

**DRAFT**GUIDELINES FOR THE PREPARATION OF  
AN ENVIRONMENTAL ASSESSMENTAn Integral Component of the Cost-Effective  
Analysis Portion of a Facilities Plan

A cost-effective analysis can be defined as a systematic comparison of alternative ways of dealing with a wastewater treatment and disposal problem in order to identify the solution which will minimize total costs to society over time. These costs include monetary and environmental as well as other non-monetary costs.

Cost-effectiveness is the central thrust of the Federal Water Pollution Control Act Amendments of 1972 (PL92-500). It is an attempt to integrate all important considerations early in the decision-making process and to meet the detailed requirements of the law in an efficient manner.

The cost-effectiveness analysis should be prepared so as to:

1. Provide the rationale for selecting a particular course of action from among alternatives evaluated. It is essential that a logical decision making process be followed and the factors governing selection be spelled out in the analysis.
2. Provide a document for evaluation by the general public. In part, this means that unnecessary technical detail, technical jargon and acronyms should be avoided.

In accordance with the National Environmental Policy Act (NEPA), the EPA is responsible for preparing environmental impact statements on facilities plans and resultant wastewater treatment projects that significantly affect the environment. To carry out this task, EPA requires that environmental assessments be prepared for all plans and projects prior to submittal. These assessments are to provide data and information needed for EPA to develop the required environmental impact statements. If properly prepared, the facilities plan is, in fact, the environmental assessment.

At the heart of environmental assessment is the need to take a broad view of the environment, encompassing physical/chemical, ecological, aesthetic, and social factors. Another key point is the necessity to consider and evaluate complete packages of feasible alternatives for meeting stated water quality goals. Evaluation of alternatives is essential in the planning process to identify the most environmentally acceptable plan. It is not the intent of NEPA that alternatives be screened solely on the basis of environmental impact, but simply to insure that environmental amenities are given due consideration along with technical considerations, costs, and public desires.

EDUCATION AND TRAINING AGENCY

It is extremely important to recognize the purpose of the attached guidance. First of all, it is based on existing regulations and requirements and is not meant to be viewed as "still another requirement". We have been asked, by several states and other groups, to prepare a guidance document for the use of consultants who are attempting to prepare environmental assessments. In this document we have elaborated on the regulations and already existing guidance to indicate the type of document which we feel will satisfy the regulations. Secondly, this guidance is of a general nature and therefore very comprehensive. It is definitely unnecessary to address each item for every facilities plan. The depth of detail and scope of the assessment will vary greatly from case to case. Large complex projects will probably require more than is contained in this guidance, such as a very detailed consideration of sludge handling alternatives. In many cases it will be possible to perform a much more simplified facilities plan as is pointed out on page 13 of our Guidance for Facilities Planning, January 1974. In any case where there is some question concerning the scope of the cost-effective analysis and environmental assessment, please contact your State water pollution control Agency or the Planning Branch of USEPA.

References:

1. Guidance for Facilities Planning - January 1974
  - a. Chapter 4 - Monetary Cost Evaluation - Appendix (present worth and annual equivalent cost).
  - b. Chapter 5 - Environmental Evaluation
  - c. Chapter 6 - Plan Selection & Alternatives
2. Manual for the Preparation of Environmental Impact Statements - July 1974
3. 40 CFR Part 6 - Preparation of Environmental Impact Statements - Interim Rules and Regulations - January 17, 1973.
4. 40 CFR Part 6 - Preparation of Environmental Impact Statements - Proposed Rules and Regulations - July 17, 1974.
5. 40 CFR Part 35 - Construction Grants for Waste Treatment Works - Rules and Regulations - February 11, 1974.
6. 40 CFR Part 105 - Public Participation in Water Pollution Control - Minimum Guidelines - August 23, 1973.

## I. Background

### A. Description of the facilities planning area

1. Maps showing the planning area and the basis for its delineation should be presented.
2. Significant topographic and hydrologic characteristics of the area should be discussed, including low flow information on streams in area.
3. All relevant treatment works and other structural alternatives should also be specifically located.
4. Water quality characteristics of the region, including:
  - a. Condition of the surface waters and the water quality standards for these waters
  - b. Septic tank problems
  - c. Groundwater contamination

### B. Present wastewater collection and treatment system(s)

1. History, condition and other characteristics of the collection systems, including:
  - a. Presence and location of bypasses
  - b. Surcharging problems (including basement backups)
  - c. Peak flow rates experienced

(This section might simply reference the Infiltration/Inflow Analysis and Sewer System Evaluation Survey which has been done for each community involved, if appropriate, or a summarization of basic information contained in these documents might be presented).

2. Basic description of the present treatment plant(s), including:
  - a. History
  - b. Present condition
  - c. Levels of treatment presently obtained
  - d. Significant industries in the area and the nature and quantity of their wastes.

### C. Estimates of future wastewater loadings and flows based on population projections and industrial wastewater characteristics for industries which might be expected to come into the municipal system.

### D. The conditions contained in the permit issued under the National Pollutant Discharge Elimination System and the status of enforcement orders, if appropriate.

E. Water quality and water quantity objectives in the area other than solution of the preceding problems. Examples of additional objectives and goals are:

1. Streamflow augmentation for enhancing water supplies downstream, stream fisheries, recreation or aesthetic values.
2. Preservation or development of recreation areas, wetlands or attractive open spaces.
3. Preservation or enhancement of high quality waters with recreational, fish and wildlife or aesthetic values.
4. Groundwater recharge for augmenting water supply
5. Alleviation of groundwater pollution.
6. Reuse of treated wastewater such as recycling of nutrients in treated wastewater.

F. Other relevant or interacting programs in the area, both governmental and private.

## II. The Environment Without the Proposed Action

### A. General

The social, economic and environmental setting of the area of the proposed action is important for the decision maker and the public. The environmental setting is the starting point from which forecasts of the environmental impact of the proposed action must be made. While the focus should be on the immediate area of the proposed actions, where appropriate, parts of the surrounding area should also be included to avoid the risk of overlooking any important interbasin or regional impacts.

The importance of using maps to illustrate topics is stressed-- especially where environmentally sensitive areas are concerned. The narrative should be concise, not exhaustive. Only those characteristics of the social and environmental setting which are most important in relationship to the proposed action should be discussed in any detail, and those which are not particularly relevant should be omitted.

B. Detailed description of the study area

1. Climate

Describe the climatic conditions for the general area of the proposed actions including temperature, precipitation, humidity, wind direction and velocity. List any specific adverse weather conditions and their frequency.

2. Topography

Describe the topography of the area of the proposed actions delineating the major and minor drainage basins along with their characteristics--area, slope, elevation, natural and artificial drainage nets, erosion, and deposition.

3. Geology

Geologic structures or formations that have a direct influence on either groundwater or surface water resources should be specifically mentioned.

4. Soils

Identify soil types and their permeability, erosion potential, expansion, compaction and other characteristics in the appropriate areas. This section should be much more detailed when land application is being considered.

5. Hydrology

a. Water quality

1. Describe the existing surface and groundwater quality using physical, chemical and biological parameters.
2. Describe the existing surface and groundwater quantity and its relation to water uses and objectives.
3. Regulatory and administrative procedures in force to reduce water consumption should be noted if significant.
4. Address specifically relevant non-point sources of pollution if they will impact the solution of the point source problem or the selection of a particular alternative.

b. Water Quality Management

1. Describe or reference all pertinent areawide or basin water quality management plans.
2. Indicate the 25, 50 and 100 year flood levels for the area. Identify any Corps of Engineer flood-plain plan or proposed project.

6. Biology

- a. Indicate those species in the area which have been designated rare or endangered, either at the State level or nationally. A list of endangered animal species generally found in Region V is attached. A similar list of plant species is being developed.
- b. Describe wildlife habitat or portions thereof which might be affected by the project.

7. Air Quality

To the extent pertinent, discuss the major factors affecting air quality and the current and anticipated future air quality in the project area. Identify and reference the air implementation plan for the area.

8. Land Use

- a. If available, include a map of existing land uses such as residential, commercial and services, industrial, cluster housing, strip development, mining, transportation, institutional, open space and outdoor recreation, agricultural, forest land, water, archaeological, historical and other points of interest in the area of any proposed interceptors.
- b. If available, include a map of land uses, both private and public, for those categories listed above, which are currently being proposed by local, State, national or regional governments in the areas of any proposed interceptors.
- c. Describe the extent and effectiveness of current land use planning by all levels of government.
- d. Describe the administrative and regulatory land use controls now in effect.

- e. Describe development trends for the industrial, agricultural, commercial, residential, and recreational sectors--especially those near or around bodies of water.
- f. Describe any aspects of these trends which might threaten air or water quality or bring about other environmental problems.

9. Aesthetics

Describe the areas general aesthetic quality, including noise, and the overall "composition" of the area.

10. Population Projections and Economics

Designate the current and projected population levels (5, 10, and 20 years). The reasons for using a particular projection or forecast should be stated briefly. This information may be in the Infiltration/Inflow Analysis and could simply be referenced here.

C. Identification of Significant Environmentally Sensitive Areas

1. Identify and show on a map any areas which may be significantly impacted by the proposed action, and which are not described elsewhere in this Chapter.
2. Some examples of environmentally sensitive areas include:
  - a. Surface waters,
  - b. marshland and wetlands,
  - c. flood plains or flood-retention areas,
  - d. groundwater recharge areas,
  - e. steeply sloping lands,
  - f. forests and woodlands,
  - g. prime agricultural lands,
  - h. habitats of rare and endangered species,
  - i. public outdoor recreation areas,



- j. sensitive geologic areas, and
- k. archeological and historic sites

### III. Alternatives

#### A. General

1. Alternative waste management techniques will be evaluated based on the Best Practicable Waste Treatment Technology (BPWTT) or, as applicable, more stringent criteria required to meet water quality standards.
2. Both the development and comparison of alternatives should be presented in a clear and concise manner so the public can follow the logic of the decision-making process.
3. One alternative which should always be included is that of "no action"--allowing the existing wastewater treatment works or septic tanks to continue in use--so that the public will understand the environmental implication of allowing the status quo to continue.

#### B. Analysis of Joint Treatment or Regionalization Questions

(Regional questions may have already been resolved by existing approved plans. If this is the case, summarization of important conclusions and proper referencing of these regional plans may suffice).

1. Identification and assessment of feasible treatment works and interceptor combinations within the planning area. (It should be noted that certain simplifying assumptions must be made for purposes of this analysis, e.g., treatment processes. These simplifying assumptions must be clearly spelled out).
  - a. Monetary costs of the feasible combinations should be assessed in terms of the "total present worth" of the entire system.
  - b. Significant environmental effects resulting from the implementation of each of the feasible combinations should be presented. Particular attention should be paid to differences in impact between the proposed combinations. Unique regional problems to be addressed are:
    1. effects of interceptor locations on land use within and between urban areas.

2. Effects of alternative combinations on stream flows in the region.
  - c. Other non-monetary costs should be evaluated, including:
    1. Possible site limitations--is area available for future expansion or additions?
    2. Possible differences in operation and maintenance capability and reliability.
  2. Based on information contained in 1, a recommendation for a specific treatment configuration should be made. This recommendation should include:
    - a. A map of the regional area with specific service areas for each proposed treatment plant delineated, and
    - b. A specific statement which identifies the political units lying within the service area of each proposed plant.
- C. Analysis of Alternative Treatment Systems Within a Specific Service Area
1. The effect which "no action" would have on communities involved must be addressed. It is not sufficient just to indicate that the communities involved are under orders. The statement must examine potential effects on:
    - a. Surface water quality
    - b. Land use - examine restrictions on land use which might be imposed by "no action".
    - c. Groundwater quality - examination of limitations in utilizing private septic systems.
    - d. Socio-economic character of communities.
      1. Health hazards
      2. Industrial development
  2. Preliminary alternative systems featuring at least one technique under each of the three categories below (treatment and discharge, wastewater reuse, and land application) will be developed and screened. A detailed proposal will be prepared for each unless adequate justification for eliminating a technique during the preliminary screening process is presented.

- a. Treatment and discharge to surface waters
  1. Biological treatment
  2. Physical-chemical treatment
  3. Systems combining the above techniques
- b. Treatment and wastewater reuse
  1. Industrial processes
  2. Groundwater recharge for water supply enhancement
  3. Surface water supply enhancement
  4. Recreation lakes
  5. Land reclamation
- c. Land application--the application of wastewater effluents on the land involves the recycling of most of the organic matter and nutrients by biological action in the soil plus plant growth for the breakdown and disposal of nutrients. Land application techniques include:
  1. Irrigation including spray, ridge and furrow, and flood.
  2. Overland flow
  3. Infiltration - percolation
- d. Any facilities plan must consider the optimization of the performance efficiency of any existing facilities as an alternative to or integral part of any additional treatment facilities.
- e. Flow and waste reduction measures, including rehabilitation of existing sewers as demonstrated to be cost-effective through the Sewer System Evaluation Survey, should also be discussed. These components of the Facilities Plan can simply be referenced. Other flow and waste reduction measures include:

1. Household water saving devices
2. Water meters
3. Water pricing
4. Land use and development regulations
5. Industrial reuse and recycling

This section should contain a discussion of limiting factors, assumptions, or conditions that affect the scope of alternatives considered or analyses performed. These constraints may be sufficient reason to reject a large number of alternatives outright, eliminate a portion of the analysis without further consideration, or they may reflect on the effectiveness or scope of available alternatives.

- D. Detailed evaluation of those alternatives which appear most feasible
  1. A comprehensive evaluation must be made of the major environmental effects which will be common to all alternatives selected for detailed evaluation. This statement must, among other things, address the following specific questions.
    - a. Adverse impacts which cannot be avoided should any one of the proposals be implemented.
    - b. The relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.
    - c. Irreversible and irremediable commitments of resources which would be involved if any of the alternatives selected for full evaluation were implemented.
  2. Analysis of the differing impacts of each alternative selected for full evaluation.
    - a. Calculation of "total present worth" for each alternative, including the possibility of phased additions, where appropriate.

- b. A careful delineation of the unique environmental effects, both adverse and beneficial, of the alternatives in question. Specific attention should be given to sludge disposal questions, where appropriate, including the exact location of any disposal sites.
- c. An examination of other non-monetary effects of each alternative. Specifically:
  - 1. Flexibility of system
    - a. Ease of moving to higher levels of treatment, if necessary.
    - b. Ease of accomodating unforeseen changes in service area or growth rates.
  - 2. Reliability of the alternative treatment system in handling variations in quantity and quality of wastewater flow.
  - 3. Operability of the alternative system in light of the manpower which will be available for operation and maintenance over the life of the facilities.
  - 4. Any greater than typical energy requirements of a particular treatment alternative.
  - 5. Any other non-monetary effects associated with a particular alternative.
- 3. A list of any permits or other formal approvals which would be needed for the implementation of a particular alternative.

#### IV. Selection and Description of a Proposed Alternative

##### A. Plan Selection

- 1. A number of comparative analysis should be conducted during the systematic development of system alternatives.
- 2. All comparisons should be discussed in narrative form and displayed in a summary chart. The major reasons for acceptance or rejection of an alternative should be stated in each case. This selection must be based on a

careful evaluation of all costs involved: monetary, environmental and other non-monetary costs. An overall minimization of costs, both monetary and non-monetary, must be sought.

3. The concept of centralized vs. decentralized systems is receiving increased attention in current system proposals. When evaluated on the cost of the facilities alone, the analyses often neglect to discuss adequately the residential, commercial and industrial development that a centralized project can induce. Their vast network of collectors and interceptors often open up many new areas for development, or more rapid growth. The final screening should specifically speak to these environmental implications of each system.

B. Description of Proposed Action

1. A brief summary of the selected alternative and its environmental implications shall be provided.
2. Any mitigative actions necessary to alleviate adverse environmental impacts shall be set forth in this section.

V. Public Participation

- A. A public hearing will be held to explain the alternative proposals and obtain the views of all concerned interests. Reflecting inputs from the public, each alternative proposal will be reviewed with respect to environmental effects, monetary costs, plan implementation capability, resources and energy use, reliability and public acceptance. Based on consideration of each of these factors, the alternative proposals will be ranked and a plan selected for implementation.
- B. In the final cost-effectiveness analysis, the various efforts at involving the public, including the mandatory public hearing, must be presented. A discussion of how the significant issues raised by the public were incorporated into the decision making process must be included. In other words, the draft material presented at the public hearing must be modified to account for significant issues raised by the public.

Date Due

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Rare & Endangered Animal Species - Region V

Fish

Salmoniformes

Longjaw Cisco            Coregonus alpenae

Perciformes

Blue Pike                Stizostedion vitreum glaucum

Birds

Falconiformes

Arctic Peregrine Falcon            Falco peregrinus tundrius

Passeriformes

Kirtland's Warbler                Dendroica kirtlandii

Mammals

Chiroptera

Indiana Bat                        Myotis sodalis

Carnivora

Eastern Timber Wolf                Canis lupus lycaon

Source: U. S. List of Endangered Fauna, U. S. Dept. of the Interior, Fish and Wildlife Service, May 1974

1974  
U.S. Fish and Wildlife Service  
Washington, D.C.