliorative measures for the purpose of protecting both on- and off-site water quality. A discussion of these measures should be included in the EIS. Example of measures which should be discussed include:

- Erosion and sediment controls.
- Treatment by settling and application of petroleum-absorbent materials.
- Grease and oil traps installed at strategic positions within the on-site drainage system.
- Provisions for combating emergency fuel or chemical spills.
- Provisions for solid waste disposal to prevent pollution of surface or groundwater systems.
- Provisions for a sanitary wastewater system to prevent pollution of the surface or groundwater system. (Note: An available municipal system with adequate capacity to serve the project is acceptable evidence that project-

generated water consumption and wastewater requirements will not adversely impact water resources or quality.

- Field monitoring during construction.
- Field monitoring to evaluate the effectiveness of particular safeguards which may be questionable.
- Special measures instituted because of unique or sensitive water bodies.
- The use of the internal drainage system not only to collect storm water, but also to optimize treatment of storm water prior to discharge off-site.

Alternate solutions may include evaluation of different sites and/or design configurations. Water quality impact for all alternatives, as well as the No Project Alternative, must be evaluated and discussed in the Alternative section of the initial assessment report, when appropriate.

h. GRAPHIC PRESENTATIONS

Where historical data and/or monitoring information is available or performed as part of the study effort, an exhibit should be provided showing the location of the sampling stations in relation to the project site.

A table should be provided showing state and/or local water quality criteria.

i. SUPPORTING DOCUMENTATION TO BE APPENDED

Monitoring data from multiple sampling stations, which would be helpful to professional reviewers, should be appended.

Section 16(e)(1) of the Airport Act requires that applications for projects involving airport location, runway location, or a major runway extension shall not be approved unless the Governor of the state in which the project is located certifies that there is "reasonable assurance" that the project will be located, designed, constructed, and operated in compliance with applicable water quality standards. To establish a "reasonable assurance," applicable standards and implementation requirements must have been established and an official designated who has authority to enforce compliance with the standards. While the water quality certification should be included in the final environmental impact statement whenever possible, its inclusion is not a prerequisite to approval of the statement if the statement includes documentation from the Governor or appropriate state official indicating a reasonable expectation that the certification will be given. The state's certification or the EPA's approval must be received, however, before the project can be approved.

Correspondence to be provided in the EIS appendix includes the following:

- Confirmation from State Water Board or other responsible agency that the project conforms to regional/basin water quality management plans and objectives.
- Confirmation from municipal authority of available water, waste water and solid waste disposal service.
- If any Corps of Engineers or state conservation or reservoir area is affected, a letter from responsible authority concurring that project plans are compatible.

j. CONSISTENCY WITH OTHER IMPACT EVALUATIONS

Impacts listed in the Water Quality section will particularly depend on evaluations prepared in the following disciplines:

- Hydrology: runoff quantities and proposed drainage system; any watercourse alteration; retention ponds.
- Ecology: identification of sensitive aquatic communities in study area; fill and/or excavation requirements.
- Wetlands: identification of wetland areas and sensitivity.
- Land Use: identification of any existing or proposed recreational (body contact) waters or reservoirs.
- Public Utilities: availability of municipal water, sewer, and solid waste disposal services; on-site systems for water and sewage treatment.

k. LIST OF REFERENCES

Biological Methods For The Assessment of Water Quality, American Society for Testing Materials. John Cairns, Jr. and K. L. Dickson, Editors. 1973.

Methods For Chemical Analysis of Water and Wastes, National Environmental Research Center, Cincinnati, Ohio. U. S. Environmental Protection Agency, Washington, D. C.

Water Quality Criteria, National Technical Advisory Committee to the Secretary of the Interior, Washington, D. C., GPO, April, 1968.

WATER RESOURCES – HYDROLOGY

5. Water Resources - Hydrology

a. GENERAL CONSIDERATIONS

This section is designed to supplement the previous section on Water Quality by evaluating, as a separate discipline, the impacts resulting from alteration of both existing site drainage and downstream drainage patterns. Evaluation of hydrology as presented in this section concentrates on quantity of flow, since runoff quality has previously been discussed. A flow chart is shown in Figure 5 which outlines the assessment procedure.

(1) *Determination of Scope of Project as it Relates to Hydrology*

Area hydrology is influenced by project location, existing drainage patterns, existing ground cover and contours, and the watershed areas associated with the project. The scope of the project relative to this discipline may involve construction of stream diversions, channelization of an existing stream, construction of retention basins, or construction and/or modification of a site drainage system.

(2) *Review of Immediately Available Data*

Preliminary engineering studies should indicate any plans for stream relocations, proposed culverts and/or storm water management plans to be incorporated into the project. Preliminary site plans will reveal the extent of natural cover to be removed, as well as excavation and fill requirements.

IMPACT ANALYSIS PROCEDURE
HYDROLOGY

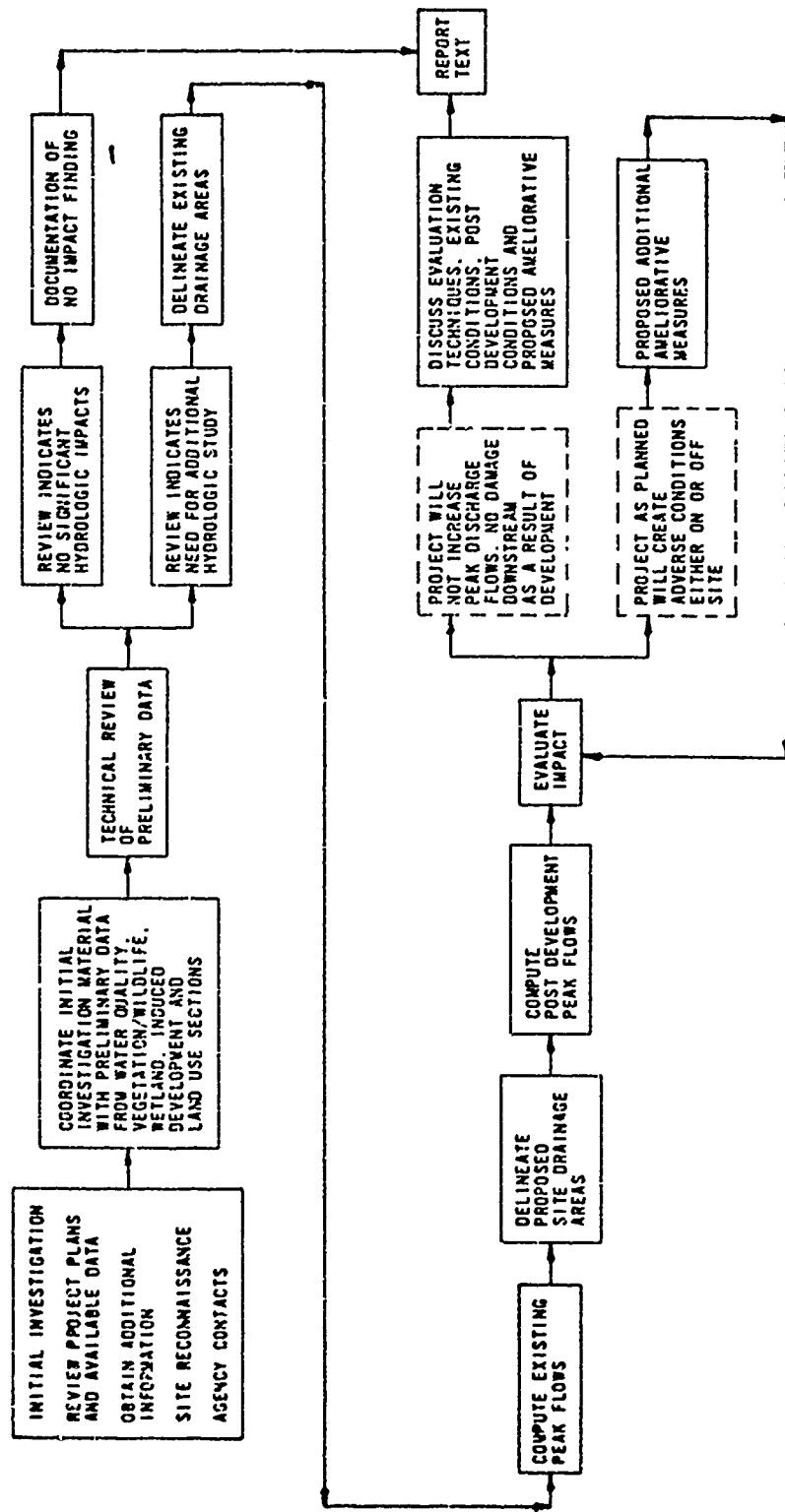


FIGURE 5

The sponsor may be aware of any potential conflicts with regional flood control or watershed management plans or projects. He may also be able to provide essential topographic or drainage maps or quad sheets. Where existing airports are involved, the sponsor will have plans of the on-site drainage system, indicating pipe sizes, inlet locations, etc.

b. SITE RECONNAISSANCE

Field review should be made to inventory the existing drainage structures or patterns and identify any visible problem areas on-site or downstream.

c. DATA REQUIREMENTS AND SOURCES

The degree of evaluation required for this particular category is a function of many variables. These include the scope or scale of the project, the existing topographic conditions, the climatological characteristics of the project area, impact from other evaluations (such as water quality, land use, wetlands, vegetation, and induced development), and, most importantly, sound technical judgement on the part of the preparer. Consideration of all of the above-mentioned variables will allow experienced technical personnel to make a determination as to the scope of the evaluation and data collection.

As shown on the flow chart concerning the impact analysis procedure for hydrology studies, the preparer may or may not determine that extensive hydrologic evaluation is necessary for a particular project.

As in other sections of this guidance document, the following list is not directed at any one type of project and does not imply that all of the following information is required for the analysis; rather, it is presented to be used based on the preparer's judgement and specific requirements.

- U. S. D. A. Soil Conservation Service (SCS): Information on watershed projects; aerial photos of area; floodplain data; soils maps; watershed characteristics.
- U. S. Geological Survey (USGS): Topographic maps and quad sheets of the project area.
- U. S. Weather Bureau: Climatological data on study area.
- Corps of Engineers District Office: Information on any existing or planned flood control/watershed management projects; any studies on flood and tidal conditions prepared for project area.
- State Department of Natural Resources/Conservation: State and regional watershed management plans; stream gaging records; design criteria; applicable laws and regulations.
- State Highway Department/Agency: This office may have more specific stream gaging or drainage system data as a result of recent or proposed projects in study area.

- Local Department of Public Works: County or municipal runoff ordinances; design criteria; stream gaging data in project area.
- Local Planning and Zoning Agency: Existing land use maps and proposed land use plans; zoning maps; regional flood control or watershed management plans or projects.

d. CORRESPONDENCE REQUIRED

Confirmation is desirable from state or local authorities that the project is consistent with watershed management plans and objectives. Should the project be located in proximity to a Corps of Engineers' dam or flood control project, a letter stating that the project has been coordinated with proposed plans from the Corps is advisable.

e. DETERMINATION OF EXISTING CONDITIONS

Drainage areas within the project site should be delineated and related to larger sub-basins and the overall watershed system.

Peak flows for specific design years should be computed for the existing project area.

Any existing drainage problems or flood hazards related to or resulting from the project or surrounding land use should be identified.

f. DETERMINATION OF LEVEL OF IMPACT EVALUATION

As in the evaluation for water quality, the amount of work required during the evaluation of the hydrology discipline will depend

heavily on the outcome of the initial study stages and coordination with other impact categories.

Should the preliminary analysis indicate that development of the project will not require extensive hydrological study, an explanation should be presented in the text, and analysis for this category will be complete.

However, should the analysis indicate that the project may create possible flooding and erosion and/or affect a sensitive ecosystem area, in-depth hydrologic studies along with additional analysis of ameliorative measures should be done.

g. IMPACT ANALYSIS

(1) Methodology

Depending upon the scope of the project as it relates to changes in hydrological characteristics, the preparer may or may not determine that extensive studies are required. The factors involved in making this decision have been discussed and will allow an experienced engineer to make such a determination.

Should it be determined that further study is required, the rational method of locally approved technique should be used to determine the increase in peak flows as a result of development. The impact on downstream watercourses resulting from project development

must also be investigated to determine if the project may create any adverse conditions downstream. These impacts may take the form of increased volumes and velocities, which in turn create problems with erosion, sedimentation and possible impact on sensitive ecosystems downstream. A determination must be made during the analysis stage, which will relate to the threshold levels, as to whether additional stormwater management controls will be required.

Many local jurisdictions have adopted legislation in the area of stormwater management which require assurances that a peak rate of discharge after development will not exceed the rate prior to development. In this case, the use of small ponds to capture and retain stormwater is a major consideration.

Other stormwater management concepts involve restricted surface drains on parking lots, use of porous pavements, and flood zoning to limit development in flood-prone areas.

Input to this analysis should include such factors as:

- The size of the drainage areas.
- Project design criteria.
- Local considerations and requirements.
- Historical rainfall - intensity data.

- Amount of change from existing conditions as far as site cover is concerned.
- Topography of the area and any changes thereto.

(2) *Identification of Short-term and Long-term Impacts*

Short-term increases in runoff quantities may occur prior to the installation of proposed stormwater controls during construction.

Long-term impacts would generally be positive in nature, assuming stormwater management controls are properly designed. Management ponds could decrease off-site peak flows and reduce downstream erosion.

Conflicts would occur if stormwater management was not considered in the design. Flooding, erosion and adverse community reaction could create definite problems for the sponsor during the local review process.

Problems also could occur if the proposed site was located in an area where its development would conflict with proposed watershed management plans.

(3) *Impact Evaluation and Comparison With Laws, Standards, and Procedures*

Project design must be shown to conform to FAA, state, and/or local design criteria.

(4) Determination of Measures to Minimize Harm

In addition to standard drainage measures, stormwater management controls may be required on the project. Coordination with Federal, state and local water resource authorities may assist in development of alternative actions.

h. GRAPHIC PRESENTATIONS

In the case where extensive evaluation was conducted, an exhibit delineating existing site drainage areas and flow patterns is desirable. In addition, a table should be provided indicating both existing and past-development peak flows for various frequency storms for each drainage area affected by the proposed project and alternatives.

i. SUPPORTING DOCUMENTATION TO BE APPENDED

Any official correspondence confirming the projects conformance with state and local laws, policies, and/or ordinances should be added to the appendix.

j. CONSISTENCY WITH OTHER IMPACT EVALUATIONS

The Hydrology section provides some of the basic information used in the Water Quality impact analysis.

This section will also provide input for evaluation of impact in the Vegetation/Wildlife section concerning aquatic communities, impacts on area wetlands, land use, and induced development.

k. LIST OF REFERENCES

FAA Advisory Circular No. 150/5320-5B, *Airport Drainage*, July, 1970, DOT/FAA.

U. S. Department of Transportation FHWA-BPR

Hydraulic Engineering Circulars

- No. 5-Hydraulic Charts for Selection of Highway Culverts 1965*
- No. 10-Capacity Charts for the Hydraulic Design of Highway Culverts 1965*
- No. 12-Drainage of Highway Pavements 1969*
- No. 13-Hydraulic Design of Improved Inlet for Culverts 1972*

Hydraulic Design Series Publications

- No. 1-Hydraulics of Bridge Waterways 1960*
- No. 2-Peak Rates of Runoff From Small Watersheds 1961*
- No. 3-Design of Open Channel Plan 1961*
- No. 4-Design of Roadside Drainage Channels 1965*

U. S. Department of the Interior Geological Survey

*Water Resources Data for Individual States
Reports of Investigations*

U. S. Department of Commerce Technical Papers

- No. 25-Rainfall Intensity-Duration-Frequency Curves 1955*
- No. 40-Rainfall Frequency Atlas of the U. S. 1961*
- Climatic Atlas of the U. S. 1974*

U. S. Department of Agricultural Soil Conservation Service

Technical Release No. 55-Urban Hydrology for Small Watersheds

FLOOD HAZARD EVALUATION

6. Flood Hazard Evaluation

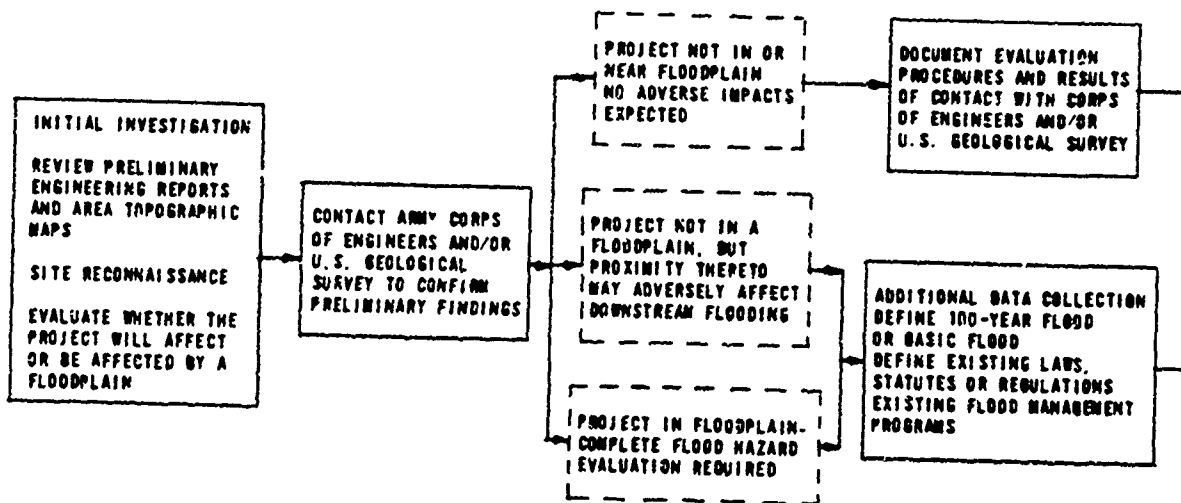
a. GENERAL CONSIDERATIONS

The requirement to evaluate floodplain hazards was made mandatory when, on August 10, 1966, the President signed into law Executive Order 11296. The Order requires that all requests for appropriations for Federal construction of new buildings, structures, roads or other facilities transmitted to the Office of Management and Budget be accompanied by a statement on the findings of the evaluation and consideration of potential flood hazards. This Order is contained in the appendix of this document.

(1) *Determination of Scope of Project as it Relates to Flood Hazard Evaluation*

FAA Order 5050.2B generally outlines the requirements for input into an environmental assessment report when the project under consideration encroaches on a floodplain. More specifically, the policy of the FAA in the evaluation of flood hazards is contained in FAA Order 1000.20, which is also included in the appendix of this document. This policy requires an evaluation of planned facilities, including ameliorative measures to be included in the project design, the encouragement of good land use planning and the protection of existing FAA facilities. Documentation of the evaluation conducted for the environmental study should include an assurance that full consideration of flood hazards has been made. An impact analysis procedure is presented in Figure 6.

IMPACT EVALUATION PROCEDURE FLOODPLAINS



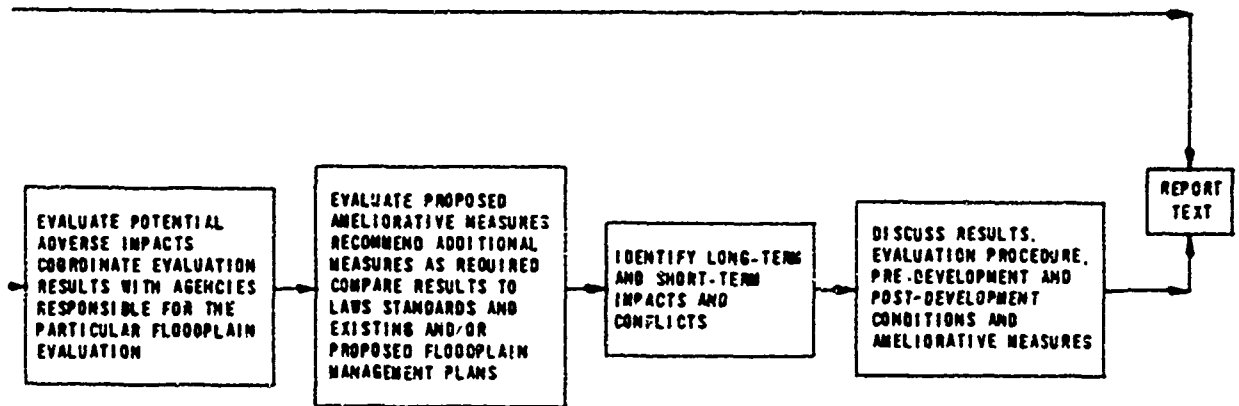


FIGURE 6

(2) Review of Immediately Available Data

As in the previous Hydrology section, the preliminary engineering studies accompanied by the master plan should provide a starting point for the evaluation of this discipline.

Review of topographic maps of the proposed site(s) (including alternative locations) should provide technical personnel with the initial input to determine whether or not a particular site will affect or be affected by an existing floodplain.

Should there be a potential problem involving floodplain conflicts, initial contact with the U. S. Geological Survey and the Corps of Engineers will provide additional information to either confirm or deny preliminary findings. In the case of lands lying in the basin of the Tennessee River, requests for information should be directed to the Tennessee Valley Authority.

b. SITE RECONNAISSANCE

In conjunction with other site investigation, the preparer will be able to verify existing land uses around the site and, at the same time, will be able to inspect all control structures along the floodway to verify existing conditions.

There is no need for the preparer to do any field monitoring for this discipline. However, should there be a potential for flood

damage to or as a result of the facility, the preparer should be responsible for gathering all available historical data concerning flood heights as input for the evaluation.

c. DATA REQUIREMENTS AND SOURCES

The following list indicates public agencies to be contacted and information available from each:

- Corps of Engineers: information on watershed management projects, floodplain protective installations, reports, design criteria, historical flood data, 100-, 50-, 25-year flood elevations, applicable watershed regulations.
- U. S. Geological Survey (USGS): topographic maps, historical flood data, watershed boundaries.
- U. S. Soil Conservation Service (SCS): information on watershed projects, aerial photos of area, some floodplain information (elevations, etc.).
- U. S. Weather Bureau: historical climatological data for the study area.
- State Department of Water Resources/Conservation/Geological Survey: state and regional watershed policies/plans, historic data, design criteria, applicable laws and regulations.
- Local Planning and Zoning Agency: existing and proposed land use maps, floodplain management regulation.

d. CORRESPONDENCE REQUIRED

Official correspondence is desirable from both Federal and state authorities, concurring with the conclusions of the flood hazard evaluation conducted by the preparer.

e. DETERMINATION OF EXISTING CONDITIONS

Determine first whether or not the project is located in a floodplain and whether or not there is a potential for damage to the project as a result of flooding.

If so, the 100-, 50-, and 25-year flood elevations should be defined to indicate any potential flood hazard problems. Also, existing land uses in the floodplain area should be defined. Existing flood protection measures should also be noted.

f. DETERMINATION OF LEVEL OF IMPACT EVALUATION

There are three levels of impact associated with the category:

- The project is not located within or near a floodplain, and, therefore, no adverse impacts are expected.
- The project itself is not located in a defined floodplain area, but its proximity to such an area and its development and alteration of the hydrologic characteristics may have an adverse impact on downstream flooding.

- The project is located in a floodplain, and, therefore, a complete flood hazard evaluation will be required.

g. IMPACT ANALYSIS

(1) Methodology

If no floodplain impacts are expected, then a statement to this effect is sufficient.

Assuming that there is a potential of flood damage either to the site or as a result of development of the site, the preparer is directed to the Flood Hazard Evaluation Guidelines established by the U. S. Water Resources Council. The steps involved in the flood hazard evaluation guidelines are summarized below:

- Determine first if there is a need to evaluate the flood hazard.
- Choose method of evaluation, either in-house or by outside agency.
- Define the 100-year flood, the flood hazard zone, the floodway, floods greater or less than the basic flood, as appropriate.
- Define existing laws, statutes or regulations of Federal, state and local governments which must be adhered to.
- Evaluate the beneficial and adverse social, economic and environmental effects of developing in a floodplain.

- Select the floods to be used in a flood hazard evaluation as minimum information.
- Define the lowest point of entry of a structure.
- Gather supplemental emergency plan data.
- Consider the effects of floodproofing on the reduction of flood hazard.
- Determine the effects of the proposed airport construction or control measures on the elevations of the evaluation floods.
- Decide whether the proposed use is suitable at the proposed location, and, if so, under what conditions.

A copy of the Water Resources Council guidelines have been included in the appendix of this document.

(2) *Identification of Short-term and Long-term Impacts*

The long-term loss associated with development of a project in a floodplain will be the possible change in hydrologic characteristics of the area to an extent that it may increase the flood stage as a result of a decrease of available flood storage volume.

Considering the long-term effects, development of the project may negate some other future development within the floodplain because the project may utilize available additional capacity of storage and downstream floodplain protection.

The short-term environmental gain would be the coordinated development of an airport in a floodplain land use plan.

(3) *Impact Evaluation and Comparison With
Laws, Standards and Procedures*

The evaluation of the floodplain hazard associated with development of the project should show, to the extent possible, that the use of such land is neither uneconomical or hazardous.

In addition, the project must be shown to be in conformance with all floodplain management programs established by Federal, state or local authorities.

(4) *Determination of Measures to Minimize Harm*

Measures to reduce the impact of development within the floodplain should be coordinated with all regulatory authorities.

No measures should be planned until total coordination has been achieved and the impact of the measures has been completely evaluated.

Coordination with floodplain management authorities may assist in development of alternative solutions.

It should be noted that part of the U. S. Water Resources Council guideline directs the preparer and reviewer to "decide on the

conditions under which an evaluation must be made to determine the impacts of including or excluding the use of the site in a floodplain. Such evaluation must demonstrate clearly that the use of the site is to the advantage of society, as well as to the advantage of the user of such site."

h. GRAPHIC PRESENTATIONS

The following exhibits and tables should be included in the text when a floodplain situation is encountered:

- A topographic or aerial photo delineating the floodplain, high-water elevation, and drainage area.
- Existing and future land use within the defined floodplain.
- Table showing historical flood data, ratings, elevations, etc., for the project area.

i. SUPPORTING DOCUMENTATION TO BE APPENDED

Any Federal, state or local correspondence confirming the projects conformance with laws, policies, or management plans of the above agencies should be included in the assessment appendix.

j. CONSISTENCY WITH OTHER IMPACT EVALUATIONS

The Hydrology section provides input into the impact analysis for floodplains and, therefore, must be consistent.

k. LIST OF REFERENCES

FAA Order 1000.20, *Flood Plain Management*, February 1, 1968.

Sets forth FAA policy in evaluation of flood hazards.

U. S. Water Resources Council - *Flood Hazard Evaluation* (guidelines for implementation of Executive Order 11296).

U. S. Army Corps of Engineers - *Flood Plain Information* (reports and maps for various rivers and streams).

U. S. Department of the Interior, U. S. Geological Survey - *Hydrologic Investigations* (for various rivers and streams).

U. S. Department of the Interior, U. S. Geological Survey - *Water Resources Data* (for various states).

U. S. Department of Housing and Urban Development, Federal Insurance Administration, *FIA Flood Hazard Boundary maps*.

WETLANDS AND COASTAL ZONES

7. Wetlands and Coastal Zones

This section focuses on two particular land use categories which are receiving increased attention in the form of Federal and state legislation and programs. Wetland and coastal zone (CZ) considerations are closely related to those discussed in the Vegetation/Wildlife, Water Resources, and Land Use sections of this document. Both types of areas would be initially identified in the evaluation of existing land uses. Detailed assessment of impacts of these areas would be tied directly to discussions on land use, vegetation and wildlife, water quality, hydrology, noise, and induced impacts.

In Order 5660.1, the Department of Transportation has stated its policy regarding wetlands: "...to assure the protection, preservation, and enhancement of the nation's wetlands to the fullest extent practicable during the planning, construction, and operation of transportation facilities and projects." DOT officials are directed to assure that "...programs and projects avoid, to the fullest extent practicable, drainage, filling, or interference with wetlands or the water sources supplying them." Guidance in FAA Order 5050.2B refers to a description of affected wetland areas, the assessment of impacts, a statement of measures to minimize harm, evidence of consultation with appropriate agencies, and, where applicable, information necessary to support a DOT Section 4(f) determination.

Wetlands are defined as lowlands covered with shallow and sometimes temporary or intermittent waters. They include, but are not limited to, swamps, marshes, bogs, sloughs, potholes, wet meadows, river overflows, and tidal overflows, as well as estuarine areas and shallow lakes and ponds with emergent vegetation. Areas covered with water for such a short time that there is no effect on moist-soil vegetation are not included in the definition, nor are the permanent waters of streams, reservoirs, and deep lakes. The wetlands ecosystem includes those areas which affect or are affected by the wetland area itself; e.g., adjacent uplands or regions upstream and downstream. An activity may affect the wetlands indirectly by impacting regions upstream or downstream from the wetland or by disturbing the water table of the area in which the wetland lies.

Wetlands are valuable ecological systems. They serve to accumulate, convert, store and supply basic nutrients. Also they provide essential habitat for many kinds of birds, animals and fishes (both fin and shell). In addition, they serve to regulate the flow of runoff waters and to cleans them of contaminants. Finally, wetlands provide a buffer against storm waters and help reduce flooding.

In response to expressed concern over the use and preservation of coastal resources, the Coastal Zone Management Act of 1972 was enacted to encourage the coastal states (including the Great Lakes states) to develop comprehensive coastal resources management programs which provide for use

and effective management of the nation's valuable coastal areas. The Act stipulates that each state management program include an identification of the boundaries subject to administration of the program. In determining the coastal zone, the Act requires that states consider that:

"the zone should extend inland only so far as necessary to control shorelands the uses of which have a direct and significant impact on coastal waters."

Some states have tentatively proposed to designate entire coastal counties as part of the defined coastal zone.

a. *INITIAL ASSESSMENT PROCEDURES*

(1) *Determination of Scope of Project as it Relates to Wetlands and Coastal Zones*

Airport development can affect wetland areas due to the actual placement of a project component within designated wetland limits or due to off-site impacts such as runoff or noise and overflight.

The effects on coastal zone resources are similar but are generally broader in scope. Both the direct physical effects and the land use considerations which may exist in the management of a larger coastal zone are to be evaluated.

Most wetlands, even if not specifically designated as such by the individual states, have been considered to be included in the term "navigable waters" for the purposes of the Federal Water Pollution

Control Act, as amended. The Corps of Engineers (COE), which is required by Section 404 of the Act to issue permits for all dredge and fill operations in the navigable waters, has issued interim final implementing regulations defining "navigable waters" to include "all coastal wetlands, mud flats, swamps and similar areas that are contiguous or adjacent to other navigable waters" (40 Federal Register 3124), and "freshwater wetlands, including marshes, shallows, swamps and similar areas that are contiguous or adjacent to other navigable waters and that support freshwater vegetation" (40 Federal Register 3124). EPA has incorporated this definition in the interim final version of the guidelines required of it by Section 404 of the Act (40 Federal Register 41293). Since many airport projects involve dredging and filling operations during construction, compliance with COE permit conditions based on the EPA guidelines is necessary for project approval.

In addition to dredging and filling restrictions, the Act requires a Federal or state permit under the National Pollutant Discharge Elimination System (NPDES) for discharging certain pollutants into navigable waters (Section 402). Certain airport practices involving the channeling of runoff into the surrounding environment may be considered to be discharges subject to the NPDES permitting system when the surrounding environment is a wetland area.

Initially, the physical limits of the airport must be established and its location verified with respect to wetland limits and the proximity of a designated or potential coastal zone. Figure 7 indicates the steps involved in the analysis procedure.

(2) Review of Immediately Available Data

Project layout plans will identify proposed airport limits. County maps, highway maps, photogrammetric maps, quad sheets, or aerial photos evaluated in the land use analysis will assist in locating adjacent wetlands and coastal resources.

b. SITE RECONNAISSANCE

A site visit and inspection should be made in conjunction with reconnaissance discussed in the land use section of this document. These efforts will serve to define the project's physical relationship to the land in question. If project is located within a designation coastal zone, the reconnaissance should be expanded throughout the project vicinity to identify major resources or other components of the management plan.

*c. DATA REQUIREMENTS AND SOURCES
(IN ADDITION TO INITIAL LAND USE DATA)*

- State Department of Natural Resources - mapping of designated wetland and conservation areas and information regarding supported wildlife.
- U. S. Army Corps of Engineers - permit requirements.

IMPACT ANALYSIS PROCEDURE
WETLANDS/COASTAL ZONES (CZ)

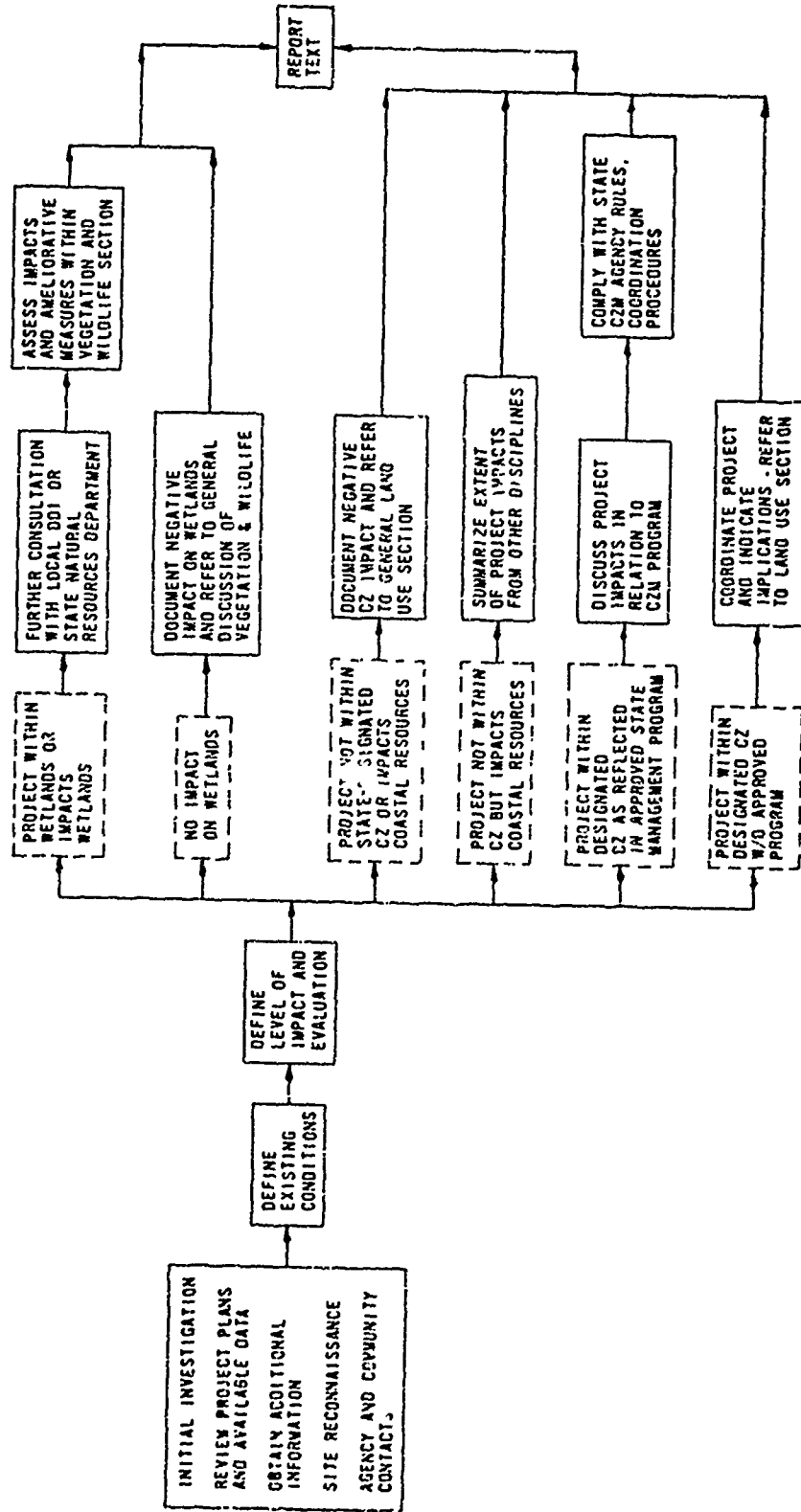


FIGURE 7

- U. S. Department of Interior, Fish and Wildlife Service and the U. S. EPA - permit requirements.
- Office of Coastal Zone Management (CZM) - NOAA (within Department of Commerce) - general CZM guidelines.
- Designated state coastal zone management agency or authority, or other state agencies referred to by state CZ authority - rules and procedures for State CZM Plan compliance; information on coastal zone resources.
- University, schools, or private organizations designated by state CZ authority as its research arm - studies in coastal zone or wetland natural resources.

d. CORRESPONDENCE REQUIRED

If the project affects any wetland areas, correspondence from local natural resource officials should be obtained denoting value of wetland areas, referencing coordination efforts, and indicating any problem with project plans and ameliorative measures.

If project activity is planned in navigable waters, correspondence relative to Department of the Army permits under Section 10 of the River and Harbor Act of March 3, 1899, and under Section 404 of the FWPCA should be obtained.

If the proposed project is within the state-delineated coastal zone, verification should be obtained from the designated CZM agency. The project sponsor should then determine the status of the state CZM

program and obtain information regarding permissible uses and location of areas of state concern. In addition, concurrence with sponsor procedures for compliance with the state CZM plan regarding permits and/or the review process should also be sought. A listing of designated state contacts for coastal zone management is contained in the appendix of this document.

e. DETERMINATION OF EXISTING CONDITIONS

Through evaluation of information obtained in the initial assessment of land uses, it is possible to present a description of existing conditions in the wetland areas and of the coastal zone.

The description of the wetlands should include information on location, type, size, associated wildlife, hydrologic aspects, and value to the community.

The description of the designated coastal zone should include discussion of its location and extent, major natural and man-made features, and a summary of the state's coastal zone management program and procedures for compliance.

f. DETERMINATION OF LEVEL OF IMPACT EVALUATION

In the case of wetlands, the project will either impact them (directly or off-site) or not impact them. If wetlands are impacted, consultation with natural resource agencies is required to specifically discuss these areas. The impact analysis required would be similar to the more detailed level of investigation indicated in the Vegetation/Wildlife section.

The level of investigation relating to coastal zone impacts depends on the project's proximity to a designated or potential coastal zone and the status of the state's coastal zone management program.

If it is clear that a project is not in a coastal zone nor impacts any coastal resources, a sentence in the report to that effect is sufficient.

If the project is not physically within a designated zone but is located such that some of its impacts may involve coastal resources, then a discussion of those impacts is necessary.

If the project is located within a designated coastal zone as reflected in an approved state management program, a discussion must be presented of the relation of project impacts to the program. Compliance with the CZM agency's rules and coordination procedures must be made.

If the project appears to be within a designated coastal zone even though there is no approved CZ management program, implications of the project and any potential issues should still be addressed and coordinated.

g. IMPACT ANALYSIS

(1) Methodology

The impact evaluation procedure for wetlands would be similar to methods outlined in the Vegetation/Wildlife section. The

discussion of wetlands could actually be presented in that section of the statement or within the discussion of water resources.

If wetlands are impacted, information should be provided regarding such things as the removal of habitat, dislocation of wildlife, effects on wildlife breeding and feeding, potential for water quality degradation, hydrologic impacts, and any potential problems with noise, overflight, or construction activities.

Coastal zone impact analysis consists of utilizing the results of several of the individual impact investigations, i.e., land use, water resources, noise, secondary impacts, etc. In addition, all rules and procedures developed as part of the state CZM program should be followed. This would also include review procedures by the state CZM agency. If state CZM plans are in the development state but have not been adopted, they should still be considered in the assessment.

(2) *Identification of Short-term and Long-term Impacts*

Long-term impacts to wetland and coastal zones could include:

- Ecological disruption of the area estuaries, wetlands, marshes.
- Alteration of nesting, feeding and breeding areas of animal species.

- Siltation and sedimentation impacts.
- Increased air and noise pollution levels.
- Development of secondary (induced) activities and/or services.
- Surface and subsurface hydrologic impacts.

Additional long-term impacts would be listed under the appropriate categories. This also is true for short-term impacts which involve construction activities and local disruption.

(3) *Impact Evaluation and Comparison With Laws, Regulations and Procedures*

An evaluation of each environmental category discusses compliance with certain national, state and local laws, procedures and criteria. In addition, coastal zone impact evaluation must comply with the procedures for evaluation and review enacted by the state CZM authority. Others would involve compliance with the state wetland permit system, the Corps of Engineers' dredge and fill permit requirements, and compliance with appropriate statutes, procedures and analysis regarding public recreational sites.

(4) *Determination of Measures to Minimize Harm*

Recommended measures to minimize harm to wetlands/coastal zones include:

- Location of airports above coastal flood-plains.

- Buffer zones around airports in coastal areas.
- Runoff from airport surfaces to be collected and held before discharge.
- Development of compatible land use plans.
- Modification of operational characteristics to reduce noise/overflight.

The assessment should include an indication as to how the project conforms with the policy of preservation and protection of wetlands.

h. GRAPHIC PRESENTATIONS

An exhibit should be prepared showing the project's limits and its associated impacts relative to state coastal zone or designated wetlands limits.

i. SUPPORTING DOCUMENTATION TO BE APPENDED WHERE APPLICABLE

The following items should be referenced in the assessment appendix:

- Determination by Coastal Zone (CZ) Management authority if project is located within a state's defined coastal zone.
- Documentation of consultation with DOI/FWS, Corps of Engineers, and state natural resource agency.
- Verification or correspondence concerning either absence of potential impact or potential impacts and mitigating measures.
- Evidence of coordination of project with state CZM authority.

j. *CONSISTENCY WITH OTHER IMPACT EVALUATIONS*

Impact evaluation of wetlands and coastal zones are based on the results of the other categories discussed in this guidebook and, as such, should be consistent with all analyses and findings.

k. *LIST OF REFERENCES*

Federal Register of November 29, 1973 - "Program Development Grants - Nature of Final Rulemaking" - issued by Office of Coastal Zone Management (OCZM).

Definitions of procedures by which states can qualify to receive development grants under Section 305 of the Coastal Zone Management Act of 1972 (CZMA).

Federal Register of January 9, 1975 - "Coastal Zone Management Program Administrative Grants, Notice of Final Rulemaking (OCZM)."

Definition of procedures by which states can qualify to receive administrative grants under Section 306 of the CZMA of 1972.

Federal Register of June 4, 1974 - "Estuarine Sanctuary Guidelines," National Oceanic and Atmospheric Administration (NOAA), Department of Commerce.

Establishes the policy and procedures for the nomination, selection and management of estuarine sanctuaries pursuant to Section 312 of the CZMA of 1972.

Designated State Contacts for Coastal Zone Management.

List of appropriate names and addresses of agencies charged with management of states' coastal zone management programs. Available in guidebook appendix.

Coastal Zone Management, The Process of Program Development, Coastal Zone Management Institute, November, 1974.

Prepared in cooperation with OCZM to serve as a technical guide in the development and implementation of coastal zone management programs. Available through the Coastal Zone Management Institute, P. O. Box 221, Sandwich, Massachusetts. 02563.

Wetlands of the United States, Circular 39, U. S. Department of Interior, Fish and Wildlife Service, 1971 (U.S. Government Printing Office).

Guidelines on Review of Fish and Wildlife Aspects of Proposals in or Affecting Navigable Waters, U. S. Department of Interior, Fish and Wildlife Service, *Federal Register*, December 1, 1975.

AIR QUALITY

8. Air Quality

a. INITIAL ASSESSMENT PROCEDURES

(1) Determination of Scope of Project as it Relates to Air Quality

Emissions from aircraft and aircraft-related ground activities generally extend several miles from the airport. The air quality impact is thus a regional problem as well as a local problem. For this reason, the existing regional air quality must be considered along with that of the immediate airport vicinity.

There are six major pollution sources associated with the operational phase of any airport:

- Aircraft engine exhausts (producing CO, HC, NO_x and particulates).
- Gasoline-fueled ground service equipment (emitting CO, NO_x, HC, SO₂ and particulates).
- Access traffic entering and leaving the airport (producing CO, NO_x, HC, SO₂ and particulates).
- Aircraft engine exhaust emissions during maintenance (giving off CO, HC, NO_x and particulates).
- Heating and air-conditioning plants (emitting CO, HC, NO_x, SO₂, particulates and aldehydes).
- Fuel handling and storage systems (producing emissions of HC).

This section of the guidance book will deal with the assessment of impact of the airport generated pollutants and a discussion of the various methodologies that can be used to determine their consistency with applicable state air quality plans. A knowledge of the proposed and promulgated emission standards and regulations is necessary for the assessment. Appropriate regulations will be referenced at the conclusion of this section. The impact analysis procedure for air quality is presented in Figure 8.

(2) Review of Immediately Available Data

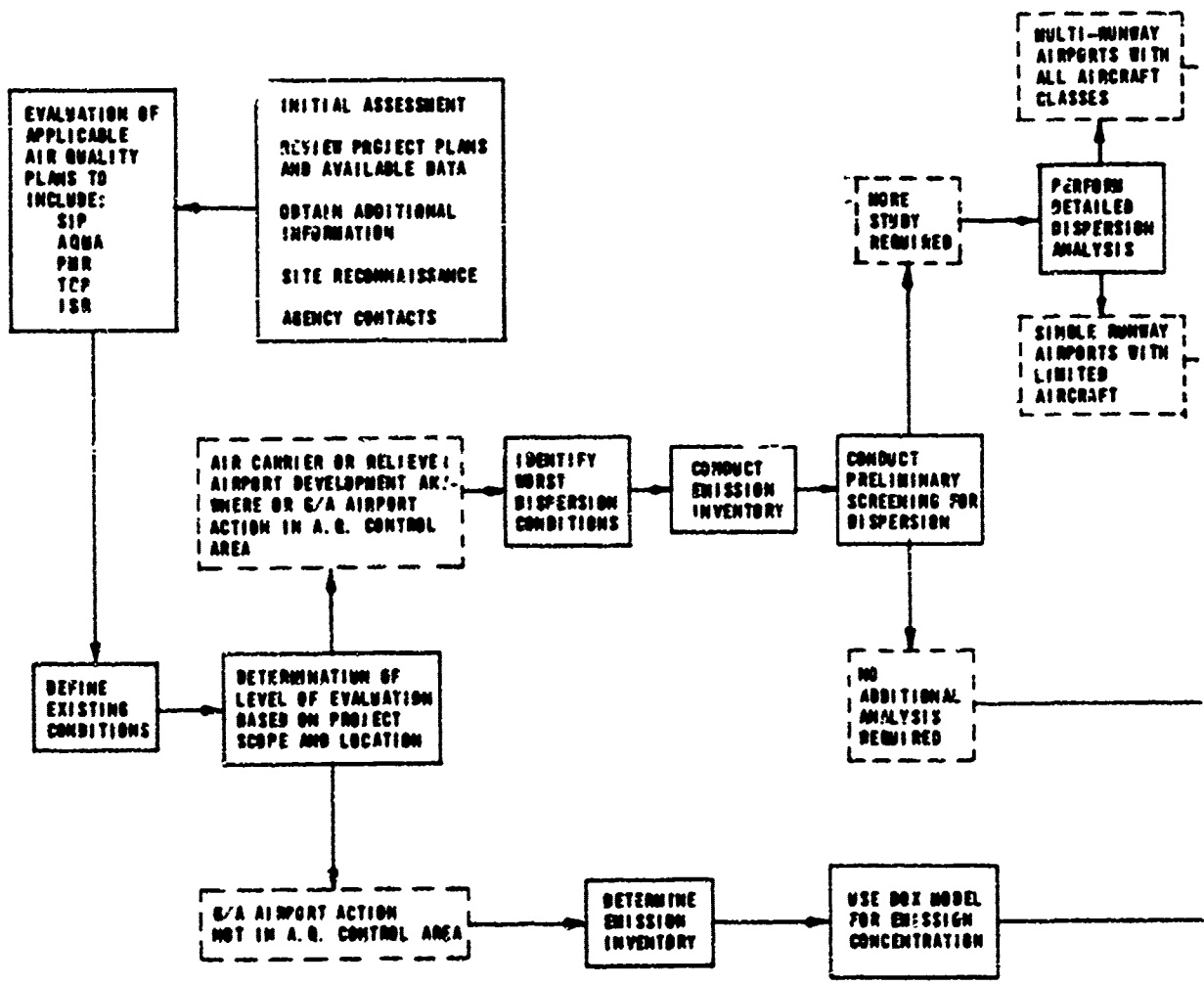
Initial information regarding airport configurations and wind data can be gathered from the specific project plans or master plans for airport development. Aerial photos, highway maps, or previous feasibility studies may provide additional information about area traffic, other pollution sources, air traffic, and nearby community facilities.

b. SITE RECONNAISSANCE

A field inventory will verify the setting, the study boundaries, and the locations of sensitive areas. A check should be made of the topography of the area and of the layout of the airport.

For an existing airport, estimates can be made of taxiing times for the aircraft, queuing length of aircraft waiting to take off, levels of activity in the parking lots, and the level of service of access roads.

IMPACT EVALUATION PROCEDURE AIR QUALITY



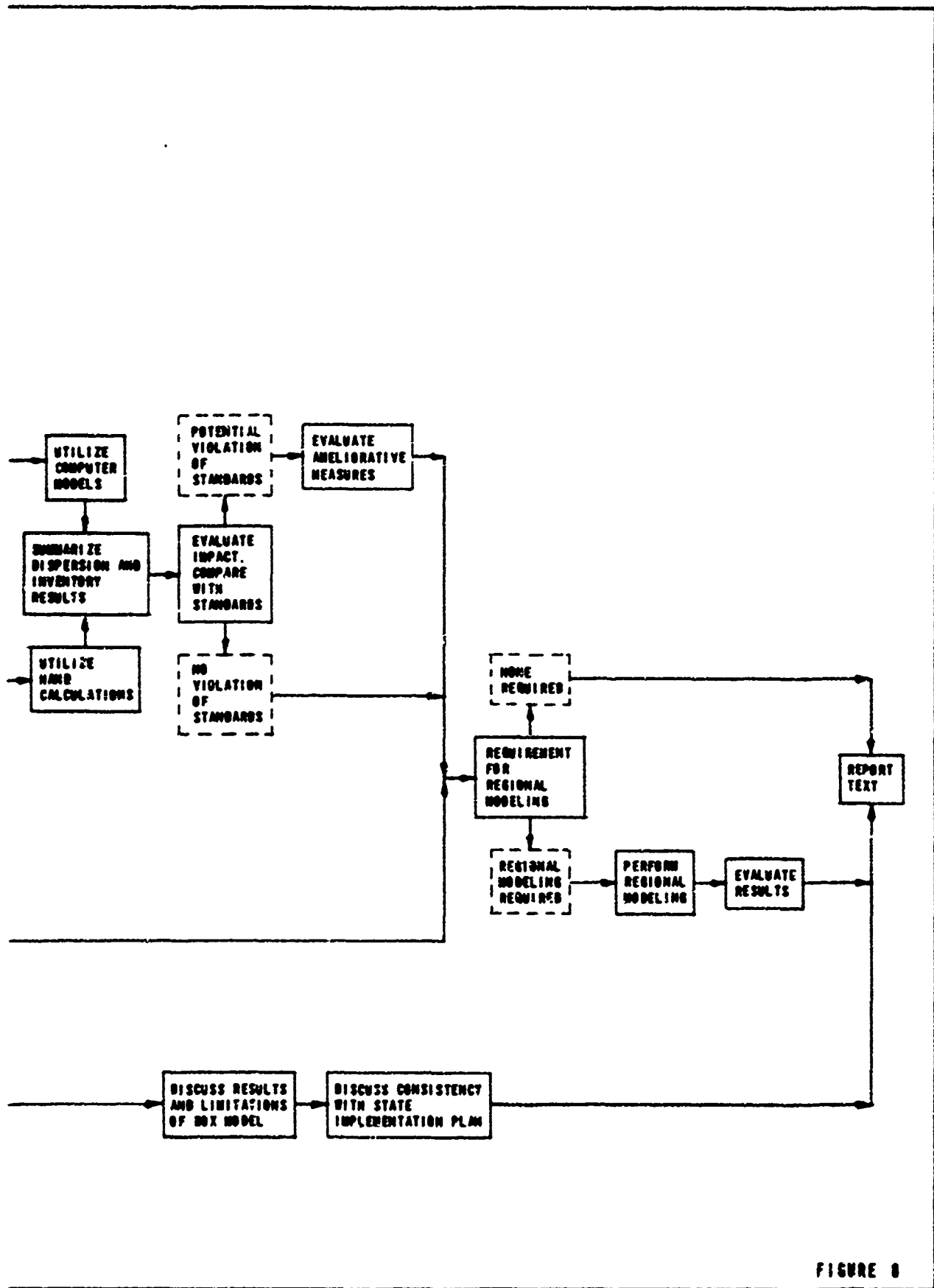


FIGURE 8

Selection of possible receptor point locations would be done in the instance where it is determined that air monitoring is necessary.

C. DATA REQUIREMENTS AND SOURCES

Federal, state, regional and local environmental offices or health departments should be contacted to obtain information on regulations, monitoring results, emission inventories, and meteorology.

This information would include the location and emission rates of stationary sources, the existing pollution concentrations within the vicinity of the airport, and the frequency of occurrence of inversions for both average and seasonal conditions. The site's Air Quality Control Region (AQCR) should be identified and its regional priority classifications for CO, HC, NO_x, SO₂, particulates and photochemical oxidants should be stated. If the site is located in an Air Quality Maintenance Area (AQMA), additional information on existing concentrations and an inventory of sources and monitoring stations should be collected.

Meteorological data to be obtained would include wind speeds, wind direction, rainfall, temperature and wind frequency. The National Climatic Center STAR program provides monthly and annual wind distribution and frequency by Pasquill stability classes for most weather stations. This is a very basic input needed to run most of the air pollution dispersion modeling programs.

The regional office of the Environmental Protection Agency can supply information on existing emission standards for aircraft and surface vehicles, the status of state implementation plans (SIP) and indirect source regulations (ISR). In fact, early consultation with EPA is encouraged in several areas (to include water quality and Noise). The EPA could also be contacted concerning the status and availability of the various dispersion models.

The airport operations office can supply information in the number of daily aircraft operations, runway usage patterns, and the type of aircraft using the airport.

County or state highway officials can provide data regarding surface traffic volumes and circulation, highway network configurations and posted speeds, access, and modal split.

d. CORRESPONDENCE REQUIRED

It may be necessary to document the state's position on the proposed methodology for air quality impact evaluation and/or any consultation regarding ameliorative measures.

e. DETERMINATION OF EXISTING CONDITIONS

Existing air quality is determined through the evaluation of the following items:

- Existing airport operational characteristics and emissions, if applicable.
- State/local controls.
- Available monitoring data.
- Local emission inventories.
- Regional classification data.
- Local meteorology and topography.
- Stationary and mobile sources within a three-mile radius of the airport (for larger airports in metropolitan areas).

Existing airport emissions can be estimated using techniques described in a later sub-section.

The State Implementation Plan should be examined to determine what preventative measures are being proposed to control the level of pollutant concentrations throughout the state. These measures should be evaluated with respect to the proposed project.

If the project lies in an urban area where local air quality regulations exist or in an Air Quality Maintenance Area (AQMA), the regulations pertaining to new emission sources have to be analyzed as to their relation to the project. If Transportation Control Plans or Indirect Source Regulations are in effect, these plans or regulations also must be examined and the effect of the project evaluated.

All of these regulations are limiting factors imposed on establishment of new or expanded emission sources, and their restrictions will be taken into consideration when deciding on the level of analysis required for the project.

As part of the examination of existing conditions, the topography of the area, regional meteorology and local climatology also must be studied. Topography and climatology are the factors affecting the dispersion potential of the pollutants in the air.

f. DETERMINATION OF LEVEL OF IMPACT EVALUATION

Air quality analysis generally involves the determination of a pollution inventory (total amount), the determination of pollutant concentrations, and a discussion of consistency with air quality plans and standards.

For all airport development projects, it is recommended that the pollution inventory be computed for the appropriate study years. This determination yields pollution per day associated with the project and is useful in evaluating conditions with and without the project, in comparing alternate configuration impacts, and in comparing airport emissions with available county or regional pollution inventories maintained by air quality agencies.

The level of evaluation of emission concentrations for comparison with criteria depends on the project scope and the existence of any air quality control plans. General aviation airports generally have less impact than air carrier airports since they do not generate the magnitude of associated surface traffic, and the emissions per general aviation aircraft operation are much less than those for a jet aircraft.

A distinction is also made between those areas with air quality control plans and those without such controls. Assessments for projects in areas where control plans are in effect must show consistency with additional criteria and may require more sophisticated analysis.

Therefore, the following guidance is presented concerning the level of investigation required for airport air quality dispersion analysis. For projects involving a general aviation airport (expansion or new construction), the Box Model may be used to compute pollution concentrations, if the project site is not in an area for which there is a Transportation Control Plan or which has been designated as an Air Quality Maintenance area.

More detailed analysis is required for general aviation airports within such air quality control areas or for any air carrier airport project (expansion or new construction). This analysis involves use of screening techniques based on line, areal, and/or point sources.

The screening techniques are used to approximate predicted levels, compare them with standards, and determine if additional study is necessary. More specifically, the screening accomplishes the following:

- Establishes background concentrations if monitoring data is unavailable.
- Establishes the increase in concentrations due to the proposed action.
- Determines the resultant total pollution levels within the airport vicinity.
- Compares the total concentration with applicable standards.

Different screening techniques must be utilized for each type of pollution source - line sources (aircraft), areal sources (parking lots), and point sources (power plant). The screening techniques are explained in the analysis section.

If screening techniques indicate that resultant airport pollution levels are approaching criteria, further analysis would depend on the airport configuration. For large airports with multiple runways and many aircraft types, the use of computer modeling techniques is recommended. For most airports, the APRAC-1A, HIWAY and the California line source models will provide sufficient detailed results to complete the analysis. These models are referenced at the conclusion of the air quality section. A computer model based on the PULSE line source model

can be utilized to study the pollutant concentration from landing and takeoff operations. Input required for these models is discussed in the next sub-section.

For small, single-runway airports, the emission and dispersion modeling for line and areal sources can be performed using hand calculations.

It is recommended that use of the Airport Vicinity Air Pollution (AVAP) Model (see references) be limited to the analysis of large air carrier airports which are controversial in nature and which are located in areas where air quality control plans exist.

Regardless of project scope or location, the assessment should include a discussion of the project's consistency with the state implementation plan.

g. IMPACT ANALYSIS

(1) Methodology

It is the intent of this guidebook only to present the basic methodologies for air quality impact evaluation and to discuss when they are to be used and what input is required. The models are available from the U. S. Environmental Protection Agency (EPA) and are referenced at the end of this section. The models to be used are discussed briefly below.

All the pollutants generated by the airport and within an approximate three-mile radius of the airport should be evaluated. This analysis will tabulate existing pollution loadings in the area with and without the project. This should be performed for both types of action-- airport modifications and new airports. Emission rates for various aircraft during the landing and takeoff cycle, service vehicles, and auto traffic are available in the literature cited at the end of this section.

Box Model

The Box Model is proposed to be used for small general aviation airports in areas without control plans. The Box Model results must be qualified when compared directly with the air pollution standards because the results (average values) are much lower than the actual maximum concentrations expected to occur. Though this constraint is recognized, this model can still be used as an indicator of impact of general aviation facilities.

The Box Model method of air quality computation uses the emissions generated in a unit landing and takeoff operation as the basic parameter for estimates. The dimensions of the box are associated with the aircraft descends to 1,100 meters above the runway on approach and reaches 1,100 meters again on departure. It is assumed that total emissions for each cycle are dispersed uniformly throughout the box.

The required input includes the number and type of aircraft operations, the characteristics of the box for each aircraft, and the emission concentrations per aircraft cycle. An example is given in the appendix.

Screening Process

Screening techniques should be used for preliminary evaluation of the impact of the proposed action on the ambient air within the airport and in the vicinity of the airport. Screening techniques can be applied to both types of action - modifications and new airports. The goal of the screening techniques should be to detect the highest concentrations expected to occur in the airport and in its vicinity and to decide if further air pollution studies are required for the proposed action.

Different screening techniques should be applied to each type of pollution source. Airport activities include the following sources:

- Line sources related to aircraft activities.
- Line sources related to car traffic.
- Areal sources related to aircraft apron activities.
- Areal sources related to car traffic.
- Stationary sources.

Pollutants generated by these activities include CO, HC, NO_x, SO₂ and particulates. Photochemical oxidants will be generated indirectly by the chemical reactions of HC and NO_x. The screening techniques to be listed in these guidelines will include CO, particulates and SO₂ pollutants only. At this time, there are no acceptable techniques for calculating the dispersion of the HC and NO_x pollutants because of their chemical instability. Screening techniques involve air pollutant concentrations and comparison with the National Primary and Secondary Standards. In performing this task, existing pollutant concentrations must be established, and the expected concentrations from the proposed action must be added to these concentrations. To establish the existing concentrations, available monitoring results should be used. However, in almost every case, a monitoring program should be undertaken or modeling studies should be prepared to establish the background concentrations.

The following modeling techniques are proposed to be used in the screening process:

- For Line Sources Around Runways - The model which can be used in determining the pollutant concentrations around the runways is a finite line source dispersion model using the Puff Modeling Equations derived from Gaussian Dispersion Theory. This model is used in the Vicinity Model for modeling the aircraft pollutants from runways. This model can also disperse the pollutants from incoming and departing aircraft. Longhand computations can also be used as well as

computer modeling. The use of this model will establish the maximum expected pollution concentrations from aircraft activities on the runways. An example of this model is included in the appendix.

This model can also analyze the wind conditions parallel to runways, which are expected to create the highest concentrations in the airport from aircraft activities.

Another line source model that can be used for runway line source modeling is the Gaussian line source model based on Gaussian line source equations given in "Workbook of Atmospheric Dispersion Estimates" by D. Bruce Turner. However, this model fails to analyze the wind conditions parallel to the runways and also fails to analyze the approach and departure modes of the LTO cycle.

- Areal Sources Within the Airport (parking lots, aprons) - Hanna's model (see references) will be used for this source. This model was also used by the EPA in their indirect source review guidelines.
- Stationary Source Models - Gaussian plume distribution equations can be used in hand calculations or as computer models. Computer models available are PMTP for one through 24 hour analysis and the CDM model for longer durations.
- Indirect Source Screening Techniques - The indirect source screening techniques will be utilized as they are provided in EPA "Guidelines for Air Quality Maintenance Planning and Analysis, Volume 9."

Hand Calculations

Hand calculation techniques are contained in the references at the end of this section. The input information

needed is similar to that listed below for the computer models. The calculation should be done for each source to preselected receptor points at varying distances from the project.

Computerized Air Pollution Models

These models would only be used where screening techniques indicated potential violation of standards. References are provided at the end of this section to indicate the source of the air pollution models. The same basic data is required as input for all the computer models:

- Meteorological Data - wind speed, direction and frequency of occurrence.
- Source Information - rate and type of pollution; location of source.

The source information would include:

- For Aircraft
 - type and mix
 - total operations, daily and peak hour
 - taxiing times
- For Surface Traffic
 - volume, daily and peak hour
 - speeds
 - vehicle mix - percent of trucks
 - location of parking lots and entrance/exit points

The Airport Vicinity Air Pollution model requires the most input and is the most complicated to run. Data concerning the location and

emissions of nearby stationary sources must be included as input. The output lists the total concentrations experienced at varying distances from the airport from which a plotting of levels can be made. It is because of the detailed input needed for this program that it is advisable to use this model only for controversial projects that need a very detailed analysis.

Additional computer models which are available include the Climatological Dispersion Model (CDM), PTMAX, PTDIS, PTMTP, HIWAY and the California line source models. The CDM model will compute long-term emission concentrations for stationary point sources and area sources for all pollutants. The PTMAX, computes maximum short-term concentration from a point source, the PTDIS computes short-term concentrations downwind from a point source at specified distances, and the PTMTP computes short-term concentrations at multiple receptors resulting from multiple point sources. The HIWAY and California line source models calculate pollutant concentrations in the vicinity of roadways.

If the airport is in an Air Quality Maintenance Area, regional air pollution modeling may be required for establishing the regional impacts of the proposed action. EPA modeling techniques established for Air Quality Maintenance Area studies must be utilized for these studies. Either APRACl-A, a model analyzing the regional CO concentrations from line sources and areal sources, or the CDM computer model, which analyzes the seasonal and annual air pollution concentrations

from point and areal sources for SO₂ and particulate pollutants, can be used.

Regardless of what techniques or models are used, it is necessary to determine the worst dispersion conditions for the area. This determination can be made from analysis of the meteorological data and should indicate its probability of occurrence.

If an on-site air monitoring program must be conducted to determine background ambient conditions, the EPA procedures for conducting such a program should be followed in order to obtain the greatest confidence level for the results. While the air is being monitored, meteorological conditions should also be recorded. This would involve the recording of hourly wind speed, wind direction, temperature and cloud cover. The equipment used should be approved by either state health officials or by the regional EPA office. The monitoring receptor point locations should be suggested during site reconnaissance and finalized based on the preliminary screening analysis to locate the areas of highest expected pollutant concentrations. The duration of the monitoring program should be for seven to 14 days in length, and should be coordinated with state or EPA officials.

The results of the air quality analyses are best presented in tabular form. An emission inventory table should be prepared for

existing and future conditions. Likewise, a dispersion table should contain emission levels for the location of highest concentration and for adjacent sensitive areas.

(1) Identification of Short-term and Long-term Impacts

The short-term impacts will result from construction operations. Construction vehicles will temporarily increase the area's inventory, but this amount has been shown to be an insignificant amount and should not be calculated.

Measures should be taken, however, to limit the amount of dust which is created on adjacent roadways and property by the operation of construction equipment. Any burning operations associated with land clearing activities should only be conducted during favorable meteorological conditions and in accordance with local health ordinances.

Long-term impacts may involve increased concentrations on- and off-site at sensitive areas, increased loadings on adjacent highways, or changes in regional air quality.

(2) Comparison With Laws, Standards, and Criteria

Once final dispersion estimates are obtained, they must be compared to Federal and state primary and secondary air quality standards. These standards are provided in the appendix.

Pollution inventory estimates can be compared with published regional or county totals. Inventory estimates before and after project development can indicate pollutant reductions due to emission standards.

Each assessment should include a discussion of the project's relationship to the state implementation plan. The discussion should include a summary of this plan and its component strategies. It should then include an explanation of how the various project components and/or pollutants relate to the individual strategies.

EPA's indirect source regulations for airports have been deferred, pending further rule making. The indirect source regulations for parking facilities have been suspended indefinitely.

(3) Determination of Measures to Minimize Harm

If violations of one-hour or eight-hour criteria occur, an investigation should be made of the airport layout plan and daily operational activity to determine possible changes in source location and movement which would result in lower cumulative concentrations. It may be possible to incorporate such changes as revising taxiing patterns or changing the configurations of parking lots and entrance/exit points.

h. GRAPHIC PRESENTATIONS REQUIRED

The following information can be graphically displayed to supplement the air quality text:

- Wind summary (wind rose)
- Monitoring locations
- Points of highest concentration
- Location of nearby stationary sources and monitoring stations

i. SUPPORTING DOCUMENTATION TO BE APPENDED OR REFERENCED

Guidance or concurrence with methodology and results from the State Air Quality Board or EPA officials should be placed in the assessment appendix.

Any technical description of models used in the analysis should be provided (or referenced) along with any monitoring data.

j. CONSISTENCY WITH OTHER IMPACT EVALUATIONS

The operational data used should be consistent with that used in the noise analysis. Air quality impacts on off-site community facilities also should be consistent throughout the assessment.

k. LIST OF REFERENCES

Workbook of Atmospheric Dispersion Estimates, D. Bruce Turner. 1970.
U. S. Environmental Protection Agency, Office of Air Programs
Publication AP-26.

Presents computational techniques currently used with atmospheric dispersion problems.

Compilation of Air Pollutant Emission Factors, U. S. Environmental Protection Agency. 1973. Air Pollution Technical Information Center AP-42 and its supplements.

Reports data available on those atmospheric emissions for which sufficient information exists to establish realistic emission factors.

Users' Guides to the Interactive Versions of Three Point Sources Dispersion Programs: PTMAX, PTDIS, and PTMTP, D. Bruce Turner and Adrian D. Busse. 1973. Dr. Ron Ruff, Chief, Computer Techniques Group, EPA, Division of Meteorology, Research Triangle Park, North Carolina.

Instructions for operating the computer programs.

Users' Guide for Climatological Dispersion Model, Adrian D. Busse and John R. Zimmerman. 1973.

Provides information on the Climatological Dispersion Model NTIS PB-227 346.

Airport Vicinity Air Pollution Study, D. M. Rote, I. T. Wang, L. E. Wangen, R. W. Hecht, R. R. Cirillo, J. Pratapas. 1973.

Description of the results obtained during Airport Vicinity Air Pollution Study FAA-RD-73-113 (DOT)

The Potential Impact of Aircraft Emissions Upon Air Quality, M. Platt, R. C. Baker, E. K. Bastress, K. M. Chng, and R. D. Siegel. 1971.

The predicted values of pollutant emission rates at selected airports and resulting concentrations of pollutants for specific time periods and locations in the vicinity of these airports. PB-208 950 (NTIS)

Users' Guide for HIWAY, a Highway Air Pollution Model, John R. Zimmerman and Roger S. Thompson. 1975.

Information on a steady-state Gaussian model that determines air pollution concentrations at receptor locations downwind of "at-grade" and "cut section" highways located in relatively uncomplicated terrain. EPA-650/4-74-008 EPA

Chicago Air Pollution Systems Analysis Program - An Urban Atmospheric Dispersion Model for Stationary Sources, J. J. Roberts, E. J. Croke, A. S. Kennedy, J. E. Norco and L. A. Conley. 1970.

Explanation and information on a multiple-source, computerized, atmospheric dispersion model
ANL/ES-CC-007.

An Air Pollution Impact Methodology for Airports - Phase I, J. E. Norco, R. R. Cirillo, T. E. Baldwin and J. W. Gudenas. 1973.

Presents a methodology for assessing the air pollution impact of major commercial airports and the urban activities that surround them. APTD - 1470 EPA

Airports and Their Environment, A Guide to Environmental Planning, CLM/Systems, Inc. 1972.

Describes and identifies environmental factors which should be considered in airport planning. PB-219 957 NTIS

A Finite Line Source Dispersion Model for Mobil Source Air Pollution, I. T. Wang and D. M. Rote. 1972. Paper presented at the Summer Simulation Conference, San Diego, California.

Describes the formation and application of a finite line source dispersion model constructed on the basis of a Gaussian type transport kernel.

IMPACT ANALYSIS PROCEDURE
DIRECT SOCIOECONOMIC IMPACTS

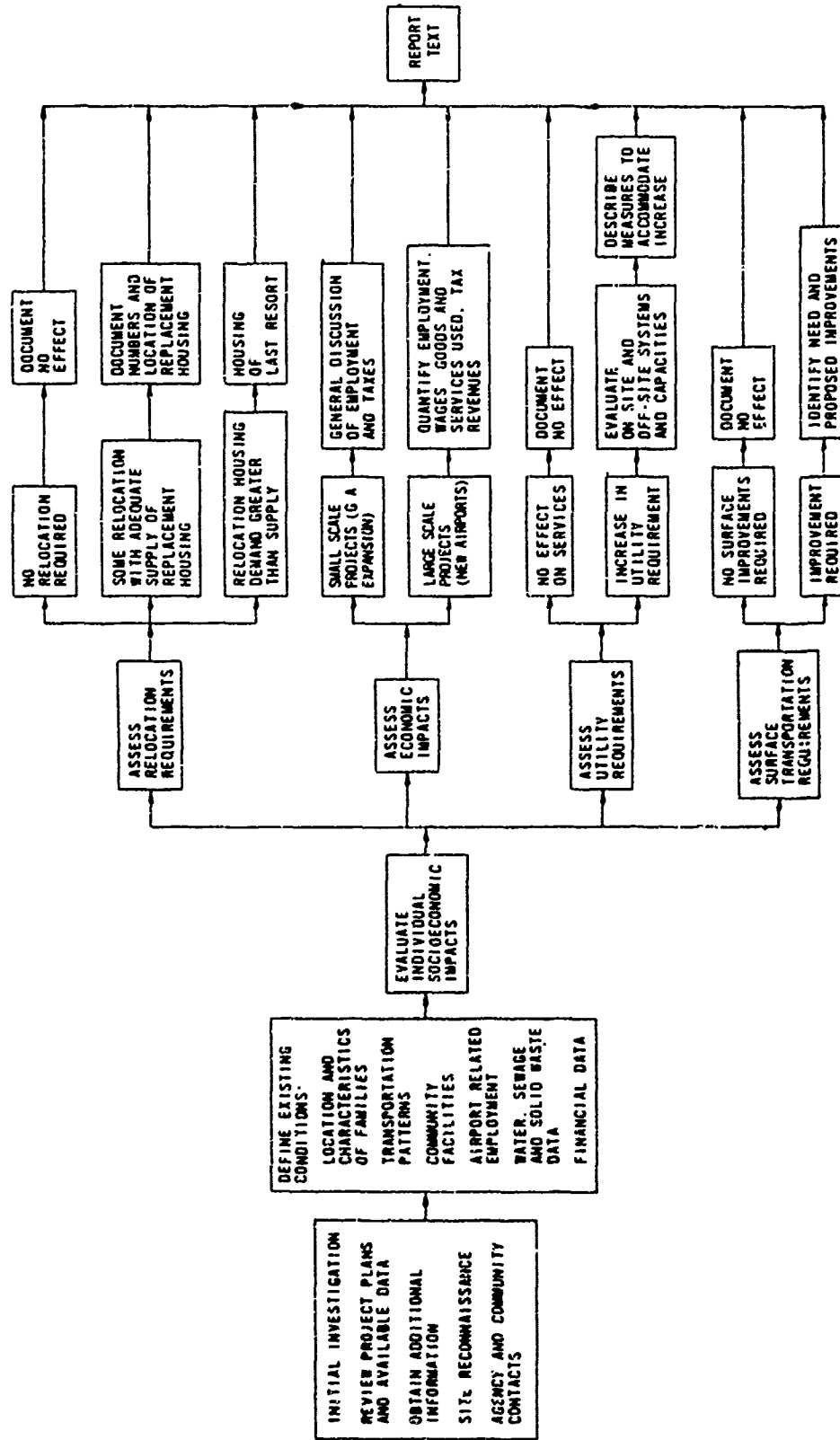


FIGURE 9

9. Direct Socioeconomic Impacts

a. GENERAL CONSIDERATIONS

(1) *Determination of Scope of Project as it Relates to the Socioeconomic Infrastructure of the Micro and Macro Areas*

Aviation development actions affect not only the natural environment but also the human environment. These effects on the human environment as generally classified under the heading of "Socioeconomic Impacts". In total, the term "socioeconomic" encompasses an extremely broad spectrum of areas of evaluation. In addition, socioeconomic impacts may be either a direct result of development or an induced or secondary result of development.

Direct impacts are distinguished from indirect impacts in that they are more immediate and easier to predict and quantify because they are confined to a precise geographical area and occur within a specified time frame. Conversely, indirect impacts involve estimates as to what may or should happen over an indeterminate period.

For example, given the scope of a project, it is possible to quantify homes taken, transportation patterns disrupted, need for transportation improvements, jobs created to construct and operate the facility, tax revenues generated, goods or services purchased for airport operation, and public service requirements. These direct impacts are

readily obvious. However, accurate forecast of induced development, spin-off jobs created, revenue generated, regional growth and secondary public service is much more difficult. Indirect or induced impacts are therefore covered in a separate section.

This section focuses on an airport development's direct socioeconomic impacts which include the following specific areas:

- Relocation of residences and/or businesses.
- Alterations in transportation patterns which may permanently or temporarily restrict traditional community access.
- Highway transportation improvements required due to the development action.
- Loss or degradation of parks, recreation areas, schools, and other facilities or amenities contributing to the quality of community life.
- The economic impacts associated with the jobs created to construct and operate the facility, goods or services purchased to operate the facility, and the tax revenues generated by facility operations.
- Use of public services or on-site developed facilities for water supply, sewage disposal and solid waste disposal.

Figure 9 indicates the steps involved in the analysis procedure.

(2) Review of Immediately Available Data

The project plan will indicate real property acquisition requirements, relocation requirements, and roadway relocation, modification

or new roadway construction required. Project construction costs and scheduling will provide base data on short-term jobs and earnings to be generated.

The project plan should also provide information on existing and/or proposed systems for potable water supply, sewage disposal systems and solid waste disposal plans. If the project involves improvements to an existing facility, the sponsor should be able to supply historic data concerning water usage quantities, sewage volumes, and solid waste quantities.

Historic data and/or projected tax revenues generated by the facility and operations associated with the airport should also be available from the sponsor.

The sponsor should be able to indicate whether any known problems or conflicts exist in local relocation programs and policies.

Memorandums and correspondence concerning general community opposition or specific problems should be available in the sponsor's files.

The sponsor should also be able to provide information or projected employment for operation of the facility, associated wages and the amount of goods and services either presently being purchased and/or projected to be purchased for total operation of the facility.

b. *SITE RECONNAISSANCE*

All residences and businesses to be relocated should be inventoried. Door-to-door interviewing need not be undertaken by the environmental study team. However, site reconnaissance, supplemented by census and local planning department demographic data, should indicate the following:

- Number of residences and businesses to be displaced.
- Parks, schools, churches, hospitals, to be displaced, or temporarily or permanently disrupted by noise or access alterations.
- Number of persons to be displaced.
- Characteristics of families displaced.
- Characteristics of dwellings to be acquired.
- Cost (owned or rental) of dwellings displaced.
- Relationship of available comparable replacement inventory to location of the project area.
- Characteristics of businesses displaced.
- Location of residences and businesses in relation to comparable community services.

Initial reconnaissance of residences/businesses to be taken and replacement potential within the community are considered critical, since the sponsor must be able to show conformance to Federal relocation regulations to gain project approval.

Existing transportation facilities which will carry airport traffic should be surveyed for type of roadway, number of lanes, etc.

If the project involves improving an existing facility, the sources of water supply, and sewage disposal and solid waste disposal methods should be ascertained.

c. DATA REQUIREMENTS AND SOURCES

- District FAA Office: FAA and DOT orders and regulations pertaining to relocation, including Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (hereinafter referred to as the Uniform Act), DOT Order 5620.1; Office of the Secretary of Transportation (OST) Regulations 49CFR Part 25, September 4, 1975; FAA Advisory Circular 150/5100-11 (February, 1975).
- District HUD Office: A second source to obtain statutes as well as a source of demographic data and community housing inventory/availability.
- State Relocation Agency: State statutes, procedures, and types of administrative assistance available to sponsor.
- Local housing, planning, or relocation agency: Local statutes, procedures, and administrative assistance available to sponsor; data on available replacement housing in terms of type and purchase or rental costs; business inventory; and census data.
- State or local Department of Recreation and Parks, (if applicable): Location of recreation areas, data on annual use and importance to the community or region.

- Local Department of Education: If a school is impacted or relocation numbers are significant, check school locations and enrollments; impact that relocation will have on other school enrollments and development plans.
- Board of Realtors: Source for existing and estimated potential listings of available dwellings.
- Civic and neighborhood associations: Input on impact project is expected to have on area.
- Project Sponsor: Employment and salary figures; concessions data; existing utility data, if applicable.
- Airlines: Data on goods purchased, local taxes paid; employment and salary figures.
- State Health Department: Effluent criteria; rules and regulations for treatment; solid waste disposal criteria.
- County Department of Public Works, Sewer and Water Division: Available capacity in the area; planned expansion of the systems; location of facilities; present operating capacities.
- County and State Solid Waste Authority: Sanitary landfill locations and estimated life of each landfill.
- State Highway Administration or State Department of Transportation: Data concerning future plans to upgrade existing road system in project area; existing and projected traffic volumes.

d. CORRESPONDENCE REQUIRED

Certification satisfactory to DCT and FAA should show that the sponsor has conformed and will comply with all relocation policies.

If municipal facilities are to be used for water supply, sewage disposal and/or solid waste disposal, correspondence stating that adequate capacities are available for use by the facility should be obtained from the appropriate agencies.

e. DETERMINATION OF EXISTING CONDITIONS

Correlation and interpretation of the previously listed data will provide a profile of the project area. The layout plan and land use and noise exhibits will show affected residential, commercial, and industrial development, sensitive areas, and the transportation network.

Census and planning data will permit delineation of neighborhoods and their socioeconomic characteristics, amenities, stability, etc. Cohesive communities in the project area should be identified and described in terms of population size, public and private amenities, transportation patterns, etc. Minority group areas must be indicated.

Discussions with the sponsor and airlines should provide direct employment data and wage schedules, tax revenue data, and information on goods and services to be purchased for facility operations.

Existing water requirements by type and volumes should be determined using historic data either from the existing facility or similar type facility. If municipal supplies are to be used, the capacity of the existing municipal system should be determined along with all

planned improvements to the system. If an existing on-site well is to be used, the well capacity should be determined along with historical water use data as above. Well capacity should also be determined along with the identification of other users of the aquifer in the area.

Sewage disposal may be accomplished either through a municipal disposal system or an on-site system. In the case of a municipal system, existing volumes generated (if applicable) by the facility along with the existing capacity should be determined. Planned improvements to the existing system should be determined to include the amount of additional capacity available for future airport development. Standards for effluent quality leaving the airport should also be defined. In the case of an on-site disposal system, existing volumes presently being handled, capacity of the existing system or details of the proposed system should be obtained. Information regarding existing quality of the effluent being discharged should also be obtained, if applicable.

Solid waste generated by airport operations may be disposed of by municipal or private disposal off-site or on-site disposal. Capacities of and expected life of off-site sanitary landfills to be used should be determined. Evaluation of on-site disposal should include definition of type and capacity. If incinerators are used, input into the air quality section of the report should be included. Where projects would result in a significant increase or change in solid waste disposal, the weight or

volume of generated wastes should be estimated and disposal procedures described. Any local or state procedure for disposal of solid waste should be outlined.

Discussion with State Highway personnel should provide existing level of service and traffic volumes on roadways to be affected by the project, as well as information on any planned improvements to the system.

f. DETERMINATION OF LEVEL OF IMPACT EVALUATION

Classification of the evaluation levels for socioeconomic impacts is difficult, due to the numerous factors, broad categories and combination of variables which may be encountered with any project. Any one adverse impact within the broad range of this category would necessarily classify the level of impact into a "significant" category. Also, in order for a project's impact on the socioeconomic environs of an area to be classified "insignificant", it must be shown that all factors covered by this discipline are considered to be insignificant.

Therefore, rather than attempt to classify general levels of impact and to apply a level of assessment to each, this document provides a methodology to be used to evaluate four specific areas which generally cover the full spectrum of direct socioeconomic impacts. These are: relocation, economics, public service requirements, and transportation.

g. *IMPACT ANALYSIS*

(1) *Methodology - Relocation Impacts*

This subsection concentrates on methodologies used to evaluate relocation impact.

It is DOT policy that no individuals will be displaced until decent, safe, and sanitary replacement housing is first made available to them.

The documentation in the environmental assessment should discuss the "manageability" of relocation. The extent of analysis depends on the scale of the relocation impact.

If only a few residences are to be acquired, the report should identify the properties, discuss the availability of replacement housing in the area in general terms, and include reference to sponsor assurances that requirements of the Uniform Act will be met.

If a large number of residences are to be acquired, a more detailed relocation plan should be outlined in the environmental document.

A supply-demand method is employed to evaluate impact on individual displaced families and to assess relocation impact on the overall community. Supply is determined by the availability of comparable

housing in an adjacent or nearby community. Demand is based on numbers and socioeconomic characteristics of displaced families. The degree of impact relates to the ability of supply to accommodate demand. The following subsections summarize input and sources for supply-demand evaluations.

Demand Quantification

The number of residences to be acquired is determined by superimposing project boundaries over the existing property maps, with field reconnaissance to verify and refine these data. Specific information must include:

- Number of dwelling units to be taken
- Number of persons to be displaced
- Family size, age, income, ethnic background
- Type and cost (owned and rented) of structure displaced
- Number of households to be displaced as owners and number of households to be displaced as tenants
- Neighborhood characteristics

Social Determinants of Demand

These include ethnic origin, race, age and family size.

Ethnic origin is critical when: (1) homes acquired are within a neighborhood of recognized ethnic homogeneity or; (2) available

replacement housing is located within an established ethnic neighborhood. Race becomes a critical consideration when large numbers of a minority group are referred to highly segregated neighborhoods.

Special consideration should be given to the displacement of elderly or handicapped persons. The elderly often live on fixed incomes, and even minor increases in living expenses may severely restrict their social opportunities. The effect of displacing elderly or handicapped persons may require special relocation advisory services and should therefore be addressed.

For physically definable reasons, family size is an important determinant of demand. It dictates the size of dwelling unit required and the need for proximity to schools.

Ethnicity, age, race, and family size may be approximated, for environmental study purposes, from secondary sources such as the census of the population. Regional offices of planning and community development are further sources of such data. Prior to relocation, however, specific information must be obtained by survey. In many instances, a state or municipal agency is set up for the specific purpose of administering relocation assistance programs in conformance with the Uniform Act. The sponsoring agency should initiate and maintain contact with these groups as early in the planning process as possible.

Economic Determinants of Demand

These include income, journey-to-work time, monthly rent for persons to be displaced as tenants, and fair market value of current place of residence for persons to be displaced as homeowners.

Evaluated together, the social and economic determinants of demand form the list of constraints which decide whether available replacement housing is, by implication of the Uniform Act, "fair and equitable." An objective of the relocation assistance program is to obtain a living environment for the displaced persons which most closely matches that from which they were displaced.

Supply Identification

Secondary data sources play an important role in locating supplies of replacement housing. Census data and information from regional and/or municipal planning agencies are the best sources of secondary information in selecting which neighborhoods would be most appropriate for relocation. Local and state relocation agencies, the Board of Realtors Multiple Listings and the real estate section of local newspapers provide the best means of finding the houses of each size and price range within the various neighborhoods of relocation.

Supply-Demand Evaluation

Using the above input, it is possible to evaluate the ability of the community to absorb displaced persons in accordance with

the law. Where supply corresponds to or is greater than demand, impact is confined to individual dislocation. It is noted that the cost of available housing should be at least equal to the cost of those being acquired. Occasionally, families must be accommodated in higher cost housing when the supply of equal cost housing is inadequate.

Where demand exceeds the total available supply, special provisions for Housing of Last Resort may be necessary. These are detailed later in this section. An example of the supply-demand analysis has been prepared and is included in the appendix of this document.

(2) Methodology - Economic Impacts

This subsection concentrates on presenting, in quantitative form, the economic impacts associated with facility construction and operation. As noted previously, the economic impacts associated with airport development actions stem from three major sources, namely: the facility as an employer during both construction and ultimate operation; as a purchaser of goods and services for continued operations; and, finally, as a tax generator.

Employment

Quantify total employment and employment income on an annual basis during both the construction and operational phases.

Purchaser of Goods and Services

Estimate the amount to be spent for facility construction along with an approximation of anticipated expenditures in the region. Quantify the approximate monies to be spent to supply utilities for airport operations. Estimate, from the sponsor's economic analysis, the potential service and concession requirements and yearly purchases, including food services. Finally, estimate, using airlines' and sponsor's records, the amount of expenditure in the region for services and supplies.

Tax Generator

From estimates of annual payrolls, airport revenues, concession sales, etc., estimate both state and county tax revenues. For comparative purposes, show the amount of taxes presently being realized from the existing area without the airport development action.

(3) *Methodology - Public Service Requirements*

Potable Water

Define the project needs and existing usage, if applicable. Evaluate the availability of the municipal system to supply this need, and, if municipal supply is not available, make an evaluation of the available subsurface supply.

Sewage

Define the amount of sewage generated by the project and evaluate the municipal system's or on-site system's capacity to handle the

projected volumes. Outline any proposed modifications required to be made to existing systems.

Solid Waste

As in the above cases, it is first necessary to define the volume of solid waste to be generated by the project from either historical records of the existing facility or a similar type facility. Evaluate on- or off-site disposal facilities' capabilities in handling anticipated volumes.

(4) *Methodology - Transportation*

The impact assessment should identify highway transportation system improvements, relocations, etc., associated with the proposed development action. The analysis should assess the potential impacts associated with alterations in transportation patterns which may temporarily or permanently restrict traditional community access and the impacts associated with additional traffic volumes in the project area, such as noise, air quality, safety, etc.

(5) *Identification of Short-term and Long-term Impacts*

Adverse short-term impacts are confined to transient disruption resulting from project construction. This can include temporary inconvenience or economic losses resulting from road detours, building access, etc.

Beneficial short-term gains are also associated with the construction period and include employment of construction workers, economic benefits in the form of wages, and the purchase of construction materials.

Long-term impacts include such negative factors as: relocation of individuals and families; disruption of neighborhoods due to increased noise and/or changes in internal circulation patterns; displacement of businesses, causing them to close due to loss of patronage resulting from distant relocation; and use of municipal facilities for public services, reducing the available supply for other future development. Direct positive impacts include increased jobs associated with airport operations, expanded air service to the region, consequential stimulation of the private and public economy, and increased tax revenues to the county and state.

Conflicts include any imbalance between housing demand and supply which penalizes dislocated individuals and families or causes friction within the project community. Other sources of conflict are the taking of irreplaceable parkland and irreconcilable disruption of school development plans.

*(6) Impact Evaluation and Comparison With
Laws, Standards and Procedures*

Projects involving the acquisition of property and the relocation of individual and families must prove compliance with Titles II and III of the Uniform Act and OST Regulations, Parts 2559 and 2557.

Procedures required by the Uniform Act include verification of the feasibility of both acquiring necessary properties and providing replacement properties.

Where replacement housing is required, the draft EIS must document the sponsor's procedures and his intent or ability to comply with the following specifications of the law:

- A relocation plan will be provided.
- Appropriate relocation advisory services will be provided.
- Furnish at least 90 days written notice to displaced persons of the requirement to relocate.
- Notices and information concerning relocation will be submitted on a timely basis.
- Compensatory payments to displaced persons are determined in a fair and equitable manner.
- There will be an adequate amount of comparable, decent, safe, and sanitary dwellings within the financial means of those to be displaced that will be available for use as replacement housing.
- Last resort housing will be provided in accordance with Section 206(a) of the Uniform Act if adequate replacement housing is unavailable.

(7) Determination of Measures to Minimize Harm

Section 206(a) in the Uniform Act provides a solution to an imbalance in supply and demand known as Housing Replacement as Last Resort. Ameliorative measures can be accomplished in the following ways:

- Purchasing an existing residential property which meets decent, safe, and sanitary requirements.
- Purchasing existing properties which do not initially meet the requirements of replacement housing, and then rehabilitating the structures to bring them up to decent, safe, and sanitary standards.
- Purchasing the residential building site(s) and constructing new dwelling(s) in compliance with the decent, safe, and sanitary residential requirements and state and local building codes or ordinances, where applicable. HUD project selection criteria and numerous property standards must be followed.
- Purchasing only the residential building site(s) and relocating thereon the dwelling(s) acquired. The dwelling(s) may be renovated or rehabilitated, as necessary.

In addition to mandatory last resort housing, numerous ameliorative measures may be considered. These include provisions to maintain motor vehicle and pedestrian traffic patterns, as well as feasible alterations in flight paths to reduce noise exposure or enhance safety. Ameliorative actions in related sections such as Land Use, 4(f) Lands, and Noise also apply to the overall socioeconomic well-being of a community.

Measures to minimize the impact on the demand for these public services will include the evaluation of alternative on-site systems capable of supplying the required service, or phasing of project components until adequate service is extended.

Finally, major alternative solutions are necessary where conflicts cannot be reconciled. These include adjustment in project design, layout, etc. or, if necessary, a re-evaluation of the site selection.

h. GRAPHIC PRESENTATIONS

Exhibits indicating land use alterations, 4(f) lands, and noise impact on housing will be provided in the respective sections dealing with these impacts. An exhibit showing buildings cited for demolition should be included in this section of the EIS.

Tables should be included showing displaced tenant housing and owner housing needs along with the total dwelling units currently available for purchase or tenant occupancy.

In the areas of water supply, sewage, and solid waste generation, tables showing projected figures in five-year intervals up to the design year of the facility are helpful. If on-site systems are employed, their locations should be indicated on the site plan exhibit.

An exhibit showing the existing and proposed transportation system adjacent to the facility is important in evaluating highway transportation-related impacts.

i. SUPPORTING DOCUMENTATION TO BE APPENDED

Specific requirements include assurances from the sponsor and/or local authorities as to compliance with the Relocation Act and related state or local statutes.

Correspondence or interviews with realtors, civic groups, and affected families may be included to document conclusions given in the text. Excerpts from local or regional master plans may also be useful.

Any water, sewage or solid waste master plans for the area which would affect airport service should be referenced. Any correspondence with state and local agencies concerning either availability of public services to the site or a statement that proposed on-site facilities are within applicable criteria and standards should be appended.

Correspondence or interviews with State Highway officials should be appended to document consultations concerning transportation impacts.

j. CONSISTENCY WITH OTHER IMPACT EVALUATIONS

Data and conclusions in this section must be consistent with those presented in the Noise, Land Use, 4(f), Induced Socioeconomic, and Water Quality Impact sections.

Efficiency will be assured by coordinating data retrieval and agency and community contact efforts for these disciplines. Findings should be reviewed jointly to verify consistency of data input and conclusions.

k. LIST OF REFERENCES

Sites For Public Airports - U. S. DOT, FAA.

DOT Order 5620.1 - Replacement Housing Policy.

Airports and Their Environment - A Guide to Environmental Planning, CLM Systems, Inc., Cambridge, Massachusetts. September, 1972.

Designed to assist and guide airport and regional planners in identifying and resolving environmental problems associated with airport development. Available through NTIS.

INDUCED (SECONDARY) IMPACTS

10. Induced (Secondary) Impacts

a. GENERAL CONSIDERATION

(1) *Determination of Scope of Project as it Relates to Induced Impacts*

Location of an airport, a runway, or a major runway extension may produce significant induced development. This would usually imply that off-site development not directly associated with the project has decided to locate adjacent to the new facility.

The degree of induced development is generally directly related to the scope of the project, i.e., the larger and more encompassing the project, the greater the likelihood of alteration of peripheral lands.

Induced development can take the form of private commercial enterprises serving passengers, air cargo and airlines at the airport (limousine or taxi services); industrial concerns that use air cargo for transporting raw materials and products; urban development that is attached to the airport environs to accommodate workers at the airport; and allied businesses and industries that take advantage of the accessibility of the airport environs. The induced impacts associated with such development may include socioeconomic and land use effects, additional impact on the natural environment and demands on public services. The impact analysis procedure is presented in Figure 10.

IMPACT ANALYSIS PROCEDURE
INDUCED (SECONDARY) IMPACTS

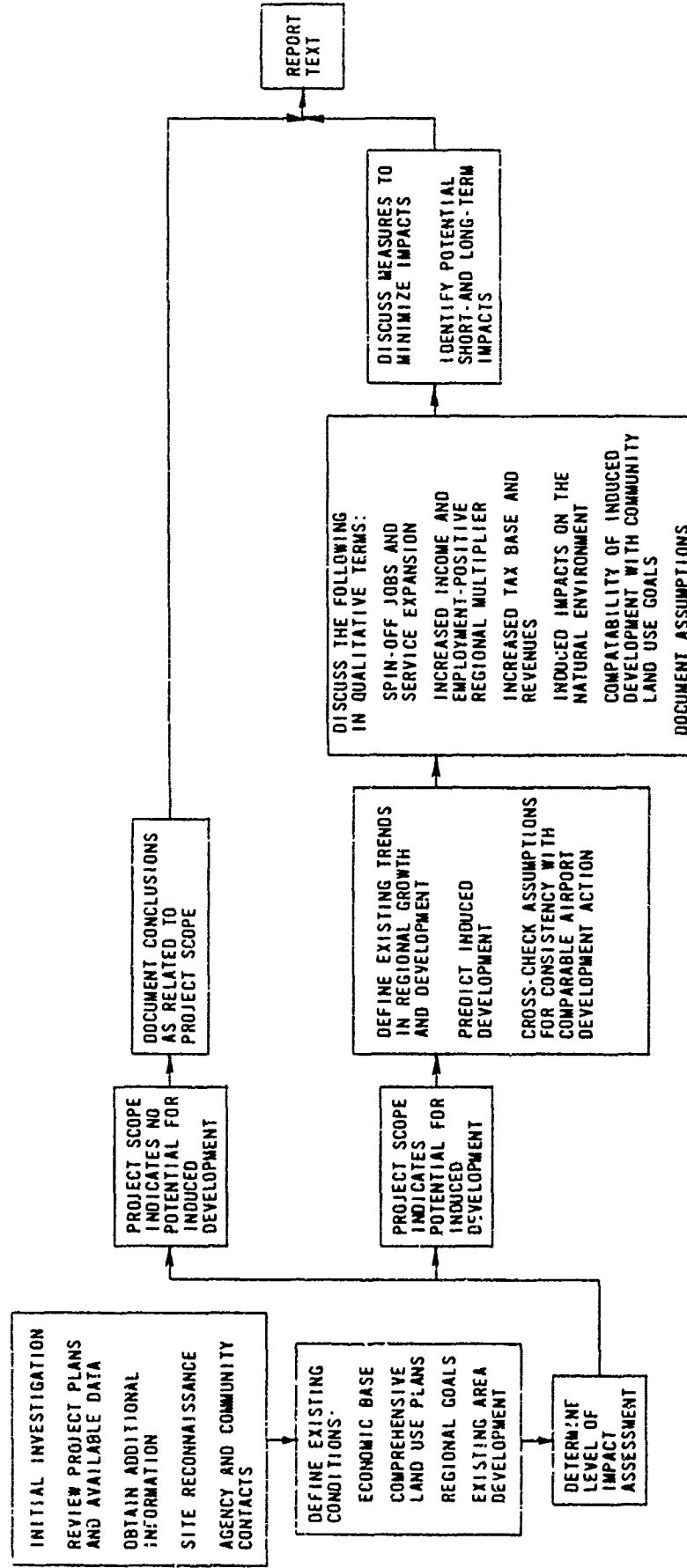


FIGURE 10

(2) *Review of Immediately Available Data*

Preliminary planning studies, feasibility studies, and financial studies provide excellent base data. Introductory section indicate the project's purpose and goals, and the ability of the project to fulfill these goals over the long term.

Preliminary plans may also disclose future contemplated actions or specific plans for complementary off-site development. They may also define proposed actions which may induce off-site development such as provisions for upgrading the local highway system or for a utility extension. Finally, reports intended to support bond issues provide forecasts of the project's capability to benefit or stimulate the public and private economy. This could be done through the number of permanent jobs necessary to support airport operations, the number of new services (spin-off jobs) required to support increased passenger traffic, and/or the increased property tax base resulting from off-site industrial/commercial development stimulated by the project. Though not specifically mentioned in the plans or studies, another result of this induced development may be increased housing demand.

b. *SITE RECONNAISSANCE*

This effort should be made in conjunction with assessment of the direct impact on land use. Elements to be noted include off-site development potential, particularly in relation to any proposed access improvements.

c. DATA REQUIREMENTS AND SOURCES

- . Regional Planning Council: Historical land use development patterns; projected population patterns; projected or desired industrial and commercial development and employment; comprehensive development plans.
- . Local or Regional Chamber of Commerce: Existing and projected data concerning the commercial/industrial profile; existing employment profile.
- . State or local planning agencies: Data on commercial/industrial site locations; economic/employment profiles; trends and forecasts.
- . County zoning offices: Information on development pressures and potential changes in zoning districts.

d. CORRESPONDENCE REQUIRED

While no correspondence is required, letters from responsible public agencies and private groups presenting their views regarding the project's stimulus to economic development may assist the decisionmaker.

e. DETERMINATION OF EXISTING CONDITIONS

Existing conditions may be identified from land use maps and economic studies.

Special attention should be paid to the area's commercial/industrial/employment characteristics and social considerations such as major institutions, recreation areas, or historic sites which attract commerce to the region or enhance the quality of life.

Specific trends, population patterns and problems should be noted. Examples include unemployment or over-reliance on one type of industry.

f. DETERMINATION OF LEVELS OF IMPACT

Due to their deferred and diverse nature, secondary or induced impacts are difficult to establish. The prediction of induced impacts are all too often dependent upon a sequence of assumed spin-off actions which may be accelerated, interrupted, or not occur at all. Therefore, considerable latitude should be applied in this area of study and detail generally waived (except where prediction is feasible), since any efforts at quantification are highly speculative.

Given this caveat, only two conditions actually exist: the development action will either induce or not induce off-site development. If the action has minimal potential for secondary impact (such as construction of a cross-wind runway), a statement that the action is not likely to cause induced development is sufficient. However, if indications are that induced development is probable, then a discussion of the secondary impacts is in order. This should be presented in a qualitative and objective manner, keeping in mind the speculative aspects of this evaluation.

g. *IMPACT ANALYSIS*

(1) *Methodology*

While dynamic modeling programs are sometimes available to predict impacts on regional economics, costs associated with data collection, programming and the highly speculative nature of these predictions discourage their use.

For this reason, assumptions (which should be clearly defined) based on the continuation of and anticipated changes in on-going trends in regional growth and development are acceptable.

Future land use development projections should be identified, and, where possible, they should be obtained from more than one source and cross-checked for consistency. In addition, similar airport developments in other regions with comparable socioeconomic structures can be examined for parallel impact patterns.

Spin-off jobs and service expansion opportunities should be noted in qualitative terms and related to the community's manpower supply capability. Spin-off jobs include such categories as air freight teamsters, food process workers supplying terminal restaurants, and servicemen for airport taxicabs, limousines, and heavy equipment. Other off-site employment can be induced from the types of typical development associated with airport projects noted above and in the land use section. These employment opportunities range from hotels to shopping areas.

Income generated from increased employment acts as a positive multiplier stimulating the regional consumer economy. Furthermore, projects resulting in the introduction or expansion of commercial carrier service stimulate the regional economy as well as enhance individual mobility, cultural opportunities, etc.

Off-site induced development increases tax revenues. The advantage to the public economy is predicated on the difference between increased revenue resulting from the project and induced development, and increased public expenditures resulting from services required to support this new development.

Based on the assumptions that induced development may occur, the induced impacts on the natural environment associated with this development should be discussed. As noted previously, these impacts may include secondary socioeconomic impacts such as displacement; secondary impacts on hydrologic characteristics of the area and associated water quality impacts; secondary impacts on the local biotic inventory; secondary effects on air quality and surface transportation-related noise; and positive or negative induced impacts relating to compatibility or non-compatibility with land use goals or plans.

As can be seen from the above discussion, the methodology of evaluation does not establish hard and fast guidelines or equations for evaluation of induced impacts, but rather requires the preparer to

subjectively evaluate the potential for induced development as a result of the airport action and then subjectively evaluate the associated impacts.

As a guide, the following points should be helpful in defining impacts and potential conflicts caused by induced development:

- . Desired or undesired alterations in land use induced by the project.
- . Private and public sector economic growth induced by the project.
- . Population growth induced by the project and any resulting alteration in demographic patterns in terms of compatibility with comprehensive land use objectives.
- . Alterations in public service demands induced by the project in terms of the community's ability to finance expansion at a pace that can accommodate growth without environmental degradation or diminution of social amenities.
- . Alterations to the natural environment brought about by induced development.

(2) *Identification of Short-term and Long-term Impacts*

Generally, induced impacts occur over the long term. However, the project may result in some secondary short-term impacts on the economy during the construction period. For example, project construction will assure an increased number of short-term jobs in the construction

industry. Also, major projects may induce increased employment and revenues in construction-support industries.

Induced impacts are most apparent over a period of several years. Depending on project scope, secondary consequences may result in the following long-term alterations:

- . Increased spin-off jobs, induced by expanded airport activities, will act as a positive multiplier on the private and public economy.
- . Road and utility improvements may induce development bordering the airport site. If compatible with land use plans, this represents a positive long-term impact.
- . Development compatible to airport operations is largely commercial/industrial in nature. These types of development create additional jobs stimulating the private sector of the economy and generate property tax revenues which supplement the tax base for the public sector. Thus, compatible induced development will, in turn, induce improved economic opportunities.
- . New or expanded commercial carrier service will directly expand mobility and social opportunities for service area residents. Expanded amenities induce more persons into the area. This represents a positive impact as long as public resources and services can expand at a rate commensurate to population growth and as long as the regional demand for labor matches the skills of incoming population and exceeds their absolute number.

(3) *Impact Evaluation and Comparison With
Laws, Standards and Procedures*

Based on the previously suggested methodology, it will be possible to hypothesize as to whether or not the project will induce development consistent with comprehensive planning goals and objectives.

Any variance with these goals or planned land use patterns must initially be considered an adverse impact. Where variances occur, ameliorative measures proposed below should be provided sufficiently in advance to prevent any undesired hypothetical scenarios.

(4) *Determination of Measures to Minimize Harm
and/or Alternative Solutions to be Sought*

Promulgation and enforcement of zoning ordinances which fulfill land use planning and comprehensive development objectives are the best methods to assure positive long-term benefits.

The induced consequences of an airport project must be contemplated early in the project's planning stage, and a coordinated effort should be established by regional officials to direct constructive growth in the area. A coordinated plan should take into account the following factors:

- . Programmed expansion of public utilities and services predicated on increased population induced by the project and its resultant induced development.

- . Revision of comprehensive land use plans to optimize induced development.

In the event that induced impacts of the project represent irreversible adverse alterations of or irreconcilable conflicts with comprehensive development plans, alternate solutions should be sought.

These include:

- . Selection of new sites.
- . Incorporation of phasing into project development to absorb impacts in increments.

Impacts on the natural environment created by induced development must also be minimized. This must be accomplished through the coordinated efforts and legislation of local governmental agencies responsible for such independent actions.

h. GRAPHIC PRESENTATIONS REQUIRED

While no graphic presentations are required in this section, conclusions may be documented by reference to exhibits in the Land Use, Direct Socioeconomic Impact, and 4(f) Impact sections.

i. SUPPORTING DOCUMENTATION TO BE APPENDED

Sources of input for assumptions regarding induced development should be cited in the assessment appendix. Where projections are based on experience in similar study areas, a bibliography of research literature should be appended.

j. CONSISTENCY WITH OTHER IMPACT EVALUATIONS

Projections of induced impact are dependent on data, evaluation and conclusions given in the Land Use and Direct Socioeconomic Impact sections of the draft EIS.

k. LIST OF REFERENCES

None suggested.

SECTION 4(F) LANDS

11. Section 4(f) Lands

a. GENERAL CONSIDERATIONS

(1) *Determination of Scope of Project as it Relates to Parks and Recreation Lands*

As discussed in Section II of this document, Section 4(f) of the DOT Act of 1966 applies to use of land from any publicly owned park, recreation area, wildlife and waterfowl refuge of national, state or local significance, and to use of land from any publicly or privately owned historic site of national, state or local significance. Once it has been determined that one of the above properties may be affected by a proposed action, certain procedures must be followed and specific information documented. These procedures include identification and description of the properties, determination of "use" of the lands, consultation with the owner agency, evaluation of feasible and prudent alternatives, and consideration of measures to minimize harm to such land. Each of these procedures will be discussed below. Figure 11 presents the 4(f) analysis procedure.

A discussion of 4(f) lands and potential impacts is clearly related to other impact categories within this assessment.

Initial identification of potential 4(f) lands should be made during the land use analysis and site reconnaissance. Since "use" of

IMPACT ANALYSIS PROCEDURE
 WII) LANDS

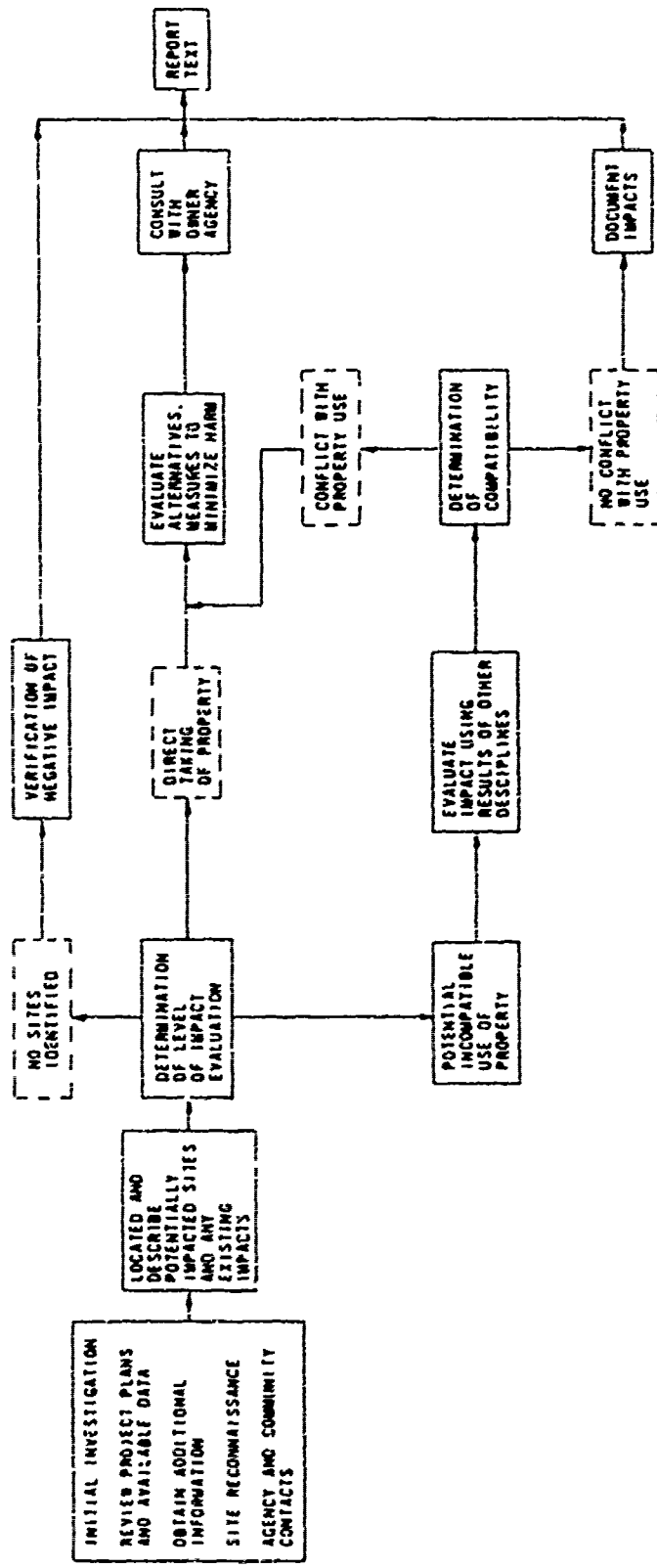


FIGURE 11

the property may be interpreted to mean more than just the physical taking of land, discussion of other off-site impacts related to noise, air, and water quality, and land use may relate to the affected property.

Separate sections of this document relate specifically to impacts on vegetation, wildlife, and historic sites.

Due to its relatively large land requirements, airport development may come in conflict with facilities such as public parks, recreation areas, or wildlife and waterfowl refuges. Impacts can involve the physical alteration of a site due to construction or expansion of a terminal, extension of runways, land acquired for clear and safety zones, or placement of navigational aids beyond the airport boundary.

Airport action may generate secondary impacts such as air, noise or water pollution on recreation facilities beyond the immediate airport boundaries. These impacts may affect public lands several miles from the airport depending on its usage and type of aircraft.

(2) *Review of Immediately Available Data*

Previous project data to be reviewed include:

- U.S.G.S. maps of area; transportation maps.
- Any prior airport expansion plans or studies.

- Airport master plan and report, if prepared.
- Land use plan for airport property and adjacent communities.
- Files concerning community impact and participation.
- Any prior correspondence with Federal, state and local recreation agencies.
- List of community groups, organizations or other interest groups.

b. SITE RECONNAISSANCE

Once it has been determined that a 4(f) property may be impacted, a field reconnaissance is necessary to determine the location, usage and relative significance of the property. This reconnaissance may include contact with park officials, depending on the location and sensitivity of the sites involved. The reconnaissance should include those areas not designated as park and recreation areas but which may be used for that purpose.

c. DATA REQUIREMENTS AND SOURCES

If Federal lands or national parks are involved, contact should be made with the local office of the owner agency. Regardless of ownership, consultation is required with DOI, DOA, and HUD, when applicable.

The following listing includes those state, local and private interest groups which should be contacted regarding their respective recreational facilities:

State

- Parks, Recreation Agency or Authority.
- Department of Natural Resources.
- State Planning Agency.

Local

- City County Parks and Recreation, Commission or Board.
- Local, Regional Planning Agencies.

Private Organizations

- Local, Regional conservation or recreation groups.
- National organization, i.e., National Wildlife Federation.

Information to be requested for each affected property includes:

- Location and description of property within airport vicinity.

- Ownership.
- Patronage and size.
- Significance to the area and/or region.
- Present and future plans, master plans for area expansion or improvement of facilities.
- Prior, future usage of local, state, Federal funds.
- Site plan, layout and photos of property.

Information to be specifically requested should include whether or not Federal grant-in-aid monies have been used either to acquire or develop the area. There are certain constraints relative to land use conversion to a non-recreation or a non-fish and wildlife use. If a state or locally owned park has been purchased or developed with Federal assistance (DOI Bureau of Outdoor Recreation, HUD, etc.), the concurrence of the grantor agency is required before the land can be used for purposes other than recreation.

d. CORRESPONDENCE REQUIRED

Any part of a publicly owned park, recreation area, refuge, or historic site is presumed to be significant unless there is a statement of insignificance by the Federal, state, or local official having jurisdiction thereof. Any such statement of insignificance is subject to review.

Any evidence of concurrence with project plans or mitigative measures by owner agency officials should be obtained.

e. DETERMINATION OF EXISTING CONDITIONS

The determination of impact on 4(f) lands involves an analysis of existing conditions around the property, i.e., how the land is presently impacted by airport operations. If no airport currently exists, the description of the potentially affected site would still relate to that site's location, size, usage, unique or irreplaceable qualities, community significance, and relationship to other similarly used lands in the vicinity.

f. DETERMINATION OF LEVEL OF IMPACT EVALUATION

Applying Section 4(f) to airport expansion proposals requires a case-by-case analysis of the impact of the project on the recreation facilities. The presence of a park or recreational facility is not necessarily an insurmountable obstacle to airport expansion. If the case can be made--and it has been made in many instances--that the conditions of Section 4(f) are met, airport expansion projects requiring use of park and recreation lands can be approved. It is important to emphasize, however, that both the statute and court interpretations of it give heavy weight to the preservation of these lands and require that alternatives involve "truly unusual circumstances", "unique factors",

or cost or community disruption reaching extraordinary magnitudes to justify the use of parklands.

DOT Section 4(f) can be invoked either by the physical taking or the use of land. When there is an actual physical taking of Section 4(f) land in conjunction with the proposed action, there is no latitude for judgment regarding Section 4(f) applicability. When there is no physical taking, but there is the possibility of use of Section 4(f) land, due to other identifiable impacts, it must be determined if the activity associated with the proposed action conflicts with or is compatible with the normal activity associated with the land. The proposed action would be compatible if it would not noticeably affect the normal activity or aesthetic value of the Section 4(f) land. If this was the case, Section 4(f) would not apply, and the assessment should contain a statement to document the negative impact on any such lands.

If there is a use of the land as determined by various impact category analyses, the assessment should state the impacts and must include an explanation of alternative land uses and a statement of the measures to be taken to minimize impacts on the property.

Certain problems may arise concerning the applicability of Section 4(f) to a specific site. Based on recent interpretations and

decisions regarding the administration of Section 4(f) property, the following guidance is offered to aid in clarifying specific situations which may arise.

If the property is designated by the public owner agency as a park, recreational, wildlife or waterfowl area, it is a Section 4(f) land.

The actual use determines whether Section 4(f) is applicable when the land is not designated recreational but is used for that purpose.

Section 4(f) applies to publicly owned lands and not to privately owned clubs or recreation facilities (except for historic sites).

A letter of non-significance from appropriate officials will eliminate the requirement for Section 4(f) considerations, provided the FAA finds that such a determination is not arbitrary.

Documentation should be made of any prior agreements concerning use of airport land for recreational purposes.

School property serving only as a recreation area for the school has not been considered to be covered by Section 4(f); whereas, an area which is open to the general public to serve the recreational

needs of the community as well as the school is considered to be covered by this Section if found to be significant by responsible officials.

Where property is owned by and currently designated for use by a transportation agency and a park or recreational use of the land is being made only on an interim basis, a Section 4(f) determination would not ordinarily be required. However, where the recreational or other Section 4(f) use is of longer duration and the land is considered significant for these uses, Section 4(f) should be considered to apply.

Where the use of a property is changed by a state or local agency from a Section 4(f) use to a transportation use in anticipation of a request for FAA approval, Section 4(f) should be considered to apply, even though the change in use may have taken place prior to the request for approval or prior to any FAA action on the matter. This is especially true where the change in use appears to have been undertaken in an effort to avoid the application of Section 4(f).

The question of airport expansion where a park or recreation facility is located in the approach area is more difficult to resolve. If the aviation impact upon the park area is so severe as to constitute a "use" of the land by reason of noise and other impacts, then again Section 4(f) would apply. In determining whether Section 4(f) applies

to the impact on a park in an approach zone, both the actual use of the park as well as the noise and other aviation impacts must be examined carefully.

Where there is parkland in an approach zone which would be affected by an airport development proposal, but would not be purchased or impacted so heavily as to constitute a "use," then normal EIS procedures should be followed. Efforts to minimize park impact should be incorporated into the project, but the requirements are not so strict as those under Section 4(f). In either case, the "planning to minimize harm" requirement can be met by providing comparable replacement park facilities or by improvements to existing facilities which would assure its continued utilization.

The reverse situation--purchase of land in approach zones by an airport authority and converting it to park or recreation use--would seem acceptable. In this case, the actual park or recreational use (existing or proposed) must again be evaluated for its compatibility with airport operations. Thus a "nature center" would probably not be compatible, although there might be other recreational uses which could be compatible.

g. *IMPACT ANALYSIS*

(1) *Methodology*

The actual determination of impacts is accomplished through analyses associated with the other impact categories discussed in this document.

Section 4(f) requires a finding that no feasible and prudent alternative to the proposed action exists. The "feasible" and "prudent" criteria are discussed in the section of this document concerning Alternatives. Where 4(f) lands are affected, the consideration and discussion of alternatives are of extreme importance. The Section 4(f) portion of the impact document should demonstrate compliance with the U. S. Supreme Court's statement in the Overton Park case, as follows:

"The very existence of the statute indicates that the protection of parklands was to be given paramount importance. The few green havens that are public parks were not to be lost unless there were truly unusual factors present in a particular case or the cost or community disruption resulting from alternative routes reached extraordinary magnitudes. If the statutes are to have any meaning, the Secretary cannot approve the destruction of parkland unless he finds that the alternative routes present unique problems."

If it is determined that no feasible or prudent alternative to the use of Section 4(f) land exists, the analysis and documentation of impacts must also contain evidence of planning to minimize harm to affected lands and documentation of consultation with owner agency officials.

(2) *Identification of Short-term and Long-term Impacts*

These specific impacts are referenced in sections of this document dealing with other impact categories.

(3) *Impact Evaluation and Comparison With Laws, Standards and Procedures*

Once it has been determined that Section 4(f) lands may be impacted, the assessment must contain specific documentation as referenced in this section.

The owner agency's position is of primary importance in the 4(f) finding.

(4) *Determination of Measures to Minimize Harm*

If there is no feasible and prudent alternative to the use of 4(f) land, the assessment should include a statement of actions taken or to be taken to minimize harm to the protected area, including replacement of land and facilities and design measures such as planting or screening to mitigate any adverse effects. Replacement is specifically required for recreation lands aided by the Department of the Interior's Land and Water

Conservation Fund and for certain other lands falling under the jurisdiction of the Department of the Interior. Evidence should be included of concurrence or efforts to obtain concurrence of appropriate officials having jurisdiction over such land regarding actions proposed to minimize harm.

Measures to minimize harm include:

- Replacement in kind of any property acquired for project use (functional replacement as per 49 CFR 25.267).
- Modification of airport operational procedures.
- Proper measures to control erosion or water quality degradation.
- Provisions to maintain access to areas in question.
- Fencing, landscaping, lighting, and other design measures.

h. GRAPHIC PRESENTATIONS

The following graphics will help to describe the affected lands and to present impacts:

- Photos of affected lands.
- Site plan of recreation areas.
- Any master plans or development plans.

- Exhibit showing affected area in relation to project, with pertinent impacts shown (i.e., extent of noise contours).

i. SUPPORTING DOCUMENTATION TO BE APPENDED

- Correspondence with owner agency.
- Statements of significance or insignificance from owner agency.
- Results of any special studies and/or on-site inventories.
- Statements of agreement when land transfers are involved.

j. CONSISTENCY WITH OTHER IMPACT EVALUATIONS

Impact evaluation of Section 4(f) lands is based upon impact developed in the other sections of the assessment such as air, noise and water pollution. Therefore, the descriptions and quantifications of impacts must be consistent with those discussed in the earlier sections.

k. LIST OF REFERENCES

None suggested.

11/1/52

HISTORICAL AND ARCHEOLOGICAL SITES

12. Historical and Archaeological Sites

a. GENERAL CONSIDERATIONS

(1) *Determination of Scope of Project as it Relates to Historical and Archaeological Sites*

Historic resources are those limited and non-renewable districts, sites, buildings, structures and objects having significant associations with historic, architectural, or cultural events, persons, or social movements.

Archaeological resources are objects or areas made or modified by man which contain information about man's past. It is a record of past human activity buried in the ground and, as such, is a non-renewable resource. The significance of an archaeological site is dependent upon the kind of human activity that took place there and how long the site was occupied.

The location and extent of most archaeological resources are generally not known until uncovered during a construction process. By then, artifacts may be destroyed or scattered about, effectively masking their true significance. Planning, in the earliest stages of project development, affords an opportunity for a systematic program of identification, evaluation and preservation of valuable archaeological resources.

The relationship of airport development projects to sites of historical and archaeological significance are summarized in this section. Though this section concentrates on historic and archaeological sites, it applies to other cultural or architectural sites as well. The impact analysis procedure is presented in Figure 12.

The previous section on Section 4(f) lands specified that the application of the Section 4(f) criteria and procedures included any publicly or privately owned historic site of national, state, or local significance. In addition to the Section 4(f) criteria, there are other specific steps to be taken in the analysis of a project's impact on historical or archaeological sites.

The steps involve identification of potentially affected sites, application of specific criteria of effect, and consultation with State Historic Preservation Officers (SHPO) and/or the Advisory Council on Historic Preservation (ACHP). These steps will be explained in more detail below.

(2) Review of Immediately Available Data

As in the case of Section 4(f) lands, the initial land use analysis will provide early evaluation of the relation between airport limits and these community resources. If appropriate, a review should be made of preservation efforts associated with any prior expansion or development plans.

IMPACT ANALYSIS PROCEDURE
HISTORICAL/ARCHAEOLOGICAL SITES

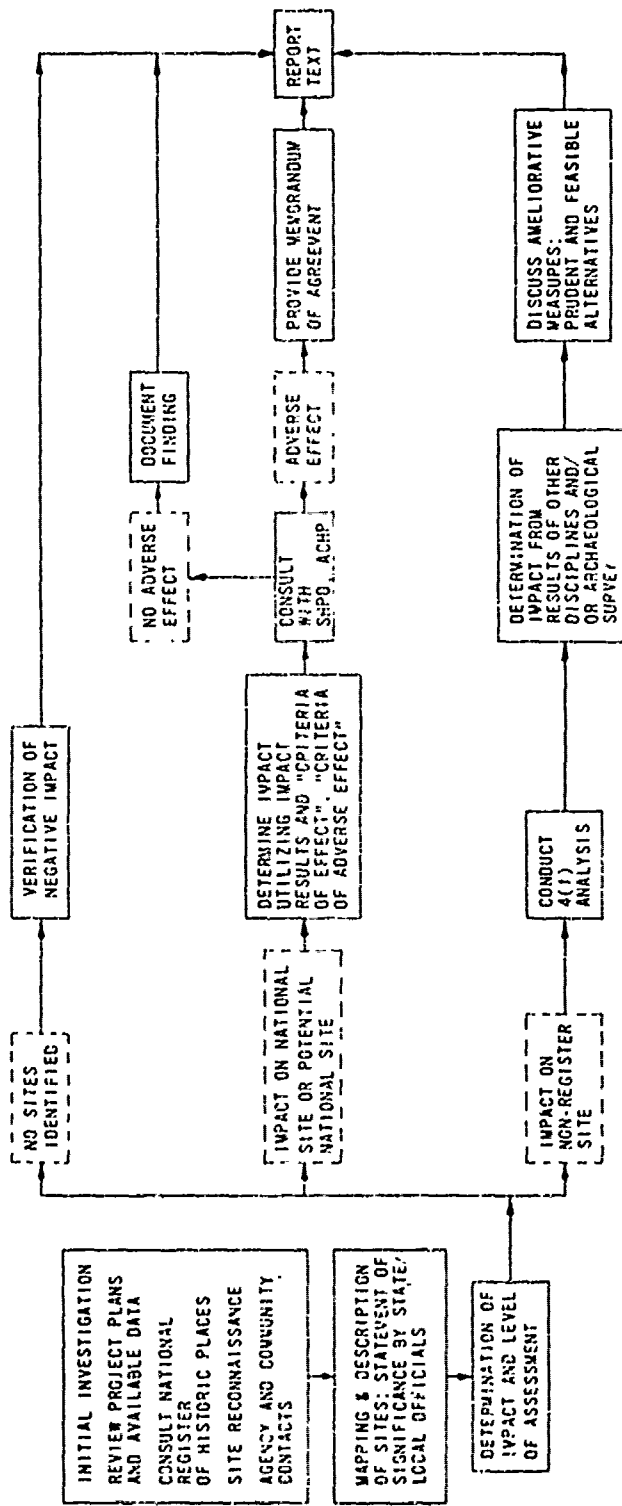


FIGURE 12

b. *SITE RECONNAISSANCE*

Where historical sites have been identified in the project area, a field inventory is needed to verify their location, use, and significance.

Where known or potential archaeological sites may be affected, site reconnaissance by qualified personnel should be conducted as specified in the methodology below.

c. *DATA REQUIREMENTS AND SOURCES*

The following agencies, organizations, and individuals should be contacted during the initial investigation of historic and archaeological sites:

- . Advisory Council on Historic Preservation (ACHP) - for guidelines and the National Register of Historic Places (published in Federal Register).
- . State Historic Preservation Officer (SHPO) - state inventory of sites; National Register Nomination forms.
- . Local Historical Society/Commission and State and local planning agencies - any published data or specific sites and/or surveys.
- . Museums and Universities - status and results of any surveys.
- . State Archaeologist - location and significance of known and/or potential sites.

It should be understood that these agencies should be contacted before any investigations that will physically affect historic and archaeological resources occur.

d. CORRESPONDENCE REQUIRED

The preparer of the assessment is responsible for obtaining information on the presence of potential sites as well as known sites. Correspondence is necessary to support a negative statement of impact. The presence or absence of archaeological sites can only be verified by professional archaeologists.

Correspondence should include a statement from the State Historic Preservation Officer on resources in the area and a letter of determination of eligibility for inclusion of properties in the National Register of Historic Places. In cases where there is a question regarding the status of a property, correspondence may be required from the Secretary of the Interior through the National Park Service, Office of Archaeology and Historic Preservation.

Further correspondence from the State Preservation Officer and/or the Advisory Council and the State Archaeologist later in the assessment phase is required to document a determination of no effect or no adverse effect and measures to mitigate any adverse impact.

e. DETERMINATION OF EXISTING CONDITIONS

By identifying and surveying potential sites and analyzing information from appropriate agencies, it is possible to identify the properties on or eligible for inclusion in the National Register of Historic Places.

The National Register includes properties which meet its specific criteria. Evaluation of effects on these sites should be in compliance with the procedures of the Advisory Council on Historic Preservation found in 36 CFR Part 800. The procedures were published in the Federal Register of January 25, 1974 (Vol. 39, No. 18) and later republished on February 10, 1976 (Vol. 41, No. 28). A copy of the later publication is contained in the appendix of this document.

Many states and localities maintain lists of other properties that do not fully meet the National Register criteria or which may be eligible for the Register, but have not yet been nominated. However, sites that may be eligible for the National Register, as well as those already listed, are subject to the above-mentioned Advisory Council procedures.

The existence of archaeological sites in the airport vicinity can be verified through prior knowledge of known sites by the office of the State Archaeologist or by verification by a professional archaeologist as to any potential sites which may be affected.

f. DETERMINATION OF LEVEL OF IMPACT EVALUATION

If no sites of historical or archaeological significance are identified through the land use analysis and agency contacts, the assessment should indicate that no such sites will be affected by project development. This conclusion should be verified by correspondence from the SHPO and the State Archaeologist.

Where properties which are included or eligible for inclusion in the National Register of Historic Places have been identified in the project vicinity, potential impacts should be evaluated in terms of the ACHP's Criteria of Effect and Criteria of Adverse Effect. According to this criteria, an impact on a National Register property would occur if the project causes "any change ... in the quality" of the "character that qualifies the property under the National Register Criteria." The effects should be evaluated in consultation with the SHPO. According to the criteria, adverse effects may include, but are not limited to:

- . Destruction or alteration of the property.
- . Isolation from or alteration of the property's surrounding environment.
- . Introduction of visual, audible, or atmospheric elements which are out of character with the property or its setting.
- . Transfer or sale of a federally owned property without adequate conditions for or restrictions regarding preservation, maintenance, and/or use.
- . Neglect of a property resulting in its deterioration or destruction.

If it is concluded as a result of the analysis and consultation that no adverse effect is expected, this finding should be presented in the impact document. Adequate documentation for a determination of no adverse effect should include:

- A list of the National Register or National Register eligible properties to be affected by the project. In the case of a National Register eligible property, a description of its significant and physical appearance, including a discussion of significant features and appropriate photographs, should be provided.
- A brief statement of the reasons why each of the Criteria of Adverse Effect (36 CFR 800.9) was found inapplicable to the effects of the project on the identified property.
- A copy of the written views of the appropriate State Historic Preservation Officer concerning the determination of no adverse effect and evidence of opportunity for review by the ACHP [36 CFR 800.4(d)].

If it is determined that the project will have an adverse effect upon a National Register property, further consultation with the ACHP is necessary and would include the preparation of a preliminary case report, an on-site inspection, and a public information meeting. The final environmental impact statement must include either an executed Memorandum of Agreement or comments from the ACHP along with an account of actions to be taken in response to those comments. (Procedures for obtaining a Memorandum of Agreement and the comments of the Advisory Council are found in 36 CFR Part 800.)

If there is a failure to agree on project mitigation or alternatives, the matter is submitted to the ACHP for consideration at their next meeting. Comments made by the ACHP as a result of the meeting are then made available to the FAA, the public, the President and the Congress. When a final decision on the project is reached by the FAA, the responsible

official must submit a report to the ACHP containing a description of actions taken subsequent to the ACHP's comments.

To determine whether the project will have an effect on properties of state or local historical, architectural, archaeological, or cultural significance that are not included in or eligible for inclusion in the National Register, the consultation should be held with the SHPO, the local official having jurisdiction of the property, and where appropriate, with historical societies, museums, or academic institutions having expertise with regard to the property. Use of land from historic properties of Federal, state, and local significance, as determined by the official having jurisdiction thereof, involves Section 4(f) of the DOT Act, and the documentation should include information necessary to support a Section 4(f) determination. (See previous section on Section 4(f) lands.)

If contact with the office of the State Archaeologist reveals that no sites of archaeological significance exist in the project area, a statement to this effect, referencing the contact, is sufficient. If no sites are known to exist, but there is reason to believe that they may be there, or if the State Archaeologist has prior knowledge of a potential archaeological site on airport property, an initial site assessment to confirm the presence and extent of any remains or artifacts is necessary.

Where surveys are undertaken and show a genuine "find," the Department of the Interior should be notified, and provisions should be made for survey, recovery, and preservation of any significant resources.

g. IMPACT ANALYSIS

(1) Methodology

Much of the methodology used in the analysis of impacts on historic and archaeological resources involves specific procedural actions which have been presented in the previous subsection. The ACHP procedures are included in the appendix. The actual analysis of potential effects on such sites are dealt with in other sections of this guidebook.

When required, on-site archaeological surveys should be performed by a registered archaeologist, using specialized techniques to uncover, tag, and identify any artifacts which are found. Special provisions should be enforced during construction operations to allow coordination with and investigation by archaeological personnel.

The possibility that archaeological discoveries may modify or curtail construction activities should be recognized, pursuant to the Antiquities Act of 1906 and subsequent legislation. If the initial survey shows a genuine "find," the site should be salvaged if consideration of relocation to an alternate site proves not to be feasible.

The FAA has an agreement with the Department of the Interior for assuring compliance with the Archaeological and Historic Preservation Act of 1974, providing for supervision relative to mitigation of damage to archaeological and historic data incident to construction activities of the FAA or any FAA assisted projects. Preliminary surveys to identify the location of these cultural resources may be necessary in those cases where there is reason to believe that such resources may exist and may be destroyed by the project and where such surveys have not yet been accomplished. The SHPO and State Archaeologist should be consulted to ascertain the need for any preliminary surveys, and to evaluate the significance of any cultural resources affected.

(2) Identification of Short-term and Long-term Impacts

The major potential effects are those described earlier as the ACHP's Criteria of Adverse Effect.

Short-term impacts would include temporary disturbance during construction activities.

(3) Impact Evaluation and Comparison With Laws, Standards and Procedures

The assessment of impact on areas of historical and archaeological significance requires compliance with the procedures of the Historic Preservation Act of 1966 and subsequent legislation, as well as with the ACHP's procedures for protection of properties.

In addition, any specific state and/or local guidelines and procedures concerning these sites and their preservation must be followed and discussed in the environmental statement.

(4) Determination of Measures to Mitigate Adverse Effects

Measures to mitigate adverse effects generally include consultation with the SHPO or ACHP (when appropriate) and compliance with previously stated procedures.

Any identified irreplaceable loss or destruction of significant scientific, prehistorical, historical, or archaeological data should be identified in the environmental assessment, with evidence of notice provided to the Secretary of Interior along with a description of measures to undertake the recovery, protection, and preservation of such data, including preliminary survey, salvage, or other investigations, as needed (as per agency agreement).

h. GRAPHIC PRESENTATIONS

The following exhibits will improve the presentation of historical and/or archaeological impacts:

- . Exhibits showing location of sites in relationship to project.
- . Photographs of buildings or site(s).

- . Exhibit showing impact of project on sites, i.e., taking of land or other type of alteration.
- . Exhibit showing site plan of historic site, park, district and any master plans proposed for sites.
- . Exhibit of other sites in project area, indicating ownership and size.

i. DOCUMENTATION TO BE APPENDED WHEN REQUIRED

- . Letters of Significance and/or No Effect from appropriate officials concerning site(s) in question. These would include evidence of consultation with the SHPO, correspondence concerning determination of eligibility, and evidence of compliance with ACHP procedures, including any Memoranda of Agreement reached.
- . Results of any surveys performed.
- . National Register of Historic Places, referencing specific sites.

j. CONSISTENCY WITH OTHER IMPACT EVALUATIONS

Evaluation of impacts on historic sites is based upon the analysis and results of other disciplines and must be consistent with any previously mentioned environmental impacts. This would include impacts such as air and noise pollution, compatible land uses, accessibility to the site, and aesthetic quality.

k. LIST OF REFERENCES

National Register of Historic Places - Department of the Interior, National Park Service (Federal Register, February 1, 1977)

The National Register is the official list of the nation's cultural resources worthy of preservation. A cumulative list is published each February in the Federal Register, while additions and deletions are printed every Tuesday of each month.

Advisory Council on Historic Preservation: To Advise, Recommend, Encourage, Coordinate, Assist

Booklet detailing the duties and functions of the Advisory Council on Historic Preservation. Available through Advisory Council on Historic Preservation, Washington, D.C. Also available is list of State Historic Preservation Officers responsible for promulgation of the National Historic Preservation Act in each state.

Archaeology and Archaeological Resources: A Guide for Those Planning to Use, Affect, or Alter the Land's Surface - issued by the Society for American Archaeology.

Booklet discussing the significance of archaeological resources, legal background for preservation, and governmental assistance in preservation. Available through the Society for American Archaeology, 1703 New Hampshire Avenue, N.W., Washington, D.C. 20009.

Public Archaeology by Charles R. McGimsey III

A document which reviews all state programs and cites both state and Federal legislation affecting archaeological resources as of 1971. Available from Seminar Press, 115th Avenue, New York, New York.

**ENERGY SUPPLY
AND NATURAL RESOURCE DEVELOPMENT**

13. Energy Supply and Natural Resource Development

a. GENERAL CONSIDERATIONS

(1) *Determination of Scope of Project as it Relates to Energy Supply and Natural Resource Development*

The scope of the project will determine its impact on the energy/natural resource supply in the following ways:

- . Additional demands on local power for support operations (lighting, heating, air conditioning).
- . Additional demands on national fuel inventory resulting from construction operations, expanded aircraft traffic, expanded vehicular traffic, including passenger, freight and service vehicles.
- . Reduction of natural resources caused by site location and use of land for airport purposes.

The scope of the project is important, since it affects not only demand but efficient use of available supply. For example, a major new reliever airport, despite its extensive scope, may reduce circling time and therefore eliminate unnecessary fuel consumption by aircraft in the region.

(2) *Review of Immediately Available Data*

Preliminary feasibility studies and engineering reports may provide specific information on existing and projected flight operations and energy requirements to operate the facility.

b. SITE RECONNAISSANCE

Unless the project site is located within an area considered to have potential value as an energy resource field or unless the project has an unusual requirement for mineral resources, reconnaissance is not necessary.

In the unlikely event that such a potential conflict would occur, extensive field monitoring would be warranted to verify subsurface conditions.

c. AGENCY AND COMMUNITY CONTACTS

The power company(s) servicing the site area should be contacted to determine a project's energy source or sources (oil, coal, oil and coal, or nuclear).

The District FAA office should be able to provide data on aircraft fuel consumption and any information on aviation industry usage and service levels.

The State or U. S. Department of Transportation should have or provide reference to research literature on surface vehicle fuel consumption and on general trends in transportation energy usage.

The U. S. Department of the Interior or various state agencies concerned with natural resources may have pertinent background information that may be useful in developing this section.

d. *CORRESPONDENCE REQUIRED*

None

e. *DETERMINATION OF EXISTING CONDITIONS*

Where an existing airport is involved, its total energy requirements can be evaluated. This estimation would include:

- . On-site power requirements.
- . Fuel consumed by daily aircraft operations, including takeoff, landing, taxiing and circling.
- . Fuel consumed by service and maintenance vehicles (Based on average daily operations).
- . Fuel consumed by average daily vehicular traffic using the airport, based on general service area boundaries.

The total consumption of these various factors will indicate existing conditions. As long as all time spans are comparable, consumption may be calculated in terms of average daily or annual use.

f. *DETERMINATION OF LEVEL OF IMPACT EVALUATION*

The determination of thresholds and subsequent levels of investigation is more difficult to accomplish than any of the previous disciplines. This is due to the fact that a point of reference is not clear. There are no criteria or laws which have been set which would assist in establishing points where more or less impact evaluation is needed.

This difficulty does not preclude a discussion of some clear-cut cases and of general considerations which may be used in evaluating energy and natural resource usage.

For projects involving modifications which will not significantly increase aircraft operations or change the role of the airport, the incremental increase in total energy requirements would be minimal. This would be the case, for example, where a crosswind runway was proposed for a general aviation airport. Discussion should relate to energy usage and control in the general aviation industry.

For projects involving expansion of larger commercial air carrier airports, the mere quantities of energy usage are much greater than that of the previous case. Therefore, an attempt should be made to evaluate average daily fuel consumption prior to and after project completion. Consumption after project completion should reflect the effect of the proposed modification.

Where new airports are involved, the new requirement for energy may require a somewhat larger portion of the local resources. However, in this case, the anticipated usage should be considered with respect to the following:

- . The new action may just be the shifting of aircraft activity (and resources) from other sites to one central site.

- . The introduction of service in a new area provides travellers or goods with more direct access, thereby affecting the levels of other types of energy required in travel and transportation.

Special consideration should also be given to sites where development for airport use may restrict the extraction and production of any natural resources or where the project has a unique requirement for construction materials (sand, gravel, etc.).

g. IMPACT ANALYSIS

(1) Methodology

Energy supply requirements and fuel consumption resulting from the project development can be calculated.

Where an existing facility is involved, incremental increases resulting from the project should be compared to existing conditions, and added to them to indicate total requirements. Any increase over existing consumption should be expressed in percentage terms. This provides an estimate of project impact on the energy supply.

The discussion of energy supply within the impact assessment should include discussion of the following energy-related actions, when applicable:

- . Optimizing airport operations for fuel efficiency.

- . In the case of reliever facilities, evaluation of new efficiency at previous site.
- . Utilization of mass transit on-and off-site.
- . Increased efficiency due to parallel runway configuration and added capacity (resulting in decrease in delays).
- . Implications regarding energy supply for alternate sites (distance to service area, access, etc.).

Preliminary engineering data will provide runway and taxiway lengths, ingress/egress and parking lot layout, and indicate energy source(s) for on-site power, communications, lighting, and other operational systems. It will also indicate fuel storage capacities and transmission systems.

Master planning data should include all necessary information about existing and design year flight operations, passenger population, embarkation/destination patterns and external highway improvements.

(2) *Identification of Short-term and Long-term Impacts*

Short-term impact is confined to fuel consumption during the construction period.

Long-term impact includes annual depletion of various energy resources resulting from project operations (new or incremental). It should be noted that facilities serving remote communities lacking

adequate rail service may have a positive long-term impact on national energy resources in that they reduce vehicular miles traveled.

Airports in urban areas, as well as general aviation facilities under challenge for other environmental reasons, may also be subject to challenge for unwise energy resource utilization. Urban airports are generally susceptible to this criticism due to available freight and passenger rail service.

(3) *Impact Evaluation and Comparison With
Laws, Standards and Procedures*

Not applicable to this category.

(4) *Determination of Measures to Minimize Harm*

Energy consumption reduction should dominate all aspects of project planning. New measures to minimize energy demand are being advanced daily. The following represent key considerations:

- . Selection of the most energy-efficient system for all aspects of project.
- . Establishment of energy management policy.
- . Design of the airfield and the total airport traffic circulation system so as to minimize fuel consumption by limiting taxiing distances and waiting times.
- . Provision for mass transit and/or limousine service to site.

h. GRAPHIC PRESENTATIONS

None.

i. SUPPORTING DOCUMENTATION TO BE APPENDED

The following material should be included in the assessment appendix:

- . A confirmation of the electric power and/or other energy requirements estimated for the project from the appropriate utility supplier.
- . A table, summary or bibliography indicating source used for estimating aircraft fuel consumption.

j. CONSISTENCY WITH OTHER IMPACT EVALUATIONS

Data on aircraft operations and vehicular traffic volumes must be consistent with that given in the Air Quality Impact section of the report.

Data on trip origins/destinations in relation to geographic service areas must be consistent with figures given in Project Purpose and Economic sections of the report.

k. LIST OF REFERENCES

The Energy Dilemma and its Impact on Air Transportation by the National Aeronautics and Space Administration (NASA), Langley Research Center and Old Dominion University, Summer, 1973.

Interdisciplinary study intended to communicate the dimensions of the energy situation and its impact on air transportation to the general public, to governmental bodies and to policy makers on the local, state, and Federal levels. Available from Old Dominion University, Norfolk, Virginia.

CONSTRUCTION IMPACTS

14. Construction Impacts

a. GENERAL CONSIDERATIONS

The environmental assessment should also disclose any probable adverse construction impacts. These are impacts caused by and confined to the construction period. Consequently, they are short-term in nature, terminating with the completion of construction operations and restoration of the project site.

Construction impacts can be identified within each impact category. Ameliorative measures should also be discussed concerning the mitigation of each construction impact. For example, measures to control fugitive dust and burning should be cited in the Air Quality section of the assessment; temporary steps to limit sediment transport to watercourses should be noted in the Water Quality section. Where ameliorative actions respond to specific Federal, state or local ordinances, the applicable statute should be indicated and summarized.

In addition to being covered within each category's impact section, adverse construction impacts and measures to ameliorate them should be summarized in a separate section of the assessment document and mentioned in the Short-term vs. Long-term section.

b. *FORMAT OF SECTION*

A clear and concise listing of construction impacts followed by a discussion indicating their respective ameliorative measures is sufficient. As previously noted, this is a summary section intended to expedite review by isolating adverse construction impacts and potential mitigation.

The preparation of this section should be accomplished after each impact category is completed and the text for the assessment is prepared. Specifics on construction impacts are then extracted from each section and listed, as illustrated by the following:

- . A short-term increase in stream turbidity. Provisions for ponding and temporary erosion controls will limit sediment transport to a minimum.
- . An increase in noise will result due to construction. If construction is near noise sensitive land uses, hours of construction operations will be limited so as to minimize impact on community activities.
- . Open burning will result in an increase in air pollution. Burning will only be permitted on days where meteorological conditions are conducive to dispersion and will at all times conform to state and local regulations. (Specific state or local ordinance should be noted).

LIGHT EMISSIONS

15. Light Emissions

a. INITIAL ASSESSMENT PROCEDURES

(1) *Determination of Scope of Project as it Relates to Light Emissions*

Proposed airport development actions often include facility installations and other sources of light emissions. Aviation lighting required for the purposes of security, obstruction clearance, and navigational guidance may create an annoyance among people in the vicinity of the installation.

The first major step in the analysis of light emissions is to identify the components of the proposed action which contain various sources of light.

(2) *Review of Immediately Available Data*

Project layout plans will identify the various project components and placement of light sources.

b. SITE RECONNAISSANCE

Where airport expansion is contemplated, the site reconnaissance made in conjunction with other impact categories will assist in identifying existing facilities with light emissions. Reconnaissance will also aid in locating areas of possible lighting annoyance.

c. DATA REQUIREMENTS AND SOURCES

The airport engineer and/or district/regional FAA office would have information regarding characteristics of existing and proposed lighting systems.

d. CORRESPONDENCE REQUIRED

None required.

e. DETERMINATION OF EXISTING CONDITIONS

As a result of the review of existing plans, a site visit, and sponsor/FAA contact, a description of existing light sources can be made. This description would identify any existing light annoyance problems and discuss current measures of mitigation.

f. DETERMINATION OF LEVEL OF IMPACT EVALUATION

The determining factor in evaluating light emissions is not the existence of lighting components in the project, but rather the existence of an annoyance problem in the surrounding community. Thus, the potential impact is determined by evaluating the project's lighting components in terms of adjacent environmental setting. Where a potential lighting problem is found, the environmental documentation should provide more information as discussed below.

g. *IMPACT ANALYSIS*

(1) *Methodology*

Documentation of lighting impacts should include a description of the location of light systems and information pertaining to their purpose, installation, beam angle and measurements, intensity, color, flashing sequence, and any other pertinent characteristics.

Included in the documentation would be the description of the locations of persons who could be annoyed by the lighting system's installation and operation.

Measures to lessen any annoyance and their relative degree(s) of success would also be included in the text.

(2) *Identification of Short-term
and Long-term Impacts*

The major long-term impact associated with the lighting components is the off-site annoyance or possible danger to persons living or driving in the airport vicinity.

(3) *Impact Evaluation and Comparison
with Laws, Regulations, and Procedures*

The impact evaluation should be made in consideration of minimizing lighting impacts on the adjacent community while still

retaining the highest level of operation efficiency and aviation safety.

(4) *Determination of Measures to Minimize Harm*

Recommended measures to minimize lighting impacts

include:

- . Shielding or angular adjustments of lights.
- . Alternative placement of lighting sources consistent with operational requirements.

h. GRAPHIC PRESENTATION

Where potential annoyance due to lighting emissions is identified, an exhibit should be prepared showing the location of the site, location of lights or light systems, and the location of residential areas where persons may be annoyed.

i. SUPPORTING DOCUMENTATION TO BE APPENDED WHERE APPLICABLE

The following items could be referenced in the assessment

appendix:

- . Technical descriptions of lighting system characteristics.

j. CONSISTENCY WITH OTHER IMPACT EVALUATIONS

The consideration of lighting emissions should be consistent with the description of the proposed project and its related components and facilities.

k. LIST OF REFERENCES

None suggested.

PRIME AND UNIQUE FARMLAND

16. Prime and Unique Farmland

Another area of the environmental setting which could be affected by airport development is prime and unique farmland. Prime farmlands are those whose value derives from their general advantage as cropland due to soil and water conditions. Unique farmlands are those whose value derives from their particular advantages for growing specialty crops. In addition, the preservation of farmland in general may provide some benefits of open space, esthetic quality, wildlife habitat and in some cases, recreational opportunities.

As part of its policy to preserve the Nation's prime farmlands, the Department of Agriculture (USDA) has recently announced a general policy to establish and maintain an inventory of prime and unique farmland. In addition, the USDA has agreed to place a major new emphasis on the review of draft environmental impact statements with respect to those lands.

A CEQ Memorandum regarding these lands is contained in the appendix of this document.

a. INITIAL ASSESSMENT PROCEDURES

(1) *Determination of Scope of Project as it Relates to Prime and Unique Farmland*

Airport development can affect prime and unique farmland not only from direct construction activities, but from changes in surrounding land use which might be induced by the project.

Initially, the physical limits of the project should be identified and the airport's location verified with respect to adjacent farmland. Figure 13 indicates the basic steps involved in the analysis procedure.

(2) Review of Immediately Available Data

Project layout plans will identify proposed project limits. Maps and photos used in the land use evaluation will assist in locating adjacent farmland.

b. SITE RECONNAISSANCE

A site visit should be made in conjunction with reconnaissance discussed in the land use section of this document. These efforts will assist in defining the project's physical relationship to the farmland in question. If the project has the potential to cause induced impacts, the reconnaissance should be expanded throughout the project's vicinity to identify other farmland areas.

*c. DATA REQUIREMENTS AND SOURCES
(IN ADDITION TO INITIAL LAND USE DATA)*

- . U.S. Department of Agriculture Field Offices and/or State Land Use Committees - identification of prime and unique farmlands.
- . State Soil Conservation Service (SCS) Offices - assistance in identifying farmlands and USDA procedures.

**IMPACT ANALYSIS PROCEDURE
PRIME AND UNIQUE FARMLAND**

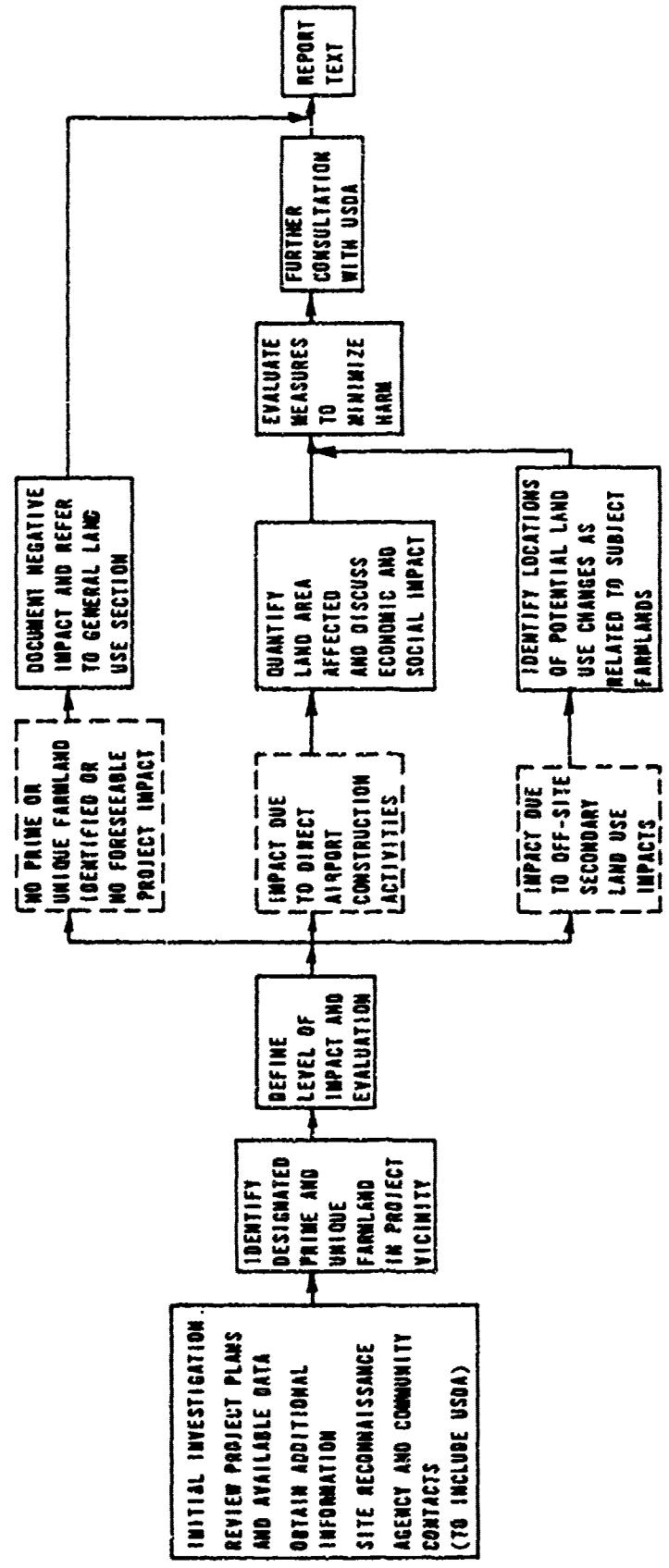


FIGURE 13

A listing of State SCS offices is contained in the appendix of this guidance document.

d. CORRESPONDENCE REQUIRED

If prime and unique farmlands are affected, correspondence should be obtained from the local USDA office denoting the significance of such lands, agency consultation efforts, and review of project plans and mitigation measures.

e. DETERMINATION OF EXISTING CONDITIONS

Through evaluation of information obtained in the assessment of land use and through consultation with the local USDA office, it is possible to present a description of existing farmlands in the project vicinity. This description should include information on the characteristics of the farmland which contribute to its classification as "prime" or "unique" farmland.

f. DETERMINATION OF LEVEL OF IMPACT EVALUATION

A proposed airport project would either impact prime or unique farmlands (directly or indirectly) or not impact them.

If it has been determined that the project will physically affect such farmlands, or that the project's induced impacts may affect such lands, the environmental analysis should reflect further consultations and discuss the extent of the identifiable impacts using results of the land use and/or induced impact investigations.

If no prime or unique farmland has been identified, a sentence so stating is sufficient.

g. IMPACT ANALYSIS

(1) Methodology

Efforts should be made in the planning process to assure that such farmlands are not irreversibly converted to other uses unless other national interests override the importance of preservation or otherwise outweigh the environmental benefits derived from their protection.

However, when airport construction is proposed in these areas, the impact evaluation for prime and unique farmlands would involve the determination of the amount of land to be affected and the social or economic impact of that loss on the local community and/or the total inventory of such farmland.

The analysis should reflect consideration of mitigation measures and the results of consultation with appropriate agencies.

Where no direct impacts on farmlands are identified, but the potential for induced off-airport land use impacts exists, the analyses should discuss the possible location of land use changes as they relate to surrounding farmlands.

(2) *Identification of Short-term and Long-term Impacts*

Short-term effects would involve the immediate conversion of farmland to airport use. Long-term effects would include the impact on the agricultural productivity of the region and the effects of induced land use changes on local farming interests and community services.

(3) *Impact Evaluation and Comparison with Laws, Regulations, and Procedures*

All projects which may have impacts on such farmlands should reflect appropriate consultation with the USDA.

(4) *Determination of Measures to Minimize Harm*

Recommended measures to minimize harm to prime and unique farmlands include:

- Site location or reconfiguration to avoid such lands.
- Consideration of farmlands in developing compatible land use plans.

h. GRAPHIC PRESENTATION

When appropriate, an exhibit should be prepared showing the project's limits in relation to designated prime or unique farmlands.

i. SUPPORTING DOCUMENTATION TO BE APPENDED WHERE APPLICABLE

The following items should be referenced in the assessment appendix:

- . Documentation of consultation with USDA.
- . Verification of no potential impact on prime or unique farmlands.

j. *CONSISTENCY WITH OTHER IMPACT EVALUATIONS*

The discussion of impacts on prime and unique farmlands should be consistent with the Land Use, Vegetation/Wildlife, Socioeconomic, and Induced Impact sections of the environmental document.

k. *LIST OF REFERENCES*

None suggested.

**ACTIONS TO MINIMIZE
UNAVOIDABLE ADVERSE EFFECTS**

17. Actions to Minimize Unavoidable Adverse Effects

In terms of report preparation sequence, this section should be prepared after narrative sections for all impacts have been written. Unavoidable adverse impacts and potential ameliorative measures should be extracted from each impact category's conclusion and concisely listed. The following are examples of data which would be included in a typical list:

- . A total of six acres of hardwood forest, ten acres of pine forest, and 14 acres of marsh communities will be taken by the project. This represents 0.5 percent of the study area's inventory. Restoration and landscape plans for the project include planting of new hardwoods and pine surrounding the parking lots, terminal and access roads. A total of seven acres of man-dominated fields will be permitted to revert to its original state.
- . A total of seven homes will be acquired for project development. Analysis indicates that adequate comparable replacement dwellings exist for those displaced. Dislocated families will receive assistance and compensation to find comparable safe housing in accordance with provisions of the 1970 Uniform Relocation Act.
- . Air traffic will be routed over the bay to avoid overflight of the residential community and institution to the south.
- . Control procedures will help mitigate potential noise impact. A two-segment approach will be established from the east to keep aircraft higher over the East Lake community.

Additional examples of unavoidable impact and ameliorative measures listings are found in the appropriate sections of the model statements.

It is emphasized that this section should be structured to disclose all adverse impacts, but not prejudice the reviewer against the project. Ameliorative actions are listed to show responsiveness to problems and to add proper perspective to project impacts. If these qualifications are not placed adjacent to the listing of impact, the net effect could be one of overwhelming adverse consequences. Conversely, by providing ameliorative actions, the project is placed in a positive perspective conducive to impartial review.

G. ALTERNATIVES

1. General Considerations

All environmental studies prepared under Sections 102(2)(c), 4(f), and 16(c)(4) require the consideration of alternative actions to accomplish the project's purpose. All possible alternatives should be considered. Alternatives can range from the No Project Alternative to totally different sites or design configurations. The depth of investigation involved relates directly to the feasibility of the alternative. In determining which alternatives to consider, all actions that might reasonably be expected to accomplish the project objective should be identified for preliminary review, including actions that are not necessarily within the authority of the sponsors or FAA to take, such as: (1) airport site out of sponsor's jurisdiction; (2) another mode of transportation; (3) air traffic operational constraints or; (4) jurisdictional land use and zoning practices. This section covers the sequence and study requirements for evaluating alternatives.

a. *TIMING*

Almost all projects represent the culmination of investigation of numerous alternatives. Economic feasibility and master plan studies evaluate multiple courses of action as a basis for their final recommendations. Certain alternatives are immediately discarded as unfeasible. These alternatives can be discussed and eliminated early

in the study process because they either do not fulfill the project purpose or they seriously conflict with critical community goals or facilities. The best place to refer to and eliminate these unreasonable alternatives is in the Purpose and Need introductory section of the EIS, as discussed in Section V.C. of this document.

Reasonable alternatives are quite different. These are legitimate actions meriting serious consideration. The assessment should contain information sufficient to permit a reasonable choice of alternatives as far as environmental aspects are concerned. Feasible alternatives generally originate out of one of the following sources:

- . Master Planning: Ideally, the environmental study should be a part of a master planning process. In this case, the objective is stated and numerous alternate sites or methods evaluated to achieve it. The superior alternative is selected as the proposed project and reasons why inferior alternatives were rejected are explained in the Alternative section of the draft EIS.
- . Community Conflicts: Occasionally an initial project is proposed which conflicts with community goals or severely impacts one segment of the community. Opposition forces the sponsor to develop alternative actions which can respond to both sponsor and community needs.
- . Economic Considerations: When it is possible to accomplish a project in different ways, alternatives are evaluated to see which is the most cost-effective.

The feasibility of alternative modes of transportation can be ascertained by evaluation of such factors as economic analysis, availability of service, and travel time involved. The feasibility of a site can be immediately determined by size, location, accessibility, zoning, land use plans, and the existence of potential Section 4(f) situations.

The purpose of the overall environmental study is to evaluate impacts of feasible alternatives. In most cases, one alternative will prove superior and will be discussed throughout the body of the assessment as the proposed project. Description and discussion of other alternative sites or configurations will be deferred until the Alternative section.

b. LEVEL OF INVESTIGATION REQUIRED

The basic guidance on the level of investigation required is that sufficient analysis of reasonable alternatives (including taking no action) and their environmental benefits, costs, and risks should accompany the proposed statement through the review process to insure that consideration of alternatives is not prematurely foreclosed. This would normally mean that noise analysis would be performed; that relocation requirements would be estimated; and that Section 4(f) situations would be identified for reasonable alternatives. Trade-offs of adverse impacts may become evident during the analysis of alternatives. For example, one alternative may increase noise exposure in a residential area, whereas another would significantly

decrease the area's natural resource inventory. Under these circumstances, the responsible official must weigh these factors in selecting an alternative.

In terms of format, all feasible alternatives should be described at the beginning of the Alternative section and the impact of each alternative indicated. The No Project Alternative should be included in this format and may also be included in the section on project need.

Wherever possible, tables or exhibits should compare similar impacts among project alternatives.

In summary, the level of investigation must take into account both quantification and subjective qualification of impacts.

2. Types of Alternatives

The terms "feasible" and "prudent" are applied to the assessment of alternatives. Both Section 16(c)(4) of the Airport Act and Section 4(f) of the DOT Act require a finding that "no feasible and prudent alternative" exists. The terms "feasible" and "prudent" are separate criteria and refer to sound engineering principles and sound judgement, respectively. A construction alternative, for example, may be feasible if, as a matter of sound engineering principles, it can be built. It may not be prudent, however, because of environmental, social, or economic consequences. Generally, the proposed action is that alternative which

is feasible and prudent when, all factors considered (safety, efficiency, economic, social, and environmental), the benefits of the proposed alternative outweigh those of other alternatives.

a. *ALTERNATE MODES OF TRANSPORTATION*

Use of highways, railroads or, conceivable in rare cases, navigable waterways represent alternate modes of transportation. The feasibility of these alternatives depends on accessibility, availability and level of service. Evaluation should take into account tangential factors such as travel time as it relates to cost-efficiency of persons to be served/products handled, energy use, capability to serve large numbers of users from comparable service areas, reliability, and safety.

With the exception of major cities along established urban corridors, railroad service cannot compete effectively, based on the above criteria. For long distances, use of automotive vehicles not only increases travel time but requires greater energy consumption. The feasibility of rail and bus service to meet the needs should be documented.

Under most circumstances, alternate modes of transportation require only superficial investigation prior to elimination as a feasible alternative.

b. *UTILIZATION OF EXISTING AIRPORTS*

Consideration must be given to upgrading or expanding an existing facility. For example, it may be feasible to upgrade a general aviation facility by extending or paving a turf strip.

The goal of this alternative is to minimize environmental impact by confining airport activity to a site which is already experiencing this type of land use.

Elements which must be considered in evaluating this type of alternative include the following:

- . Capability to expand on-site.
- . Off-site acquisition required to achieve project objectives.
- . Off-site environmental impacts resulting from expanding/upgrading existing facility.
- . Suitability of surface transportation network and other services to support proposed project.
- . Proximity to service area.

For projects intended to relieve congestion at air carrier airports, operational alternatives to the project should be discussed in sufficient detail to show why they would not be feasible. Such alternatives might include incentives or regulations to reschedule operations in order to reduce peak hour congestion, as well as incentives or regulations to divert low passenger carrying operations to separate general aviation facilities.

c. ALTERNATE SITES

Ideally, environmental evaluation of alternate sites should occur during the preliminary planning period, concurrent with economic and

engineering feasibility studies. In this way, environmental impacts, which could ultimately prevent project approval, can be determined prior to making costly commitments. Site selection studies should include environmental evaluation along with other planning criteria.

Feasibility studies generally do consider alternative sites-- whether for a new facility or as a pragmatic alternative to existing facility expansion. Results of preliminary analysis serve as the source material for the environmental investigation. Where economic and engineering studies justify expansion of an existing facility, evaluation of alternate sites may be more superficial, since environmental impacts associated with a new site are generally more extensive and profound. New sites may be discounted by such factors as introduction of new and incompatible land use, traffic, noise, impact on housing, induced development, etc.

The purpose of the alternative section is to evaluate all realistic alternatives in sufficient depth to provide adequate information to the decisionmaker.

The draft EIS text should assist the decisionmaker by focusing on points which distinguish alternate sites from the proposed project. Exhibits illustrating comparative land use compatibility at various sites and comparative noise contours can be used.

Tables comparing losses resulting from the proposed project site to losses at alternate sites will expedite the review process.

d. ALTERNATE CONFIGURATIONS WITHIN A GIVEN SITE

Alternate configurations which are equally feasible to accomplish the project's objectives can be introduced as part of the project description in the first section of the draft EIS and as exhibits showing alternate layout plans.

For purposes of clarity, the proposed configuration should be described first and summary paragraphs provided citing reasons for this preference. The impacts of this project are discussed, by category, in the Environmental Impact section of the text, with comparative impacts of alternate configurations covered in the Alternative section of the draft.

Site reconnaissance and field monitoring should be conducted for all alternate configurations, since these alternate layouts may affect totally distinct natural or human communities adjacent to a given site. All disciplines should be analyzed and ameliorative measures developed for each alternate configuration. Capability to minimize impact and costs of ameliorative measures may become decisive factors. Exhibits illustrating results should be provided in the Alternative section.

• Conclusions as to the relative advantages or disadvantages of each alternative should be given for each affected discipline. In addition,

a summary sub-section should be provided. This should provide the reviewer a concise recapitulation of reasons why alternatives have been rejected.

Every effort should be made to achieve clarity while presenting a comprehensive analysis. Elimination of unreasonable alternatives can be accomplished in the need for the project section.

e. NO PROJECT ALTERNATIVE

FAA Order 5050.2B specified that "rejection of the alternative of taking no action or postponing action pending further study must be supported by a detailed examination of the need for the project and the consequences of taking no action." This mandates study of the No Action or No Project Alternative.

For purposes of clarity, it is suggested that consideration of the No Project Alternative be covered in a separate sub-section of the Alternatives section. This section should focus exclusively on impacts resulting from inaction.

No Action does not automatically imply maintenance of the status quo. In terms of the natural environment, biotic communities will not necessarily be saved. If land use plans call for commercial-industrial development of the study area, loss of biotic communities becomes inevitable, regardless of whether the site is used for an airport or other approved types of development. Each discipline should be reviewed with

the consideration of what would happen over the short term and long term if the project was not constructed.

Generally, study will show that the No Project Alternative will have little adverse short-term impact but would result in major long-term impact--especially in terms of socioeconomic consequences.

If the project is shown to directly and indirectly increase employment, induce desired land development and population growth, advance social mobility and generate tax revenues to increase public amenities, a No Action choice might not seem to be in the best long-term interests of the community. This section must broadly assess restrictions resulting from the No Project Alternative.

H. SHORT-TERM/LONG-TERM TRADE-OFF

All environmental impact statements must include a summary section evaluating a project's short-term impacts against its long-term effects. Earlier in this guidebook, each section covering impact analysis focused on the need to identify and distinguish between short-term and long-term consequences. This section is intended exclusively to discuss these findings.

This is a summary section in that it is comprehensive in scope--encompassing all disciplines without repeating the detail required for

each discipline. This section calls for tabulating and weighing the sum of all conclusions documented earlier.

As noted previously, short-term impacts are those immediately felt by the community. Loss of homes, construction noise, disruption of traffic patterns are typical adverse short-term impacts. Jobs generated by project construction exemplify one of the positive short-term impacts. The compensating nature of short-term adverse impacts is that they are generally temporary in nature and conducive to amelioration. Stream turbidities will temporarily increase, but this will not be significant with the installation of proper sediment controls. Particulate pollution can be diminished by treating excavated areas with water or other dust palliatives. Each of the short-term impacts noted should be qualified by its accompanying ameliorative measures.

Long-term impacts range from permanent loss of corridor vegetation and wildlife on the negative side to the stimulation of the private and public economy on the positive side. Long-term impacts should be predominantly favorable and compatible with overall community goals in order to justify the project.

"Trade-off" refers to the concept of evaluating long-term and short-term gains and losses resulting from the project. The long-term gains to the overall community must be sufficiently great to accept the short-term hardships which most directly fall on a small segment of the community surrounding the project site.

While this section of the draft EIS requires the summation of extensive material, it need not be lengthy. Unavoidable long-term and short-term adverse impacts have been specifically discussed earlier. This section should focus on the narrow question as to whether losses are tolerable and trade-offs acceptable.

I. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This section requires disclosure of any irreversible or irretrievable action resulting from the project. Both natural and cultural resources are subject to investigation and summary.

Natural and cultural resources include, by way of illustration but not limitation, a summary of the following from previous sections:

- . Commercial forests
- . Navigable waterways
- . Wetlands, coastal zones, bays, lakes
- . Potential sites for energy resources
- . Archaeological and Historical sites
- . Park and recreation areas, wildlife and waterfowl refuges, botanical gardens, zoos
- . Universities, colleges, schools, libraries
- . Museums, concert halls, theaters, sports arenas
- . Hospitals, research centers

Disclosure in this case requires consideration of whether construction or operation of the project will: (1) significantly deplete the area's natural resource inventory or; (2) irreversibly alter use or enjoyment of natural and cultural resources.

The first point is fairly obvious. Based on known construction requirements and the area's general inventory of construction resources, it is possible to estimate whether the project would use up a disproportionate share. However, unless new or unique materials are involved, a general statement that construction requirements will not significantly deplete regional resources is acceptable.

The second point, covering irreversible alteration, involves not only immediate impact but the foreclosing of future options. For example, an airport may extend into a bay, disturbing bottom conditions and irreversibly foreclosing options to develop the portions of the bay as a recreational resource or tourist attraction.

Irreversible commitments have positive effects as well as negative effects; these should be stressed.

There may be some varying interpretation of the term "irreversible". A limited facility does not necessarily irreversibly foreclose future options. An example can be taken from the many Nike missile sites which surround U. S. cities in the early 1950's. When the Nike defense system became obsolete, those sites were converted to other uses.

Thus, careful consideration should be given to identifying whether the options are absolutely irretrievable/irreversible or whether they only strongly impede returning to a former condition.

J. COMMUNITY INVOLVEMENT

INTRODUCTION

A summary of community involvement and public hearing should be documented in the EIS.

The Federal government has recognized that the concerned public has a right to participate in the planning process. The provision of official avenues for public input diffuses opposition, corrects misunderstandings, calms fears and, if justified, stimulates support.

While the opportunity for a public hearing is the only formal requirement for public participation (as per Section 16(d) of the Airport Act), it is recognized and encouraged that the community should be informed and actively involved in the planning process from the earliest possible point. FAA Advisory Circular 150/5050-4, dated September 26, 1976, "Citizen Participation in Airport Planning," has additional specific guidance in community involvement.

FAA Order 5050.2B specifies that "communities, organizations and others affected by airport development proposals submitted to the FAA shall be provided an effective opportunity to comment at all appropriate stages

in the decisionmaking process." Consequently, public involvement must be considered an integral part of any proposed project.

Timing is critical to positive public involvement. Typical areas of controversy common to airport development would be increased noise levels or land use conflicts where an airport is built or expanded in an environmentally sensitive area. Even though the project sponsor may effectively deal with these problems through his planning and assessment efforts, public ignorance of the ameliorative measures proposed to mitigate them can greatly complicate the decisionmaking process. Thus, public involvement should begin as early as possible in the planning stage, particularly where alternative plans are proposed.

This section discusses some of the methods which have been successfully utilized to inform interested citizens of the extensive efforts undertaken by project sponsors to insure that a project will be compatible with its surrounding environment and that negative impacts will be minimized.

Two types of public meetings will be discussed--the informational or other informal meeting and the formal public hearing. The public hearing process is, of course, mandated by laws and ordinances controlling development activity, and the timing is usually at an advanced stage in plan development. Informational meetings, however, may be held at any time during the development process and offer project sponsors an opportunity

to not only inform the public, but also to receive the public's reactions and opinions on a project prior to the formal public hearing process.

The extent of meetings or other techniques to be utilized to involve the public is not determined by project size or complexity. Rather, it is dictated by the intensity of interest expressed by residents of a given area, regardless of project size.

1. Preliminary Steps to Community Involvement

Prior to any informational meetings, it is necessary to become familiar with the affected community.

Field reconnaissance will provide the opportunity to become familiar with street names, neighborhoods, schools, churches, agencies, parks, etc., within the project limits and probable flight paths. In this way, specific questions raised at informational meetings can be responded to directly, without requesting lengthy explanations.

Community surveys are a means to assess support or opposition prior to a public meeting and can be accomplished by mail. Affected residents can be identified and provided with a newsletter by the sponsor. Its content should include project goals, a summary of anticipated impact on the community and a request for resident reaction.

Initial apathy which may seem apparent from survey results does not necessarily imply long-term disinterest or tacit support. A

well-organized civic association can quickly arouse public concern. Therefore, it is essential to reach key public interest groups and opinionmakers early in the planning process. Every effort should be made to identify, contact and gain the cooperation of key leadership in these organizations. If their involvement is invited, their views accommodated or, at least, given serious consideration, potential opposition can be diffused.

Cooperation can take many forms. The sponsor can provide site inspection tours for group chairmen, showing them boundaries, existing facilities, proposed facilities and planned ameliorative actions--drainage systems, ponds, erosion controls, etc. Another alternative is to hold leadership luncheons with audio-visual presentations explaining the project. This type of public information effort is distinct in that it focuses on leaders or opinionmakers exclusively and should be timed in advance of approaching the community in general.

In summary, three steps may be taken to advance the sponsor's interest prior to public information meetings.

- . Area reconnaissance to learn neighborhood characteristics in detail.
- . Survey assessment to indicate degree of resident concern within the impact area.
- . Contact with key leadership in community, neighborhood and public interest organizations.

2. Informational and other Informal Meetings

a. *PURPOSE*

Informal informational meetings are the established means to obtain public input into the planning process. These meetings have three goals:

- . To introduce the project in an informal manner which both informs and invites comments.
- . To determine the nature and extent of support or objection from general public and/or special interest groups.
- . To provide a method by which comments for and against the project can be translated into input which will aid the sponsor in developing a project which will receive approval.

b. *NOTICE PROCEDURES*

Informational meetings should be held at places of public assembly within the impact area, if possible, so as to maximize convenience to the affected public. Local school auditoriums, church meeting rooms, or cafeterias of municipal buildings are suitable facilities.

The meeting should be scheduled during the early evening hours, so that working people may attend. It is advisable to begin shortly after the usual dinner hour, so that there will be sufficient time for all interested persons to comment and still be able to conclude at a reasonable hour.

Persons to be invited include:

- . Residents within the project's influence area.
- . Aviation and airspace users.
- . Local conservation or environmental groups.
- . Civil organizations, neighborhood associations.
- . Representatives of local government, business, labor, education, and public service sectors.
- . Public at large.

The notification process of the date and time of the informational meeting is flexible. However, the meeting should be advertised in local newspapers well in advance of the meeting and again on the day of the meeting.

c. MEETING PROCEDURES

Even though the tone of the meeting is informal, an organized agenda and orderly procedure to receive public comments should be planned. This agenda should be announced at the beginning of the meeting. The moderator should advise that the project and alternatives will be presented and then questions or comments accepted. If the project is controversial or the attendance anticipated to be large, it may be advisable for the moderator to request that all persons wishing to comment submit their names to a designated secretary. When those requesting to comment have concluded, the moderator should open the

meeting to further questions or comments from the audience. The meeting should be recorded for subsequent review. Magnetic tape is sufficient for recording, but video tape may be used, if desired.

The agenda should begin with introduction of all persons participating in the presentation, including the sponsor, local airport committee members, FAA representatives, and consultants. The project should then be presented, with the prepared text covering at least the following points:

- . Project description and any alternatives considered.
- . Environmental impacts being investigated and the depth of study for each.
- . Potential adverse impacts.
- . Ameliorative measures being studied and their anticipated success in mitigating impact.

Graphics, visual aids and special materials are extremely helpful in presenting the project. An audio-visual presentation utilizing slides or view graphs is the best technique to cover all points clearly in a short time span.

Slide presentations coordinated with a prepared text are usually best suited to informational meetings. Slides must be extremely clear and should contain no more detail than necessary to convey the desired message.

Additional graphic exhibits should be located in the meeting room. These include large scale maps, renderings or layout plans, and should be provided for public review before and after the meeting or during any break in the program. Representatives of the sponsor or his consultant should station themselves near these exhibits to be available to answer any questions which might arise.

A handout information package is also an excellent public informational device. This can be a simple, mimeographed document which includes the following:

- . Summary of presentation--project description, and environmental study scope.
- . Project Location Map.
- . List of agency and consultant representatives participating in meeting.
- . Name and address of person(s) to whom written comments may be submitted.

d. POST-MEETING REVIEW OF COMMENTS

After the meeting, public input and sponsor performance should be reviewed. Comments should be categorized by impact and evaluated in terms of the following:

- . Did responses fully answer questions asked?
- . Should certain issues be responded to in writing?

- . Are further informational meetings needed either for special interest groups concerned with specific impact or to inform public of any detail changes resulting from their input?

This post-meeting evaluation is critical to the study process in the following ways:

- . It identifies comments which can be incorporated into project planning, thereby fulfilling the purpose of mandated public input.
- . It indicates sponsor/consultant performance in clearly responding to comments in terms of brevity, clarity, and thoroughness.
- . It identifies major areas of conflict which must be resolved or confronted in the assessment and the public hearing.

3. Additional Actions to Inform and Involve the Public

While the informal informational meeting is the best method to obtain organized public input, additional techniques are available to the sponsor.

Audio-visual presentations can be made available for civic association programs. The Chamber of Commerce, Lions, Rotary, Optimist and other similar organizations have frequent luncheon or dinner meetings. The sponsor can offer to be guest speaker, providing a program on the importance of the project and environmental considerations taken in its development.

Meetings may be planned with special interest groups, focusing on measures to ameliorate a specific impact. Special programs would be structured to concentrate on alleviating fears and initiating a positive dialogue conducive to resolving conflicts. The type of special interest group relates directly to a specific type of impact. A conservation group would be most vocal in opposing projects impacting parks and other natural resources or open space. Minority residents may oppose neighborhood disruption, especially if the neighborhood contains ethnic or older persons.

Exhibits at places of public assembly also increase public knowledge of the project. Models, renderings and graphic presentations are often put on display within the existing airport, in downtown government or office buildings, and at shopping centers.

Finally, the sponsor can offer to participate in local television or radio news programs, interview panels, talk shows and local club meetings. While informational meetings are critical to the local community coverage, the news media is the best means to inform the regional service area.

4. Review Process Involvement

Additional community participation must be conducted as part of the review process. The formal public hearing provides an open forum for the public to question or comment on the project. A second avenue

for input is via the A-95 clearinghouse. The clearinghouse is required to inform state and local agencies and may circulate material to known interested private groups. Responses to comments from public hearings or civic groups contacted by the clearinghouse must be incorporated into the EIS. Details on the public hearing are provided below. Information on clearinghouse review procedures are provided in Section VI. It is sufficient to note here that community involvement is a continuing effort which extends beyond the actual study throughout the review process and which is documented in the EIS.

5. Public Hearing

A public hearing on the project is mandated by law after the draft assessment report is completed, published and distributed for public review. Regulations specify hearing structure, including advance notification, advertisement and format to permit public participation.

The following goals should govern the public hearing preparation:

- . Project presentation must comply with all applicable laws and regulations.
- . The presentation should emphasize actions taken in response to public input from informational meetings, and, if completed, the A-95 clearinghouse review. This: (1) indicates sponsor sensitivity and responsiveness to public and citizen concerns and; (2) may eliminate certain issues from discussion.

- . An agenda should be planned in advance which permits the public to comment in an orderly fashion to facilitate subsequent review by responsible agencies.

The hearing must be taped or transcribed to document all comments. Transcripts can be included in the appendix of the assessment report to indicate satisfactory responses. Additional responses may also be provided as an addendum to the transcript at a later date.

In order to facilitate public participation, speaker request cards should be handed out prior to the meeting and collected during the project presentation. Speakers should be recognized in the order that request cards are received. At the conclusion of all listed speakers comments, the meeting should be opened for comments by latecomers or persons who have questions resulting from previous discussion.

a. *NOTIFICATION PROCEDURES*

A notice of opportunity for a public hearing must be advertised in local newspapers 30 days in advance of its scheduled date. As part of the advertisement, it must be noted where copies of the environmental assessment report are available. These should be specified and can include libraries, state or municipal office buildings and the sponsor's office. Consideration should be given to providing copies to interested individuals or groups.

The location of the meeting should be established to maximize convenience of residents within the project impact area. The meeting should be scheduled at a convenient time to facilitate attendance.

b. *FORMAL PRESENTATION*

The following points must be covered in the formal presentation:

- . A full description of the project and alternative actions considered.
- . A brief explanation of each environmental discipline studied and depth of investigation for each.
- . Listing of potential adverse impacts.
- . Listing of ameliorative measures planned, with particular emphasis on actions taken in response to comments from informational meetings.

A prepared text should be used to insure that all pertinent data is mentioned. Where more than one representative of a sponsor or consultant will speak, texts should be coordinated to prevent repetitive overlap. The sequence of multiple speakers should be planned to give a sense of direction and continuity to the presentation.

Graphic exhibits should be provided and handled in a manner comparable to that suggested for informational meetings.

Handout information packages may be prepared for distribution. Contents could include the following:

- . Brief project description.
- . Brief discussion of EIS, summary of findings and ameliorative actions.
- . Project location maps.
- . Summary of informational meetings held prior to public hearings.
- . Summary of actions taken as a result of informational meetings.
- . List of sponsor and consultant representatives participating in program.
- . Name and address of person to whom written comments may be submitted.
- . Meeting agenda.
- . Speaker's request card.

Subsequent to the project presentation, comments should be received from those requesting to speak and the public at large. While no effort should be made to restrict participation, speakers may be requested to limit their comments to a given time period, if possible.

SECTION VI
ENVIRONMENTAL REPORT REVIEW PROCESS

VI: ENVIRONMENTAL REPORT REVIEW PROCESS

Review procedures are thorough and comprehensive, permitting input by Federal, state, regional and local agencies, special interest groups, and the public at large. Multiple review opportunities are provided, and all comments raised during review must receive a response prior to submission of a final EIS. Five exhibits illustrating the review and submission process are provided in the appendix to this document. The following section covers actions required to complete each step of the review process.

A. ONGOING COORDINATION BETWEEN THE SPONSOR AND THE FAA

Continuous coordination with the FAA in development of the assessment report is essential. The FAA is charged with ultimate responsibility for the environmental impact statement, which may be based on such a report. While the sponsor and/or consultant(s) may prepare preliminary material, the FAA must assure that documentation presents a full, accurate and fair assessment of environmental consequences. FAA must assure that sponsors and/or consultant(s) have given a complete and objective presentation of all project impacts and alternatives. To provide this verification, FAA must have confidence in the sponsor and his consultant(s). To accept this responsibility, District FAA officials must be sure that

they have been informed, if not actively involved, with every phase of the study process so that FAA can make valid judgements based on this study.

Order 5050.2B also mandates consultation between FAA and the sponsor and/or his consultant(s) on the following factors:

- . Environmental action choices
- . Key decision-making issues
- . Alternatives
- . Environmental assessment criteria
- . Project schedule considerations
- . Public involvement, including public notice
- . Proponent coordination
- . Reproduction and publication requirements
- . Follow-up assistance

B. MEASURES TO ACCOMPLISH FAA INVOLVEMENT

The degree of direct FAA involvement may be constrained by multiple demands on personnel. The sponsor must assure coordination, and the FAA must determine the degree of direct involvement which is desirable and feasible.

At minimum, FAA should be consulted on and participate in the following actions:

- . Early meetings to determine the scope of the project, alternative actions, procedures to comply with Federal laws and FAA regulations, approaches to potential environmental problem areas, and the level of assessment required.
- . Clearance and concurrence of FAA as to investigative input and methodology, i.e., noise models, air pollution dispersion models, etc.
- . Attendance at a meeting where the draft assessment report is presented to and discussed with sponsor. This would involve FAA review during and after the meeting to verify that the draft is complete, accurate and objective. The FAA will have an opportunity at this point to suggest additions or revisions.
- . Representation at all public meetings and hearings.

In addition, the sponsor/consultant(s) should keep the FAA constantly informed about the status of the study, particularly developments or findings which indicate problems with the project as proposed. The FAA should be consulted on any revisions in the original plan required to solve environmental problems or proposed in response to community impact. Further, the FAA should be aware of ameliorative measures and their effect on project costs and operational procedures.

In summary, since the FAA holds the final responsibility for the draft EIS, it must be advised of and concur with all study procedures, findings, recommendations, and project modifications resulting from the study.

Coordination of the environmental document within FAA is also an important part of the process. Some form of internal review procedure involving all the appropriate agency divisions will serve to accomplish the following:

- . Assure that the document covers all related foreseeable agency actions;
- . Assure that the document consolidates the environment assessments of all pertinent divisions; and
- . Assure that commitments of other divisions can be met and will be carried out.

For example, coordination will identify the kinds of commitments that can be made by the Air Traffic Division or the Airways Facilities Division. It does little good to go through an extensive analysis of noise impacts based on assumed flight tracks and runway use if there is little evidence to show that operations will take place in the manner described. Close coordination between various elements of FAA will assure that the best information available is applied at the planning stage relative to operation of aircraft into and around airports.

C. STATE AND LOCAL A-95 REVIEW

The purpose of the A-95 clearinghouse process is to assure that Federally assisted programs conform to state and local comprehensive plans and programs. Clearinghouse procedures are specified in Paragraphs 71

through 79 in FAA Order 5100.17. Clearinghouse review must be accomplished prior to submittal of the assessment report to the FAA and, if possible, should be completed in advance of the public hearing. This permits the sponsor to incorporate A-95 comments and responses in the draft assessment report prior to public review. Inclusion of A-95 comments and responses is mandatory for the FAA submission. It is not mandatory for public review, but desirable in that it assists in assuring the presentation of a full, accurate and fair assessment.

Procedurally, the actual submission of assessment reports to the clearinghouse can be accomplished at a meeting called by the sponsor and attended by: the state clearinghouse director; key state, regional and local agency officials who will be reviewing the draft; consultants who prepared the draft; and the FAA. In addition to transmitting the report, the sponsor should give a verbal presentation, summarizing the project, study effort, impacts and ameliorative measures.

The formal A-95 review process should be initiated 60 days prior to submission of the draft document to the FAA. The clearinghouse must have 30 days to inform appropriate state and local agencies of the proposed project. The clearinghouse should also be asked by the sponsor to inform known interested groups of the project.

During the review period the clearinghouse can act as the liaison between affected agencies, interested groups and the sponsor. Liaison

responsibilities include arranging meetings or other forms of consultation to answer any questions or resolve any problems raised by the project.

Clearinghouse comments and responses must be included in the assessment report. Initial comments, if easily responded to, may be answered by revisions in the draft text prior to submission to the FAA. For example, comments dealing with obvious typographical errors should be corrected in the text, and comments indicating misunderstanding due to ambiguity in the narrative text should be rewritten to make explanation clear.

However, substantive comments requiring lengthy responses should be accommodated through preparation of a special addendum to the report. Format should include agency comments followed by an item-by-item response. In cases where the same issue is raised in comments from several agencies, it is possible to prepare a single comprehensive response and to reference subsequent responses to similar comments to the first response. This prevents unnecessary duplication.

Every effort should be made to complete the A-95 review process prior to the public hearing and to include A-95 comments and responses as part of the presentation. This assures the public that key issues raised by local agencies have been responded to and/or resolved, and thus may preclude the need for further comment.

D. PUBLIC HEARING

This part of the review process is explained in Section V of this document in the discussion of community involvement.

E. PREPARATION OF RESPONSES TO COMMENTS BY REVIEWING AGENCIES AND ORGANIZATIONS AND TO THOSE ISSUES RAISED AT PUBLIC HEARINGS

Responses to comments may be accomplished in any one of the three following methods:

- . Revisions in draft text
- . Appended studies or information
- . Addendum responses to comments

Revisions in text are appropriate to reflect modifications in the project resulting from comments raised during informational meetings or by the A-95 review process. Revisions are also warranted where comments point out typographical errors or omission of minor detail. These can be easily corrected or added to the body of the text without major re-write. A prime consideration in the preparation of the report is that it be both comprehensive and clear. Where comments indicate ambiguous writing has resulted in confusion or failure to make a desired point, the text should be rewritten to be clear and direct so that there can be no misunderstanding during subsequent review.

Appended studies and additional information may be provided in response to civic association input, for example, or to A-95 agency comments requesting substantial additional detail or consideration of new alternatives. Examples include comments citing omissions in description of methodology, investigative results, etc. Initially, noise monitoring may not have been considered appropriate to the level of investigation planned, but may be considered later to assist in responding to issues raised in comments. If the decision was then subsequently made not to monitor noise, an explanation of the reasoning would be provided in the responses. Where appropriate, the text within the appropriate discipline should be revised to include a better explanation of impacts or information indicating that additional analysis was conducted in response to public comment.

The following sub-sections focus on the techniques used to respond to comments during various stages of the study and review process.

1. Community Informational Meeting Comments

Early input from informational meetings may be accommodated by revisions in draft text. The fact that community involvement was solicited and an organized method provided for input via information meetings, as well as adjustments in the plan resulting from meetings, should be noted in the Background section of the assessment report.

In the event that comments raised at this meeting were highly substantive and dealt with conflicts which could not be resolved by project revisions, a transcript or summary of the meeting may be included in the appendix. Documentation in response to meeting comments may most easily be provided within the draft. In any event, the sponsor should obtain a copy of a meeting transcript and make it available to the responsible official on request.

2. A-95 Clearinghouse Comments

All A-95 comments should be included in an appendix section of the assessment. Responses may be handled by any one of the following methods:

- . Individual, point-by-point responses following each agency letter or in a referenced addendum entitled Responses to Clearinghouse Comments.
- . Individual, point-by-point responses to comments covered by text revisions, with appropriate reference.
- . Combining all similar comments received from multiple sources and providing a single, comprehensive response in the addendum.

While specific unique comments will still require an individual response, use of cross-referencing to text revisions and grouping of similar comments will prevent unnecessary duplication and expedite the review process.

Letters and/or the addendum containing response to comments should be sent to the A-95 clearinghouse office, as well as agencies and organizations who submitted comments on the draft assessment.

3. Public Hearing Responses

Two methods are available to respond to hearing comments, and they may be used either singly or combined:

- . Number all comments in the margin of the transcript and respond individually to each numbered comment.
- . Combine and paraphrase all similar comments and provide one response.

These methods may be combined in the addendum by numbering all comments in the transcript, then responding to unique comments individually and similar comments with a single, categorical response.

F. PREPARATION OF THE FAA DRAFT STATEMENT

Upon completion of public hearing and A-95 review processes, the environmental impact assessment report should be submitted to the FAA. The complete document must include all comments and responses resulting from A-95 review and a summary of comments and responses to environmental issues raised at the public hearing.

All appended material from the original assessment report must be included. This should be supplemented by additional studies and data resulting from review comments; A-95 review comments and responses; and public hearing comments and responses.

As previously noted, the sponsor must make a transcript of the public hearing, but this document need only be submitted upon FAA request. Experience indicates that the inclusion of the transcript is a useful, efficient means to respond to comments.

The sponsor/consultant(s) should review, with the FAA, the extent and content of revisions prior to submission to the FAA. Once revisions are completed and all comment-response studies are appended, the environmental impact assessment report is transmitted to FAA. Henceforth, primary responsibility for the document is vested in the FAA and the sponsor/consultant assumes a supportive, supplementary role.

SECTION VII
MECHANICS OF STATEMENT PREPARATION

VII: THE MECHANICS OF STATEMENT PREPARATION

This section of the guidance book deals with in-house procedures and techniques which contribute to the actual formulation and production of the environmental impact statement. The items discussed are by no means exhaustive of the many actions which take place during the statement preparation process. Rather, they are presented as highlights of those sometimes routine, sometimes subtle measures which become integral components of the report preparation.

A. EARLY PROJECT MEETINGS

At the beginning of a project, it is beneficial to arrange an orientation meeting with those individuals who will be involved in the subsequent phases of the project. This meeting will allow the accomplishment of the following:

- . Presentation of project description, purpose, scope, and governing legislation.
- . Assignment of assessment discipline responsibilities.
- . Determination of scheduling and deadlines.

Any available maps and/or slides of the project area should be shown to aid in early identification of project boundaries, surrounding land uses, and sensitive areas.

B. CORRESPONDENCE/COMMUNICATION

Within the data collection phase of the project, it is usually necessary to request base data and/or solicit local agency input by letter. Each initial contact should include an explanation of the preparer's request, a description of the project, and a clear statement of information requested. Correspondence with appropriate agencies should be prepared and sent early in the data collection process to allow the agencies enough time to research and respond to the request.

Original agency responses should be kept in a master project file and, if appropriate, reproduced in the assessment appendix as supporting documentation. Copies should be routed to those persons dealing with the specific impacts referenced in each letter.

Telephone conversations are another source of information. As such, a standard means for documenting calls and important information received by phone should be established. A standard form to serve as a record of conversation can be reproduced and distributed to all staff members. A sample record of conversation is provided in Figure 14.

When possible, a telephone book for the project area should be obtained during the initial site visitation to facilitate direct agency and community contacts.

GREINER ENVIRONMENTAL SCIENCES, INC.

RECORD OF TELEPHONE CONVERSATION

DATE: _____ TIME: _____

PERSON CALLED: _____ ADDRESS: _____ **JOB NUMBER** _____

REPRESENTING: _____ PHONE NUMBER: _____

NAME OF CALLER: _____ ADDRESS: _____

REPRESENTING: _____ PHONE NUMBER: _____

DETAILS OF CONVERSATION:

ACTION TAKEN:

DISTRIBUTION:

(Name and Title)

A record should also be made of all meetings attended during the course of the study. Memorandums for the project file should include date and location of meeting, purpose of meeting, attendees, meeting highlights, and action taken.

C. GRAPHICS

Graphics which are easy to understand are important to the impact statement. Not only do the graphics provide a necessary supplement to the main text of the report, but they sometimes serve as a primary source of information and may also directly affect the reviewer's first impression of the document.

Clarity is facilitated by limiting the amount of information presented on any one page to that which is considered to be most important. This would be reflected in a properly selected title. Exhibits should be placed as close as possible to the text material which they illustrate.

Base maps are important items which must be obtained in the data collection phase of the project. A list of exhibits to be included in the EIS should be developed early in the study. Work on graphics should be scheduled so that they can be used and properly referenced during the text preparation process.

Those individuals involved in the graphic aspects of the project should be encouraged to improve their knowledge of the state-of-the-art of graphic materials, reproduction techniques, and both local and in-house capabilities.

D. USE OF REFERENCE MATERIAL

One of the preparer's main resources in his approach to any EIS is the availability of in-house reference material which has been accumulated as a result of his experience with environmental statements. The most important of these is a current copy of all relevant laws and administrative orders and guidelines.

There are several information services and sources which can be utilized on a regular basis.

One such service is the Environmental Reporter, published by The Bureau of National Affairs, Inc., in Washington, D. C. The Environmental Reporter is a multi-volume reference set containing Federal and state laws, regulations, policies, and procedures on air, water, solid waste and land use. In addition to amending current information, this service also provides new material on a weekly basis. This series of references also includes a separate volume on noise regulations entitled the Noise Regulation Reporter.

Another reference source is the National Technical Information Service (NTIS). This service is provided by the U. S. Department of Commerce and is a central source for the public sale of reports prepared by various Federal agencies. NTIS publishes catalogs on a regular basis, listing new documents available, along with a brief description of each.

The Federal Register is a daily publication published by the General Services Administration and distributed by the U. S. Government Printing Office, and is designed to highlight regulations and legal notices (including bills enacted by Congress) issued by Federal agencies. This is an invaluable source of current information on environmentally-related matters.

In addition to the above reference documents, numerous other sources can be utilized for technical input. Among those used are monthly technical journals, professional association publications, various governmental documents, and EIS's prepared for the same type of project or in the same location or similar environment.

E. USE OF TECHNICAL WRITER/PROOFREADER

It is recommended that a technical writer who has had experience in both impact analysis as well as writing be utilized to assist in the preparation of the statement. The use of a technical writer has the following advantages:

- . Reduces writing time of staff members.
- . Provides a consistent style and approach to the report.
- . Provides a means of consistency control through the review of all component impact sections by one individual.
- . Improves technical quality of the document.

The responsibility for the final text however, still rests with the project manager. He must read every word in the statement to insure that the statement is consistent with the project's scope, the analyses used during the assessment, and his own professional standards.

Another valuable individual in the report preparation process is the proofreader. The proofreader adds a measure of consistency and quality control by making editorial comments and checking technical content. It is important that the proofreader be proficient in his tasks so that reports are submitted with the least possible number of typographical errors in the text.

F. MASTER COPY

In preparing an impact statement, one of the first steps should be to obtain a looseleaf notebook and prepare a tentative table of contents for the report. As sections of the statement are prepared, they can all be placed in order in the one master looseleaf book. Blank sheets can be

temporarily inserted to denote location of figures, exhibits, or tables which are not yet complete. This development of the first office copy contributes to the overall organization of the final report and facilitates typing.

Close coordination should be maintained with the secretarial staff associated with the report. Early determination of such things as format, type-font, margins, spacing, page numbers, headings, and appendices insures preparation of a professional-looking report and ultimately saves secretarial time.

After an environmental impact statement has been created in rough form, it can then be mechanically reproduced. The ingredients required to mechanically produce the report are:

- . Word processing equipment such as a Magnetic Tape Selectric Typewriter (MTST).
- . A trained operator.
- . Color-coded, carbonized paper.

The word processing equipment operator receives the environmental impact statement in rough form which, in most cases, means it is hand-written and may be stapled and/or cut and pasted. The MTST is set up for margins, tabulations, and spacing.

First draft typing is easily accomplished on carbonized, colored paper. Several brands of carbonized, colored papers are available. When the first typed draft is completed, the white (master) colored copy is retained by the operator and the first colored copy is circulated for review and correction. At this point, a master tape or set of cards has also been produced on the equipment and is set aside for future correction.

After review and coordination of comments by the responsible individual(s), only the one colored original draft copy is returned to the operator for correction, with all comments incorporated therein.

A second draft copy, of a different color, is produced by utilizing the original taped information to the point where the equipment operator makes all corrections, deletions and insertions, as necessary. A second master tape or set of cards is simultaneously produced which captures all updated corrections. The original tape or card identification is destroyed, and the tape or cards become available for further reuse. Usually, at this point, no further color-coded drafts are required, and an original master copy on white bond paper or reproducible mats may be produced.

If the second color-coded draft results in the making of a third master tape with added corrections incorporated, a third color draft for proof reading is used. It is considered advisable to use the same color coding order of revisions or updating drafts to insure that all corrections are incorporated into the final document.

**SECTION VIII
GLOSSARY**

VIII: GLOSSARY

A

ambient

Sum total of existing environmental conditions for any given impact category.

ameliorative measures

Those measures necessary to reduce or remove environmental impact or disturbance.

aircraft operation

A landing or takeoff of any one aircraft.

aquatic

Growing or living in or upon water.

B

biotic community

Recognizable assemblages of organisms (vegetation and wildlife), generally functioning as a unit.

C

critical habitat

An entire habitat or portion thereof having any constituent element which is necessary to the normal needs or survival of an endangered or threatened species.

D

decibel (dB)

A unit of noise measurement used to describe sound pressure level. It is a dimensionless unit, which is commonly expressed as one-tenth of the logarithm of the ratio between two power levels, one of which is nominally a reference level. The human auditory response to a given increase in sound pressure is approximately proportional to the increase in sound pressure in comparison to the pressure already present.

dispersion

Physical transport of various pollutants in the atmosphere.

draft environmental impact statement (DEIS)

FAA's initial evaluation of the environmental impact of a proposed action when coordination pursuant to Section 102(2)(C) of NEPA is initiated.

E

ecology

The science or study of the relationship between an organism and its environment.

ecosystem

An ecological community together with its physical environment, considered as a unit.

effective perceived noise level (EPNL)

Measurement used to evaluate aircraft noise, which considers the characteristics of the effects of pure tone comments on narrow bands of high frequency noise from jet aircraft and the time history of the

event -- flyover, takeoff or landing. EPNL takes the duration of the signal into account by integration of the noise level with time for the duration of the event.

endangered species

Those species in danger of extinction throughout all or a significant portion of their range. (U. S. DOI, Fish and Wildlife Service, May, 1974.)

environmental impact assessment report (EIAR)

A report prepared by the sponsor of an action, analyzing the environmental impact of a proposed action for which Federal financial assistance is being requested. This report may serve as the basis for the FAA's draft environmental impact statement or negative declaration.

estuary

Any confined coastal water body with an open connection to the sea and a measurable amount of salt in its waters.

exempted actions

Those actions not having the potential for causing a significant environmental impact and not requiring an environment impact assessment report.

F

fauna

A collective term for the animal species present in an ecosystem.

flora

A collective term for the plant species present in an ecosystem.

flood (100-year)

A flood that has a magnitude that may be equaled or exceeded once every one hundred years, on the average.

floodplain

That area which would be inundated by storm runoff which would occur under a given recurrent frequency flood condition.

H

habitat

An area possessing uniformity of physiography, vegetation, climate or other qualities important for species survival.

I

indirect source

A facility, building, structure or installation which attracts mobile air pollution source activity that results in emissions of a pollutant for which there is a national standard.

M

macro area

A broad study area which includes the airport's service area.

micro area

The immediate area adjacent to an airport within which direct impacts occur.

N

noise contour

A line connecting points of equal noise exposure.

noise-sensitive land uses

Areas where noise will interfere with the usual activities associated with use of the land. Residential neighborhoods, educational, health, and religious structures or sites, as well as cultural or historic sites may be noise-sensitive areas.

R

reliever airport

A general aviation airport designated as having the primary function of relieving congestion at an air carrier airport by diverting general aviation traffic.

S

sedimentation

A process of gravitational deposition of soil and other particles.

T

terrestrial

Species living on land rather than in the water.

threshold (level of impact)

That set of conditions or circumstances which requires more detailed evaluation.

turbidity

Reduced water clarity resulting from presence of suspended matter.

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