

APPENDIX D

Economic And Social Considerations

TABLE OF CONTENTS

Paragraph	Page D-
D-1. Background.....	1
D-2. Other Direct Benefits.....	1
D-3. NED Cost Evaluation Procedures.....	3
D-4. Planning Special Topics and Cautions.....	11
D-5. Financial Analysis.....	21
D-6. Interest Rate and Period of Analysis.....	30
D-7. NED Benefit Evaluation Procedures: Unemployed/Underemployed Labor Resources...	31
D-8. Social Effects.....	38

LIST OF TABLES

Table D- 1: Project Investment.....	12
Table D- 2: Annualized Adverse Effects.....	13
Table D- 3: Tabulation of Current Costs and Benefits.....	16
Table D- 4: Value of Time Saved by Trip Length and Purpose.....	20
Table D- 5: Schedule of Estimated Federal and Non-Federal Expenditures.....	24
Table D- 6: Schedule of Sources and Uses of Funds.....	26
Table D- 7: Occupational Tables.....	36

LIST OF FIGURES

Figure D- 1: Illustration of Financing Plan Outline.....	27
Figure D- 2: Sample Bond Consultant's Letter.....	28

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APPENDIX D

Economic and Social Considerations

D-1. Background.

a. Introduction. This appendix covers economic and social considerations not addressed elsewhere. Guidance for estimating NED benefits is provided in Appendix E, Civil Works Missions and Evaluation Procedures, where the evaluation procedure for each project type is presented in its mission context. Some aspects of economic evaluation, and of planning generally, are constant across missions; those aspects are in this appendix. (Note: Every effort has been made to eliminate all inconsistencies between the main body of the ER and the appendices. If any inconsistencies are found, the information in the main body of the ER will prevail over the one in the appendices. Please, notify CECW-PD immediately of any inconsistencies for correction.)

b. Economic Considerations. Economic considerations which cut across missions and projects include such aspects as the proper use of interest rates, how to allocate costs among project purposes, how to test for financial solvency of a non-Federal sponsor, how to best estimate current project benefits, how to evaluate other direct benefits, and other economic evaluation procedures.

c. Social Considerations. The social considerations which cut across various missions and projects include such aspects as the evaluation of unemployed and underemployed labor, evaluation of urban and community impacts such as life, health and safety factors, estimations of displacement, evaluations in changes to long-term productivity or real income, evaluations in changes in energy requirements and conservation, evaluations of changes in educational, cultural or recreational opportunities, evaluations of changes in emergency preparedness.

D-2. Other Direct Benefits

a. Purpose. This section provides a definition of other direct benefits and procedural guidance for the evaluation of other direct benefits attributable to water resources plans and projects. Other direct benefits are the incidental direct benefits of a project. The other direct benefits to be included in the NED benefit evaluation are the incidental effects of a project that increase economic efficiency by increasing the output of intermediate or final consumer goods over and above the direct outputs for which the plan is being formulated.

b. Conceptual Basis. Other direct benefits are incidental to the primary purposes of water resource projects. Primary purposes of projects are those purposes for which the alternative plans are formulated. Other direct benefits derive from incidental increases in outputs of goods and services or incidental reductions in production costs.

c. **Planning Setting.** Standard planning procedures involve comparison of the with project condition to the without project condition. In considering other direct benefits, define the boundary of direct influence of the plan. Economic efficiency gains to firms in production and satisfaction gains to consumers other than those identified as the direct beneficiaries of primary project purposes should be valued and measured as other direct benefits.

(1) **Without Project Condition.** Forecast future conditions expected to exist without implementation of the plan. The without project condition is the projection of output and production levels and costs of production likely to be achieved in the absence of a plan.

(2) **With Project Condition.** Future conditions expected to exist when the plan is fully implemented. The with project condition is the projection of output and production levels and the costs of production likely to be achieved with the plan.

d. **Evaluation Procedure: General.**

(1) When applicable, compute other direct benefits using the procedures of Appendix E and the remainder of this appendix. Some benefits, such as reduced water supply treatment costs, can be computed on the basis of reduced costs to consumers.

(2) Improvement in production possibilities of the private market sector as well as the non-market sector (some recreation, for example) are other direct benefits. The following are examples: a large water storage project is to be located upstream on a main tributary of a river system that enters the ocean by a delta through an estuary. The direct output of the project is flood control for communities residing on floodplains along upper valleys of the tributary. One effect of regulating flow by reducing winter high and summer low flows is to increase the recreational potential of land and water in the lower reaches of the river system. A cooling of water temperatures and increased flow during summer increases fish and wildlife productivity; riparian habitats along lower water courses expand and increase in density; salt water marshland receives less saline water in summer. As a result, there is an increase in dove and pheasant hunting as these wildlife populations increase. Opportunities for sport angling also increase as game fish productivity rises. Shrimp production benefits from the change to less saline water in the marshland, and commercial shrimp harvest increases, resulting in greater output at lower unit total cost to shrimp fishermen. An incidental effect is the improvement in water quality to downstream users; turbidity is reduced in winter and water hardness is reduced in summer. Treatment costs are lower for firms and households. If the impoundment causes the recharge of groundwater basins in the vicinity of the dam site or along the stream course, these incidental effects are other direct benefits. Pumping costs could be reduced.

e. **Evaluation Procedure: Problems in Application.** The major problems encountered in the estimation of other direct NED benefits are the identification of the firms, industries, and

consumers who will be subject to these incidental effects caused by projects and plans. It must be emphasized that it is not practical or economic to trace out all direct effects.

(1) Determining the context or system within which the major incidental impacts might be experienced is a useful first step in identifying likely direct benefits worth measuring. The immediate watershed or the subsystem of a river system would constitute a relevant context. The delineation of geographical and economic market regions in which impacts are likely to be felt cannot usually encompass the whole regional economy in a highly industrialized area. Nevertheless, it is important to avoid delineating too small an area in which to search for possible effects.

(2) Another procedure for identifying likely impacts is tracing the hydrologic changes that will occur as a result of the project. For example, flows downstream and in other parts of a river system can be changed in quantities and qualities; the water's chemical and physical characteristics, oxygenation, turbidity, temperature, etc. can undergo change that may impact on fish and wildlife resources and on the production functions of firms and the satisfaction of consumers.

f. Evaluation Procedure: Data Sources. An assessment of the current situation and the economic efficiency of potentially affected firms and individuals usually entails the collection from primary sources of data on cost, production function, and firm capacity. Studies of industrial structure and the interdependence of firms in the supply of various inputs and the use of outputs can provide valuable supplemental information.

g. Evaluation Procedure: Risk and Uncertainty. Other direct benefits are unique to each project design and its location, so the historical record of data is of limited usefulness. The risk and uncertainty attached to the hypothesized outcomes can be reduced by clearly revealing areas of uncertainty. A physical description of other direct benefits, together with assessment of their relative (major or minor) significance, is an integral part of such a procedure. Nevertheless, these estimates may involve high degrees of risk and relative uncertainty, based as they are on the total mix of project outputs and the effect these mixes would have on stimulating increased productivity.

h. Report and Display Procedures. Other direct benefits should be identified by component and added onto the benefits of the benefit-cost analysis. The method used to value the benefits should be presented in the report. Provide a tabular breakdown of all other direct benefits claimed for the project.

D-3. NED Cost Evaluation Procedures

a. Purpose. This section provides procedures for the evaluation of NED costs of structural and nonstructural elements of water resource plans and projects.

b. Conceptual Basis.

(1) Project measures, whether structural or nonstructural, require the use of various resources. NED costs are the opportunity costs of resource use. In evaluating NED costs, resource use must be broadly defined to fully recognize scarcity as a component of value. This requires consideration of the private and public uses that producers and consumers are currently making of available resources or are expected to make of them in the future.

(2) The opportunity costs of resource use are usually reflected in the marketplace. When market prices adequately reflect total resource values, they are used to determine NED costs. When market prices do not reflect total resource values, surrogate values are used appropriately to adjust or replace market prices.

(3) Total NED cost is the market value of a resource plus other values not reflected in the market price of the resource; it therefore accounts for all private sector and public sector uses. Market price is used to reflect the private sector use of resources required for or displaced by a project, and surrogate value is used to reflect the public sector use.

(a) The market price approach relies on the interaction of supply and demand. Price is determined through transactions on the margin between knowledgeable and willing buyers and sellers, neither of whom are able to influence price by their individual decisions. Distortions in market price occur if one or more of the conditions of perfect competition is violated.

(b) The surrogate value approach involves the approximation of opportunity costs based on an equivalent use or condition. Surrogate values are frequently used in restricted markets and in non-market situations.

(4) Proper NED analysis requires that project NED costs and benefits be compared at a common point in time. Costs are calculated in annualized terms (see paragraph D-6).

c. Planning Setting. The basis for the evaluation rests in a thorough analysis of expected conditions in the future with a project and without a project. This requires identification of those resources that will be affected by a project; the current value of such uses is measured as the economic worth to the Nation of the services associated with those uses.

d. Evaluation Procedure: General.

(1) Resources required or displaced to achieve project purposes by project installation and/or operation, maintenance, and replacement activities represent a NED cost and should be evaluated as such. Resources required or displaced to minimize adverse impacts and/or mitigate fish and wildlife habitat losses are also NED costs. Costs for features not required for project

purposes, avoiding adverse effects, and/or mitigating fish and wildlife habitat losses are not project-related NED costs and should not be evaluated. Costs for features not required for project purposes will generally not be part of the Corps project.

(2) All NED costs shall be based on current costs adjusted by the project discount rate to the beginning of the period of analysis as defined in paragraph D-6. Compute all costs at a constant price level and at the same price level as used for the computation of benefits. Current costs shall be based on the price level at the time of the analysis. These costs will be updated in the year(s) the project is submitted for authorization and/or appropriations. Deferred costs will be discounted to the end of the installation period, using the applicable project discount rate. Costs incurred before the beginning of the period of analysis will be increased (i.e., to estimate future value) by adding compound interest at the applicable project discount rate from the date the costs are incurred to the beginning of the period of analysis. All NED costs will be converted to an annual equivalent value over the period of analysis.

(3) Project NED costs may be adjusted by an allowance for the salvage value of land, equipment, and facilities that would have value for non-project uses at the end of the period of analysis. Significant salvage values of replaceable items (e.g., generators) will normally become adjustments to allowances for replacement costs.

e. Evaluation Procedure: Implementation Outlays. The NED costs of implementation outlays include the costs incurred by the responsible Federal entity and, where appropriate, contributed by other Federal or non-Federal entities to construct, operate and maintain a project in accordance with sound engineering and environmental principles and place it in operation. These costs are the remaining post-authorization planning and design costs; construction costs; construction contingency costs; administrative services costs; fish and wildlife habitat mitigation costs; relocation costs; historical and archaeological salvage costs; land, water, and mineral rights costs; and operation, maintenance, repair, rehabilitation, and replacement costs.

(1) Postauthorization (Preconstruction, Engineering and Design) Costs. These costs are the direct cost for investigations, field surveys, planning, design, and preparation of specifications and construction drawings for structural and nonstructural project measures. In the evaluation procedure, these costs will be based on the actual current costs incurred by the responsible Federal entity for carrying out these activities for similar projects and project measures. They may be computed as a percentage of construction costs when there is a documented basis for the rate used. Make adjustments when appropriate to reflect circumstances special to the project under consideration.

(2) Construction Costs. These costs are the direct cost of installing project measures. They should be based on the market value of goods and services required to install project measures, including those measures required for avoiding adverse environmental effects and public health and

safety risks. They include the cost of purchased materials (including associated transportation costs); equipment rental or purchase; construction wages or salaries (including social security and fringe benefit costs); and contractors' management, supervision, overhead, and profit. These costs will be based on current contract bid items in the project area or on the current market value of purchased materials and services, etc.

(3) Construction Contingency Costs. These are project costs normally added to reflect the effects of unforeseen conditions on estimates of construction costs. They are not an allowance for inflation or for omissions of work items that are known to be required. They are included to cover unforeseen construction problems. These costs will vary with the intensity of the surveys and investigations performed, the variability of site conditions, and the type of project measures being installed. They may be computed as an appropriate percentage of estimated construction costs. If contingency costs are included in real estate costs, planners shall ascertain the basis for these contingent costs. To the extent that contingencies are meant to account for inflation, this effect shall be excluded from real estate costs for evaluation purposes. Only that portion of real estate contingency cost for which there is reasonable basis for anticipating uncertainty (condemnation costs may be an example) shall be included.

(4) Administrative Services Costs. These are the costs associated with the installation of project measures, including the cost of contract administration; permits needed to install the project measures; relocation assistance advisory services; administrative functions connected with relocation payments; review of engineering plans prepared by others; government representatives; and necessary inspection service during construction to ensure that project measures are installed in accordance with the plans and specifications. Base these costs on the actual current costs incurred by the responsible Federal entity for carrying out these activities for similar projects and project measures. These costs may be computed as a percentage of construction costs if there is a documented basis for the rate used. Make adjustments when appropriate to reflect unusual circumstances special to the project under consideration.

(5) Fish and Wildlife Habitat Mitigation Costs. These are the costs of mitigating losses of fish and wildlife habitat caused by project construction, operation, maintenance, repair, rehabilitation and replacement. The mitigation measures to be included in the project will be determined by the responsible Federal entity in coordination with Federal and State Fish and Wildlife Agencies as required by the Fish and Wildlife Coordination Act (Public Law 85-625). Installation of these mitigation measures should be concurrent with the installation of other project measures, where practical. These costs include all project outlays associated with the installation of mitigation measures, including preconstruction, engineering and design costs; construction costs; construction contingency costs; administrative services costs; relocation costs; land, water, and mineral rights costs; and operation, maintenance, repair, rehabilitation, and replacement costs. These costs will be based on current market values and the actual current costs incurred by the Federal entity for carrying out these activities for similar mitigation measures.

(6) Relocation Costs. These are project costs associated with the following items.

(a) The requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646); and

(b) The relocation of highways, railroads, and utility lines. The relocation cost of railroads and utility lines will be based on the costs of replacement in kind. In the case of highways, the relocation cost will be based on replacement that reflects the current traffic count and current standards of the owner, which may result in a justified improvement over the configuration of the existing roadway. The additional relocation cost of highways that are upgraded to increase their carrying capacity for project purposes such as recreation is also a project cost. The relocation cost of highways, railroads, and utility lines shall include all project outlays associated with their relocation, including planning and design costs; construction costs; construction contingency costs; administrative services costs; fish and wildlife habitat mitigation costs; land, water, and mineral rights costs; and historical and archaeological salvage costs. These costs will be based on current market values and the actual current costs incurred by the Federal entity for carrying out similar relocations.

(c) Real property acquisition relocation payments as applicable to a displaced person, business, or farm operation. The costs include moving and related expenses for a displaced person, business, or farm operation; financial assistance for replacement housing for a displaced person who qualifies and whose dwelling is acquired because of the project; and termination payments for dislocated businesses whose owners choose to close out. Base the NED cost of replacement housing on replacement in kind. (Costs over and above replacement in kind are treated as financial costs for non-project purposes.) Base these costs on current market values.

(7) Historical and Archaeological Salvage Operation Costs. These are project costs associated with salvaging artifacts that have historical or archaeological values as prescribed by the Preservation of Historic and Archaeological Data Act (Public Law 93-291). These costs will be based on the current market price of salvage operations carried on during construction.

(8) Land, Water, and Mineral Rights Costs.

(a) These costs include all costs of acquiring the land, water, and mineral rights required for installing, operating, maintaining, repairing, rehabilitating, and replacing project measures. They include all expenditures incurred in acquiring land, water, and mineral rights, easements, leases, and rights-of-way. Such costs include the cost of the land, water, and mineral rights minus salvage value; the cost of surveys incident to a sale; legal fees and transfer costs; and severance payments. These costs will be based on current market values and the actual current costs incurred by the Federal entity for carrying out similar land, water, and mineral rights acquisitions. The market

value of easements will be based on the difference in market value of land without the easement and with the easement.

(b) Some land, water, and mineral rights are owned by Federal, State, and local governments and have been committed to specific uses. The NED cost of using such resources for project purposes consistent with their committed uses will be based on the surrogate value of the public services provided by the resources. For example, if State-owned land committed to recreation use is to be used for project recreation development, its NED cost is not the market value of the land, but the value of the recreation services that would be provided by the land without the project. Public domain lands not committed to specific uses should be valued at the market value of comparable private land or a surrogate use value, or a combination if there are complementary uses.

(9) Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R) Costs. These costs represent the current value of materials, equipment, services, and facilities needed to operate the project and make repairs, rehabilitate, and make replacements necessary to maintain project measures in sound operating condition during the period of analysis. They include salaries of operating personnel; the cost of repairs, replacements, or additions; and an appropriate charge for inspection, engineering, supervision, custodial services, and general overhead. When operation, maintenance, repair, rehabilitation, or replacement will be performed by contract, the cost should include an allowance for contingencies and the costs of survey, planning design, and administrative services. These costs will be based on actual current costs incurred for carrying out these activities for similar projects and project measures. When the project is an addition to or extension of an existing project for which the costs and benefits are not included or otherwise involved in the project analysis, include only the additional cost of operation, maintenance, repair, rehabilitation, or replacement necessitated by the addition or extension to the existing project. Adjustments can be made when appropriate to reflect circumstances special to the project under consideration.

(10) Interest During Construction. This represents the opportunity cost of capital incurred during the construction period. The cost of a project to be amortized is the investment incurred up to the beginning of the period of analysis. The investment cost at that time is the sum of construction and other initial cost plus interest during construction. Cost incurred during the construction period should be increased by adding compound interest at the applicable project discount rate from the date the expenditures are incurred to the beginning of the period of analysis. This is comparable to the treatment of benefits that accrue during the construction period (see paragraph D-4c) and is performed to insure costs and benefits are evaluated on a equivalent time basis.

(a) All PED costs are included in project NED costs and are charged interest during construction. This includes any studies performed using PED funds (i.e., physical modeling, plans

and specs, etc.) When performing economic updates, expended PED costs will be considered sunk and not included in the benefit-cost ratio.

(b) Lands acquired are charged interest during construction from the date they are put to use for project purposes, or the date their non project use ceases, whichever is earlier. Through lease back or other arrangements these dates may differ from date of acquisition.

f. Evaluation Procedure: Associated Costs. Associated costs are the costs of measures needed over and above project measures to achieve the benefits claimed during the period of analysis. For example, associated costs include the cost of irrigation water supply laterals, if they are not accounted for in the benefit estimate. Base associated costs on the current market prices of goods and services required for the installation of measures needed over and above project measures.

(1) Associated costs have often been handled through the self-liquidating cost concept. A self-liquidating cost is the cost of a particular type of asset that can be operated in such a way that it repays the money spent to acquire it (e.g. mooring or dock space). The use of self-liquidating costs is limited to those cases in which appropriate associated costs are netted out of benefit measures.

(2) It is preferred that associated costs be explicitly treated as NED project related costs, and appear as costs in benefit-cost ratios. Where the concept of self-liquidating costs has been used to account for associated costs this procedure may continue to be used as long as:

- (a) The appropriate associated costs are subtracted from the estimated benefits, and
- (b) The associated costs are identified and the netting process documented in project reports.

g. Evaluation Procedure: Other Direct Costs.

(1) These are the costs of resources directly required for a project or plan, but for which no implementation outlays are made. Consequently, they are included in the economic costs of a plan but not in the financial costs. These costs may be important for both structural and nonstructural plans. For example, a zoning plan to preserve floodplain values by restricting development would have as a cost the value of with project development opportunities foregone. A plan that responds to demand growth by reallocating existing outputs from low value uses to high value uses through pricing mechanisms (i.e., raising the price of existing outputs) would have as its major cost the value of the outputs to the users who forego its use as a result of its higher price. On the other hand, a structural project may displace recreation use at the project site and the value of foregone recreational opportunities is a direct cost. Whenever possible, compute these costs using the procedures set forth for computing benefits (in Appendix E). If these costs are not quantified, they should be otherwise identified.

(2) Other direct costs also include uncompensated NED losses caused by the installation, operation, maintenance, repair, rehabilitation, or replacement of project or plan measures. All uncompensated net losses in economic outputs (not transfers) that can be quantified shall be considered project NED costs. The evaluation of such costs requires an analysis of project effects both within and outside the project area.

(3) Examples of other direct costs include increased downstream flood damages caused by channel modifications, dikes, or the drainage of wetlands; increased water supply treatment costs caused by irrigation return flows; erosion of land along streambanks caused by dams that prevent the replenishment of bedload material; loss of land and water recreation values through channel modifications, reduced instream flow due to consumptive use of water by irrigated agriculture, or inundation by reservoirs; increased transportation costs caused by rerouting traffic around a reservoir; new or increased vector control costs caused by the creation of wetlands; and decreased output or increased cost per unit of output of private firms caused by project-induced decreases in raw materials. When applicable, compute such costs using the procedures for computing benefits contained in Appendix E and this Appendix. Some costs, such as increased water supply treatment costs, may be computed on the basis of increased costs to resource users.

h. Evaluation Procedure: Problems in Application.

(1) Application of the procedures in this section requires care to ensure that all costs are included. The identification and determination of all associated costs and external diseconomies require full perception of the measures required to achieve the benefits being claimed and the impacts produced by the actions taken. It must be emphasized that it is not practical or economic to trace out all other direct effects.

(2) Application of the procedures in this section requires care to avoid double counting. A full understanding of the values reflected by market and surrogate values is necessary to prevent double counting. For example, the market value of land that includes a private recreation development reflects the recreation value. In this case, double counting would result if a surrogate recreation value (loss) were added as a cost. On the other hand, the market value of land that provides free public recreation does not reflect the recreation value, so the surrogate recreation value (loss) must be added as a cost.

(3) Market prices are relatively easy to obtain. However, some prices are subject to large fluctuations in short periods of time, so care must be taken to determine reasonable current costs of such items for project evaluation purposes.

i. Evaluation Procedure: Data Sources. Market price information is available from data on comparable sales, Government publications (e.g., bulletins of the U.S. Departments of Commerce,

Agriculture, and Labor), and business reports. Data sources for those NED benefit evaluation procedures having application to cost analysis are covered in their respective sections of Appendix E.

j. Report and Display Procedures. Display NED costs identified through the procedures described above as line item entries in the adverse effects section of the NED account. The following display tables are suggested:

D-4. Planning Special Topics and Cautions. This section comprises certain topics elaborating, amplifying, and extending ideas contained in, or implied by, the planning and evaluation procedures presented in the main body of this regulation and Appendix E. In a few cases the guidance is mainly for or only for particular project purpose(s) or type(s) of authorization.

a. Non-Standard Procedures. Procedures to calculate the benefit-cost ratio of a project not approved by the Water Resources Council are considered non-standard procedures.

(1) Specific approved procedures are described in Appendix E, this Appendix, and in the [Principles and Guidelines](#) (P&G).

(2) An alternative procedure which is not specifically contained in the NED Procedures may be employed if the following requirements are met:

(a) The procedure is in accord with current policy and estimates of the magnitudes of project effects, that is quantities, are empirically estimated.

(b) The procedure would give a more accurate benefit estimate; or, it can be demonstrated that the procedure reduces study time and cost and does not alter the formulation of the project.

(c) The procedure is fully documented.

Table D- 1: Project Investment

	Alternative 1			Alternative 2			Alternative X		
	Unit		Amt.	Unit		Amt.	Unit		Amt.
	Quantity	Price		Quantity	Price		Quantity	Price	
1. Construction cost
2. Construction contingency costs
3. Post-authorization planning and design costs
4. Administrative services costs
5. Fish and wildlife habitat mitigation costs
6. Historical and archeological salvage operation costs
7. Land, water, and mineral rights costs									
8. Relocation costs									
9. Interest during installation period at a rate of ___%									
Total investments
Price level:
Installation period:
Period of analysis:
.....

Table D- 2: Annualized Adverse Effects

	Alternatives		
	1	2	X
Interest on investment Amortization on investment Annual OMRR&R			
Associated costs ^a Other direct costs ^a			
Total annualized costs Other adverse effects not evaluated in monetary terms ^a			

(d) Prior approval for each application of such alternative procedures is obtained from HQUSACE (CECW-PD). Approval is less likely for procedures proposing use of the cost of an alternative or administratively established values as an estimate of benefits.

b. Current Estimates of Project Benefits. It is Corps policy to report and maintain current estimates of project benefits, costs, and economic justification of all active funded projects and separable elements beginning with the Report of the Chief of Engineers. The purpose of the policy is to provide reasonable estimates of economic justification to non-Federal sponsors, Congress and Federal decision makers throughout the project development process. An analysis is considered current if it was approved within 3 fiscal years of the pertinent decision date. As an example, in June 1996 budget submissions, the approval date of the document containing the most recent economic analysis could be no earlier than October 1992, since FY 1993 is three fiscal years prior to FY 1996 and October 1992 is the first month of FY 1993. If more than three fiscal years have elapsed since the release of the Report of the Chief of Engineers, an economic reevaluation must be the first item of work upon receipt of any funds intended to further project implementation.

xiii _____
^a Identified by type

(1) Dates and general guidance for decision requests. The pertinent dates for budgetary and investment decisions, along with guidance for various decision requests are specified below.

(a) New Start PED Budgeting. For all New Start PED funding requests the pertinent decision date is the submission of the budget request to HQUSACE. Benefit-to-cost ratios (BCR), which are required in support of budget requests, will be developed based on the latest approved economic analysis, annualized at the specified discount rates. The current project costs should be deflated to the same price level as in the latest approved economic analysis, annualized at the current interest rate. The report and approval date of that analysis must be cited and should not be more than three fiscal years old. If more than three fiscal years have elapsed since the release of the Report of the Chief of Engineers, an economic reevaluation must be the first item of work upon receipt of PED funds. Follow-on funding will be contingent upon approval of the economic reevaluation.

(b) Continuing PED Budget requests. For all continuing PED funding requests the pertinent decision date is the Division submittal of the budget request to HQUSACE. The same methodology, deflating costs to the date of the approved economic analysis and adjusting costs and benefits for the budget year discount rate applying to New Start PED budget requests, should be used for continuing PED funding requests. The three year requirement for updates is also applicable.

(c) New Construction Start Budgeting. For all New Start Construction funding requests for projects and separable elements, the pertinent decision date is the submission of the Division budget request to HQUSACE. The same BCR computation and reporting requirements and the three year updating requirements previously discussed are applicable to New Construction Start Budgeting. If the reevaluation uncovers major changes that could affect project formulation or sizing, additional PED funds rather than construction funds should be requested to undertake a complete General Reevaluation (GRR) level evaluation.

(d) Project Cooperation Agreements. For all PCA's, the pertinent decision date is the submission of the final PCA to ASA (CW) for approval. If more than three fiscal years have elapsed since the approval date of the latest economic analysis, a reevaluation must be performed in sufficient detail with supporting documentation to show the project remains justified. The reevaluation may be presented in a Limited Reevaluation Report (LRR) which supplements the project document cited in the PCA. Submission of the LRR to HQUSACE for approval must be accomplished prior to submission of the draft PCA.

(e) Non-PCA Projects. The pertinent decision date for approval to initiate expenditures of Construction General appropriations for projects which do not require a PCA, such as inland navigation, is the submission date of the request to HQUSACE. The three fiscal year and reevaluation requirements for PCA's are also applicable to non-PCA projects.

(2). Definition of Last Approved Official Document. The approved official document for the Feasibility Report is the Report of the Chief of Engineers. Other approved official documents may include General (GRR) or Limited Reevaluation Reports (LRR). If other documents are to be used as the basis for obtaining budgetary or implementation approval, they must be approved by CECW.

(3) Plan for Economic Updates. Feasibility reports, General Reevaluation reports and other project decision (formulation) documents, shall include a plan for updating project benefits for future reporting and decision making. The economic update plan shall likewise be included in all Project Management Plans. The actions in the plan may be limited in that no major new analyses need be conducted but rather previous assumptions reviewed and updated with techniques such as surveys and sampling employed to develop a reasonable estimate of current project benefits provided no significant changes in without and/or with project conditions have occurred. However, in no event will simple indexing of overall benefits be acceptable. The plan shall include discussions of the data that will be required and the procedures that will be employed. Any rational set of procedures that result in a current analysis of benefits may be acceptable except procedures which amount solely to indexing of benefits. Examples of procedures that could be formulated during feasibility and other studies, and which could be useful in providing current analysis in the future are sampling and monitoring, partial benefit reanalysis, and limited indexing.

(a) Sampling or Monitoring. The focus of the effort should be on factors which are critical to project formulation and feasibility and are representative of the major benefit categories (i.e., inundation reduction benefits in a flood control project or transportation cost savings in a navigation project). For example, in a fully developed floodplain a sample of structures may be selected for development of replacement cost less depreciation of structure values using construction cost models. The values derived could then be used to represent values for the floodplain. For a navigation project, if feasibility depends critically on ships of given characteristics, a plan may be developed to monitor future use of these ships.

(b) Partial Benefit Reanalysis. This study will not have nearly the depth or breadth of a feasibility study. It could be informative regarding current benefits and may be accomplished at reasonable cost. For example, damage calculations at current prices for sampled structures provide valuable information on the current level of inundation reduction benefits.

(c) Limited Indexing. Use of generalized indices such as CWCCIS may be used for specific infrastructure benefit categories such as roads, bridges, and rail lines provided these benefit categories do not constitute a major portion of overall project benefits. Additionally, the reevaluation report must document that the infrastructure improvements are still present and used and are subject to comparable flood damages as in the latest report.

(4) Content of Limited Economic Reevaluation. Limited Reevaluation Reports (LRR) may be used to document the current economic evaluation of a project (or separable elements), or to report some other kinds of project changes.

(a) Scope and Documentation. The limited economic evaluation information submitted to HQUSACE for approval in a reevaluation document needs to be either complete within the document or accompanied by the document it is updating. Limited economic reevaluations must include sufficient data to describe what was done in the previously approved document, what was done in the limited reevaluation, what differences there are and the reasons for the differences. Documentation should cover items which are not strictly socio-economic conditions such as changes in hydrology and hydraulic characteristics or periods of record and costs. This documentation should cover each benefit and cost item, and show net benefits and the benefit-cost ratio at the current discount rate.

(b) Format and Displays. A good format would start with brief summary description of the previous approved evaluation and the current reevaluation, accompanied by a tabular display of the changes, followed by support documentation explaining the changes. The following simple display format is a suggested guideline for the tabulation of current costs and benefits and economic justification in a structural flood control project.

Table D- 3: Tabulation of Current Costs and Benefits

	Latest Approved ¹	Current Estimate	Difference	Reason for Difference
Benefit Category ²				
Inundation				
Residential Structures				
Residential Contents				
Other				
Cost Category				
Construction				
Lands				
Other				
Net Benefits				
Benefit / Cost Ratio				

¹ Cite document, name, date, approval date, price level and interest rate.

² Use categories and sub-categories of benefits in latest approved document.

(5) **Project Changes Requiring More Detailed Analysis.** In some instances a more thorough reanalysis than specified in the economic update plan needs to be provided. Examples may include instances where the previously approved project document predates cost-shared feasibility study planning; an economic benefits update plan has not been approved; the project has not had seamless funding; substantial changes in the without condition, project formulation, project design and/or project costs have occurred. The level of effort for the economic reevaluation should be based on whether the changed conditions warrant a reformulation of a project or a reaffirmation of the justification of the authorized plan. If reformulation, including evaluation of alternative sizes of a project, is warranted a GRR should be prepared and the economic reanalysis should be of similar scope as required for a feasibility study. If reformulation is not warranted a limited economic reevaluation shall be documented in an LRR.

(6) **Summary.** The policy of reporting and maintaining current estimates of project benefits and economic justification can most effectively be accomplished through quality cost estimates in feasibility reports, seamless funding, and development of economic update plans. Through such quality development in the early stages of planning and engineering, the necessity for laborious reevaluation and review can be diminished. Occasionally, more full reanalysis and review are warranted when conditions change and older projects are reintroduced into the system; the LRR and GRR are the appropriate vehicles for these reanalyses.

c. **Benefits that Accrue During Project Construction.**

(1) Benefits accruing during project construction should be documented and included in the benefit evaluation. These benefits should be brought forward from the time the benefits start to the beginning of the period of analysis, using the project discount rate. Benefits (and costs) first are stated in present worth terms as of the beginning of the period of analysis, and then are annualized.

(2) Benefits and costs during the construction period are calculated separately; it is not assumed that benefits accrued are offset by interest incurred, or vice versa.

d. **Most Likely Non-Federal Alternative.** The cost of the most likely alternative may be used to estimate NED benefits for a particular output if non-Federal entities are likely to provide a similar output in the absence of any of the alternative plans under consideration and if NED benefits cannot be estimated from market price or change in net income. This assumes that society would in fact undertake the alternative means. Estimates of benefits should be based on the cost of the most likely alternative only if there is evidence that the alternative would be implemented. The most likely alternative should in general be something other than a single-purpose project constructed at the same site by the non-Federal entity. In determining the most likely alternative, the planner should give adequate consideration to nonstructural and demand management measures as well as structural measures.

e. OMB-approved Survey Questionnaire. This paragraph provides guidance on the use of OMB-approved survey questionnaires for collection of planning data.

(1) The requirement for OMB approval of survey questionnaires is noted at several locations in this Appendix and in Appendix E.

(2) OMB has approved a group of questionnaire items for the collection of planning data. The questionnaire items cover the range of data that would generally be collected by survey in water resources studies.

(3) The approved questionnaire items are transmitted by memorandum every three years, as additions and revisions are made and OMB approval is renewed.

(4) The District Commander or his designee must thoroughly review the individual questionnaire for quality control purposes before it is used by the district. Currently, OMB requires that Corps questionnaires be submitted for their review and approval before implementation. The quality control review information below must be provided to OMB when seeking survey approval.

(5) Quality control review should be based upon the need for the questionnaire and the reasonableness and adequacy of:

- (a) The research questions to be answered.
- (b) The sampling strategy being employed.
- (c) Data collection procedures being employed, and follow up procedures.
- (d) Data analysis plan.

(6) Additional guidance for the conduct of questionnaire surveys is contained in the memorandum transmitting the approved questionnaire items.

f. Opportunity Cost of Time. This paragraph provides guidance for evaluating the opportunity cost of time, when time is saved or lost as a result of implementation of a project. For a more thorough discussion of this subject, see Value of Time Saved for use in Corps Planning Studies, A Review of the Literature and Recommendations, IWR Report 91-R-12, October 1991.

(1) Determine the amount of time savings or loss that results from implementation of a project for each economic activity.

(a) The amount of and circumstances resulting in the time savings or loss should be clearly expressed in the with and without project planning context.

(b) Savings and losses should be estimated by individual or unit economic activity. The number of individuals or economic activities should also be specified.

(2) Determine the alternative use of the time savings or losses. The alternate use will be valued as either work, social/recreation or other.

(3) The following table will be used for the determination of value of time saved in Corps planning studies. Thus, the value of time saved will be different depending on the purpose of the trip and the amount of time saved on each trip. The percentages shown in column (3) can be applied after the before-tax family income of drivers in the study area is estimated. The dollar values shown in column (2) are based on \$32,191, the median family income for the U.S. in 1988 (U.S. Bureau of the Census). The value of time savings for work trips is on a per vehicle-occupant basis. Therefore, to calculate the total value of work time saved per vehicle requires multiplication by the adults per vehicle. For social/recreation, vacation, and other trips, the value of time saved is on a per vehicle basis. The value of time saved for these trip purposes should not be adjusted for the number of passengers.

Table D- 4: Value of Time Saved by Trip Length and Purpose

	VALUE OF TIME SAVED ADJUSTED TO HOURLY BASIS (\$/HOUR)	VALUE OF TIME SAVED ADJUSTED TO HOURLY BASIS (% OF HOURLY FAMILY INCOME OF DRIVER)
LOW TIME SAVINGS (0-5 MINUTES)		
WORK TRIPS	\$0.99	6.4%
SOCIAL / RECREATION TRIPS	0.20	1.3%
OTHER TRIPS	0.01	0.1%
MEDIUM TIME SAVINGS (6-15 MINUTES)		
WORK TRIPS	4.99	32.2%
SOCIAL / RECREATION TRIPS	3.58	23.1%
OTHER TRIPS	2.24	14.5%
HIGH TIME SAVINGS (OVER 15 MINUTES)		
WORK TRIPS	8.33	53.8%
SOCIAL / RECREATION TRIPS	9.29	60.0%
OTHER TRIPS	9.98	64.5%
VACATION		
ALL TIME SAVINGS	11.63	75.1%

Note: Work trip is on per person basis while all other trip purposes are on a per vehicle basis.

g. Publication of Planning Data, Information and Guidance. Various data used in planning are circulated by Economic Guidance Memorandum. These data include:

- (1) Federal water resources discount rate;

- (2) Normalized agricultural prices;
- (3) Unit day values for recreation;
- (4) Areas eligible for NED benefits from employment of previously unemployed labor resources;
- (5) National Flood Insurance Program operating costs;
- (6) List of contacts for Corps of Engineers when seeking National Marine Fisheries Service (NMFS) input on measuring commercial fishing benefits; and
- (7) Vessel operating cost estimates.
- (8) Ability-to-pay factors for qualifying counties and counties eligible for price reductions on water storage contracts.

D-5. Financial Analysis.

a. Purpose. This Section provides procedures and responsibilities for financial analysis in support of construction recommendations. It also provides guidance on the relationship between project outputs and non-Federal sponsors' ability to finance projects. Approval authority for the financing plans has been delegated to Division commanders who have the authority to further delegate it to District commanders.

b. Definitions.

(1) Financial Analysis. A financial analysis consists of a non-Federal sponsor's statement of financial capability and financing plan and the District Commander's assessment of the non-Federal sponsor's financial capability.

(2) Financial Commitment. The financial commitment is the total financial obligation a non-Federal sponsor will be required to pay over the life of a project, including the acquisition of lands, disposal areas, easements, rights-of-way and relocations, the costs of operation, maintenance, repairs, replacements and rehabilitation (OMRR&R) over the life of the project, the cost of any associated work such as berthing areas for navigation projects or interior drainage for flood control projects, and the cost of debt service.

(3) **Statement of Financial Capability.** The statement of financial capability is a clear and convincing description, submitted by the non-Federal sponsor, of its capability to meet its financial obligations for the project in accordance with the project funding schedule.

(4) **Financing Plan.** A financing plan consists of a clear and convincing description of how the non-Federal sponsor plans to meet its financial obligations for the project in accordance with the project funding and OMRR&R schedules.

(5) **Assessment of Financial Capability.** The District's assessment of the non-Federal sponsor's financial capability is to determine if it is reasonable to expect that ample funds will be available to satisfy the non-Federal sponsor's financial obligations for the project. Districts are expected to present rationale supporting the conclusion of the assessment. Appropriate rationale would include discussion of prior performance of the non-Federal sponsor on similar projects, certainty of revenue sources and method of payment, the overall financial position of the non-Federal sponsor and/or the credit worthiness of sponsor's debt obligations as reported by independent credit rating service such as Moody's or Standard & Poor's.

c. **General Financial Analysis Philosophy.** Financial analysis is required for any plan being considered for Corps of Engineers implementation that involves non-Federal cost sharing. The ultimate purpose of the financial analysis is to ensure that the non-Federal sponsor has a reasonable plan for meeting its financial commitment. The financial analysis should include:

(1) The non-Federal sponsor's statement of financial capability;

(2) The non-Federal sponsor's financing plan; and

(3) The district's assessment of the non-Federal sponsor's financial capability. Financial considerations can be expected to affect project scale as well as construction scheduling and phasing and OMRR&R expenses.

d. **Procedures and Responsibilities.**

(1) **Specifically Authorized Projects.** A financial analysis is required as part of the Project Cooperation Agreement (PCA) package to be submitted to HQUSACE. The parts of the analysis to be submitted with the PCA will include the District Commander's assessment of the non-Federal sponsor's financial capability and the Allocation of Funds Table. The financing plan and the statement of financial capability should be prepared by the non-Federal sponsor, with assistance from the District. These two documents are considered to be working documents to be used by the District Commander in making his/her capability determination and need not be included in the PCA package. If the replacement and rehabilitation costs are significant, the sponsor should be provided schedules and costs of occurrence for assistance in their overall financial planning.

(2) Specifically Authorized Studies.

(a) Reconnaissance Phase. The reconnaissance phase is expected to provide an assessment of the level of interest and support of local interests in potential solutions. A letter from the non-Federal sponsor indicating his understanding of project cost sharing requirements should accompany the Reconnaissance Report. The letter should discuss, in general terms, the options available to the non-Federal sponsor for financing the non-Federal share of project construction.

(b) Feasibility Phase. The feasibility report should be accompanied by supporting financial information consisting of a preliminary financing plan and a statement of financial capability as described in this section of this Appendix. It is recommended that this information be included in an appendix on local cooperation. This information is necessary to establish implementability.

(3) Continuing Authorities Studies. See Appendix F.

e. Non-Federal Sponsor's Financing Plan and Statement of Financial Capability.

(1) Scope.

(a) Financing Plan. Each financing plan should include the following information:

(1) A current schedule of estimated Federal and non-Federal expenditures by Federal fiscal year (see Table D-5), including Federal expenditures, non-Federal contributions, non-Federal lands, easements, rights-of-ways, relocations, and disposal areas (LERR&D), and, for commercial navigation projects, non-Federal utility relocations. The total Federal and non-Federal shares displayed in the schedule should exactly reflect cost sharing policy and should agree with estimated cost figures in the PCA. Current cost sharing policy requires that the non-Federal funds (i.e. cash) be made available to the Federal Government in proportion to scheduled Federal obligations in each Federal fiscal year; also, if there are engineering and design costs to be cost shared, but which were not covered by a PED cost sharing agreement, then these are to be recovered in the first year of construction.

Table D- 5: Schedule of Estimated Federal and Non-Federal Expenditures

Fiscal Year	FEDERAL		NON-FEDERAL			
	CASH	LERR&D	CASH	LERR&D	Utility Relocation	Other

Notes:

1. Federal, Non-Federal cash and LERR&D should be shown for each project purpose.
2. Any repayment for navigation projects should be shown in a footnote.
3. Include in other any associated costs such as berthing areas or interior drainage.

(2) A schedule of the sources and uses of non-Federal funds during and after construction (see Table D-6) by Federal fiscal year. The schedule should include project outlays and income as well as outlays and income related to project construction and financing. Outlays during construction include cash payments to an escrow account or the government; LERR&D; associated costs; and, for bonds, various insurance-related costs and interest paid to bond holders during construction. Income during construction includes funds on hand, revenues, appropriations, grants, interest on unexpended balances, and, for bonds, bond proceeds. Outlays after construction include bond debt service, repayments to the government, and OMRR&R. The schedule of the sources and uses of funds should be consistent with the schedule of estimated Federal and non-Federal expenditures.

(b) The method of finance for all non-Federal outlays including OMRR&R associated with the project should be explained in the financing plan.

(c) Statement of Financial Capability. The non-Federal sponsor's statement of financial capability should provide evidence of the non-Federal sponsor's authority to utilize the identified source or sources of funds; and each statement of financial capability should provide information on the non-Federal sponsor's capability to obtain remaining funds, if any. This information will be at a level of detail necessary to demonstrate such capability for the particular project and the particular non-Federal sponsor.

(1) Where the non-Federal sponsor's capability is clear, as in the instances where the sponsor has sufficient funds currently available or has a large revenue base and a good bond rating, the statement of financial capability need only provide evidence of such.

(2) If capability is not clear and the non-Federal sponsor is relying on its full faith and credit to obtain remaining funds (as in the use of general obligation bonds, appropriations or a repayment agreement), the statement of financial analysis should include a credit analysis which demonstrates that the sponsor is credit worthy for the required amount and purpose.

(3) If the non-Federal sponsor is relying on non- guaranteed debt (e.g. a particular revenue source or limited tax, or bonds backed by such a source) to obtain remaining funds, the statement of financial capability should include an analysis that demonstrates that the projected revenues or proceeds are reasonably certain and are sufficient to cover the non-Federal sponsor's stream of costs through time.

(4) If the non-Federal sponsor is relying on third party contributions the statement should include comparable data for the third party together with evidence of it's legal commitment to the non-Federal sponsor.

(2) Preparation.

(a) The District should, with input from the non-Federal sponsor, prepare the schedule of estimated Federal and non-Federal expenditures including OMRR&R.

(b) Either the non-Federal sponsor or the District should prepare the schedule of the sources and uses of non-Federal funds, using information provided by the other.

(c) Either the non-Federal sponsor or its financial consultant should prepare the financing plan and the statement of financial capability. The appropriately empowered official representing the non-Federal sponsor should sign the statement of financial capability.

(d) A financing plan and statement of financial capability should be prepared for each non-Federal sponsor which is signatory to an PCA (this applies to continuing authority projects as well as specifically authorized projects). If a non-Federal sponsor's financing depends on the contributions of funds by a third party or parties, and the non-Federal sponsor does not have the capability or authority to meet its financial obligations without said contribution, a separate statement of financial capability and financing plan should also be provided for the contributions for the third party or parties. These should include sources of funds, authority and capability to obtain remaining funds, and evidence of the third party's legal obligation to provide its contribution.

ER 1105-2-100
 22 Apr 2000

Table D- 6: Schedule of Sources and Uses of Funds

	FUNDS AVAILABLE FROM LOCAL SPONSOR		
	Begin Balance <u>Plus Annual Income</u>	Required Annual Contribution	Fund Balance
Balance on hand construction initiated			
1st year Revenues Interest Income Operating Revenues Bond Sales etc.			
2nd year Revenues Interest Income Operating Revenues Bond Sales etc.			
3rd year Revenues Interest Income Operating Revenues Bond Sales etc.			
.			
.			
.			
Project Completion			

Required Annual OMRR&R \$_____ (Schedule of major replacement and rehabilitation costs should be included if they are significant cost items which sponsor must plan for.)

Source of Funds for OMRR&R _____

(e) The financing plan and the statement of financial capability may be combined in one document.

f. Assessment of the Non-Federal Sponsor's Financial Capability. The District's assessment of the non-Federal sponsor's financial capability should ascertain that it is reasonable to expect that ample funds will be available to satisfy the non-Federal sponsor's financial obligation for the project. Districts are expected to present rationale supporting the conclusion of the assessment. Appropriate rationale would include discussion of prior performance of the non-Federal sponsor on similar projects, certainty of revenue sources and method of payment, the overall financial position of the non-Federal sponsor and/or the credit worthiness of sponsor's debt obligations as reported by an independent credit rating service such as Moody's or Standard & Poor's.

g. Illustration of Financing Plan Outline

Figure D- 1: Illustration of Financing Plan Outline

<p>The (enter non-Federal sponsor's name), non-Federal sponsor of the (enter project name), is capable of meeting cost sharing and other obligations as required under the terms of the draft Project Cooperation Agreement.</p>
<p>USES OF FUNDS</p>
<p>(Status of land acquisition including an estimate of the cost of real estate interests that have not yet been acquired.)</p>
<p>_____ (Total cash contribution required from the non-Federal sponsor for the project during construction.)</p>
<p>_____ (Annual cash required from the non-Federal sponsor for operation, maintenance and rehabilitation.)</p>
<p>_____ (Total cash required by the non-Federal sponsor for any project related requirements such as berthing areas for navigation projects and interior drainage for flood control projects.)</p>
<p>SOURCES OF FUNDS</p>
<p>_____ (Cash available for project.)</p>
<p>_____ (Financing to be obtained from bonds, if any.)</p>
<p>_____ (Financing to be obtained from other sources, e.g. operating revenues, tax revenues, interest earnings on funds dedicated to the project, etc.)</p>

h. Sample Bond Consultant's Letter. See Figure D-2.

Figure D- 2: Sample Bond Consultant's Letter

"We have been working with the (enter non-Federal sponsor's name) to develop a well-planned approach toward financing the pending project. In this regard the (enter non-Federal sponsor's name) has taken significant steps over the years in implementing certain actions designed to make the project financially possible. Among these are (list actions taken)."

"We have developed financial projections that indicate the (enter non-Federal sponsor's name) has the financial capability to complete the project. Bonds, in the amount of (enter amount) have been/will be authorized on (enter date) and the (enter non- Federal sponsor's name) current bond rating according to (enter source) is (enter bond rating)."

i. Continuity of Financing Responsibilities.

(1) Status of Local Sponsor's Financing Plan and Corps Responsibilities During PED. Between completion of the feasibility study and signing of the PCA the District Commander shall stay informed and current regarding the continuing ability and willingness of the sponsor to meet its financial responsibilities. This time can be used to firm up any aspects of the financing plan that may have been weak. In addition, a mechanism shall be agreed upon whereby the sponsor will inform the Corps of any material changes in its financing abilities. Likewise, it is the responsibility of the District Commander to inform the sponsor in a timely way of material changes in cost estimates resulting from PED studies, due to design changes or other reasons.

(2) Local Sponsor's Financing Responsibilities and Corps Responsibilities During Construction. Mutual responsibilities regarding information about financing abilities and changes in cost estimates continue after the PCA is signed and construction initiated. The District Commander shall stay informed and current regarding the sponsor's continuing ability to meet its financial obligations, especially so if the financing plan calls for using other than cash or direct appropriations, or if the sponsor intends to repay its cost share. A mechanism shall be agreed upon whereby the sponsor will inform the Corps of any material changes in its financing abilities. The District Commander continues to be responsible for informing the local sponsor of changes in construction costs.

j. Ability to Pay Determination. See [ER 1165-2-121](#)

for procedures for determining cost shares for qualifying non-Federal sponsors under the ability to pay provisions of Section 103 of the WRDA of 1986, as amended. The ER applies only to flood damage reduction studies.

k. Relationship Between the Feasibility Study (Economic) Analysis and Financial Analysis.

The primary purpose of the financial analysis itself is to ensure that the non-Federal sponsor has a reasonable plan for meeting its financial commitment. Project related economic analysis can provide data and other information potentially important in developing the financial analysis.

(1) Relationship of Financing Plans to Project Outputs.

(a) Relationship of Project Outputs to Willingness to Pay. Project outputs create willingness to pay for the project on the part of direct beneficiaries equal to the total benefits. Frequently there are indirect beneficiaries. Willingness' to pay of both direct and indirect beneficiaries can potentially be captured by the local non-Federal sponsor, and can become a part of the non-Federal sponsor's financing plan. For example, flood control for a business or commercial area has direct damages avoided benefits, and may improve the general business climate such that property values outside the flooded area increase as well.

(b) Financing Plan Alternatives. Some non-Federal sponsors will finance projects in a way that directly uses the vendibility of project outputs. Examples are port user charges or user fees for other project outputs, special taxing districts, property tax surcharges, etc. Other financing plans will be indirectly related to project outputs. For example the non-Federal sponsor's general taxing or bonding indebtedness capabilities may be used with the expectation that the project's beneficial effects will create ability to pay. Others will finance in ways entirely unlinked to the captured value of project outputs. For example, the non-Federal sponsor may have sufficient funds available, a large revenue base or may rely on third party contributions.

(1) Procedures. The role of economic analysis in development of financing plans is to establish relationships between project outputs, willingness' to pay on the part of direct and indirect beneficiaries and ability to finance projects.

(a) Outputs of projects (or use of project outputs) for which there are identifiable beneficiaries with willingness to pay that can potentially be captured should be quantified. The quantification should be to a degree of certainty that is useful to non-Federal sponsors in developing a financing plan. Examples are: numbers, locations, values, and physical and use characteristics of structures to be protected by a flood control project; expected visitation at recreation facilities; vessel names, registries, ownership, drafts and cargo carrying abilities of ships expected to benefit from harbor deepening, etc.

(b) Indirect effects of projects, e. g. local or regional development, should be identified and quantified to the degree practicable. Maximum use should be made of secondary sources (i.e. found in the literature) regarding average, or if available, location specific relationships between investment and induced economic activities, between investment and changes in property values, etc.

(c) Estimates of the willingness to pay of beneficiaries should be provided to local sponsors. These should be in a useful form and of a degree of certainty that is useful in developing financing plans. Examples are: average annual damages avoided for structures; willingness to pay for recreation visits; and transportation cost savings for the different beneficiaries identified in (a) above. If efforts to collect from beneficiaries would affect use of project outputs and the level of induced or secondary effects this information shall also be provided to local sponsors.

D-6 Interest Rate and Period of Analysis

a. Conceptual Basis. Project NED benefits and costs shall be compared at a common point in time. The following information shall be presented in decision documents:

(1) Installation Period. The number of years required for installation of the plan. If staged installation is proposed over an extended period of time, the installation period is the time needed to install the first phase.

(2) Installation Expenditures. The dollar expenses expected to be incurred during each year of the installation period.

(3) Period of Analysis. The time horizon for project benefits, deferred installation costs, and operation, maintenance, repair, rehabilitation, and replacement (OMRR&R) costs. Use the same period of analysis for all alternative plans. Appropriate consideration should be given to environmental factors that may extend beyond the period of analysis.

(a) The period of analysis for comparing costs and benefits following project implementation is further defined and limited to the lesser of:

(1) The period of time over which any alternative plan would have significant beneficial or adverse effects;

(2) A period not to exceed 50-years except for major multiple purpose reservoir projects; or

(3) A period not to exceed 100-years for multiple purpose reservoir projects.

(b) In cases where alternatives have different implementation periods, a common base year will be established and costs and benefits will be compounded or discounted to that base year. Projects that accrue benefits during the implementation period should refer elsewhere in this document (paragraph D-4c) for specific guidance.

(4) Benefit Stream. The pattern of expected benefits over the period of analysis.

(5) OMRR&R Costs. The expected costs over the period of analysis for operation, maintenance, repair, rehabilitation, and replacement necessary to maintain the benefit stream and agreed-upon levels of mitigation of losses to fish and wildlife habitats.

(6) Discount Rate. The rate established annually for use in evaluating Federal water projects.

d. Calculating Net NED Benefits In Average Annual Equivalent Terms. Net NED benefits of the plan are calculated in average annual equivalent terms. To perform this calculation, discount the benefit stream, deferred installation costs, and OMRR&R costs to the beginning of the period of analysis using the applicable project discount rate. Installation expenditures are brought forward to the end of the period of installation by charging compound interest at the project discount rate from the date the costs are incurred. Use the project discount rate to convert the present worth values to average annual equivalent terms.

D-7. NED Benefit Evaluation Procedures: Unemployed or Underemployed Labor Resources

a. Purpose. The economic effects of the direct use of otherwise unemployed or underemployed labor resources during project construction or installation may, under certain conditions, be included as a national economic development (NED) benefit. Because of the dynamic nature of unemployment situations, the appropriateness of these benefits will be determined in consideration of economic conditions existing at the time the project is submitted for authorization and for appropriations to begin construction. This section provides procedural guidance.

b. Conceptual Basis.

(1) The social cost of a project is less than the market contract cost in situations in which otherwise unemployed or underemployed labor resources are used in project construction. The opportunity cost of employing otherwise unemployed workers in project construction or installation is equal to the value of leisure time foregone by such workers. Because society does not give up any alternative production of goods and services and because it would be difficult to measure the value of leisure time foregone, a zero opportunity cost is used in these procedures. The opportunity cost of employing otherwise underemployed workers equals their without project earnings, which,

by virtue of their underemployment, are less than their market cost. The most straightforward way to reflect the effects of employing unemployed or underemployed labor resources would be to reduce by the appropriate amount the project construction costs in the NED account, but this method would cause accounting difficulties in appropriations, cost allocation, and cost sharing. Therefore, these effects are treated as a project benefit in the NED account.

(2) Conceptually, any employment, anywhere in the Nation, of otherwise unemployed or underemployed resources that results from a project represents a valid NED benefit. However, primarily because of identification and measurement problems and because unemployment is regarded as a temporary phenomenon, only those labor resources employed onsite in the construction or installation of a project or a nonstructural measure should be counted. Benefits from use of otherwise unemployed or underemployed labor resources may be recognized as a project benefit if the area has substantial and persistent unemployment at the time the plan is submitted for authorization and for appropriations to begin construction. Substantial and persistent unemployment exists in an area when:

(a) The current rate of unemployment, as determined by appropriate annual statistics for the most recent 12 consecutive months, is 6 percent or more and has averaged at least 6 percent for the qualifying time periods specified in subparagraph (2) below and:

(b) The annual average rate of unemployment has been at least: (a) 50 percent above the national average for three of the preceding four calendar years, or (b) 75 percent above the national average for two of the preceding three calendar years, or (c) 100 percent above the national average for one of the preceding two calendar years.

(3) Only the portion of project construction activity located in such an area is eligible for employment benefits as calculated in accord with the procedures specified below. Any benefit claimed should be clearly justifiable both in terms of availability of amounts of unemployed and/or underemployed labor and their skills and occupations.

c. Planning Setting.

(1) Without Project Condition. The without project condition is the most likely condition expected to exist in the future in the absence of a project, including known changes in law or public policy. The evaluation of NED benefits associated with the use of otherwise unemployed and underemployed labor resources is linked to the number by which these resources would be reduced over time without a project.

(2) With Project Condition. The with project condition is the most likely condition expected to exist in the future with a given project alternative. There is a different with project condition and thus a different employment benefit for each alternative plan. Currently, the employment benefit cannot be estimated directly on the basis of a comparison of the size of the

pools of unemployed and underemployed labor with and without a project. Instead, the benefit procedure implicitly projects the percentage of project labor hires estimated to come from the unemployed labor pool.

d. Evaluation Procedure.

(1) Step 1. Calculation of employment benefits is limited to onsite project construction or installation activity in eligible regions as defined in paragraph D-7b(2). The first step therefore is to determine whether a project is wholly or partially located in an eligible area.

(2) Step 2. Estimate the number of skilled and unskilled unemployed construction workers in the labor area. Construction labor pool data are usually available from local offices of State employment security agencies.

(3) Step 3. Determine the labor requirements for plan implementation as follows:

(a) Labor cost. The manpower requirements of water resource projects differ widely. Construction cost estimate data will provide the percentage of labor cost to total construction contract cost.

(b) Manpower requirements. Analyze the plan's construction work force and schedule to determine manpower requirements over the construction period for skilled and unskilled categories of workers. Convert these data to total construction wages in skilled and unskilled categories by year of construction. In addition, estimate the yearly wage bill of other workers needed on the project. Use the occupational tables in Table D-7 in this section to categorize different types of workers.

(4) Step 4. Compare the annual manpower requirements of the project to the size of the unemployed labor pool in eligible regions. If labor availability is significantly larger than labor requirements, proceed to the next step. If not, reduce the percentages in the next step based on one or both of the following: expert interviews; or a careful match-up of requirements and availability for specific types of jobs (e.g., carpenters).

(5) Step 5. Calculate NED employment benefits.

(a) Standard method. The following percentages are derived from An Evaluation of the Public Works Impact Program (PWIP).¹ Although the projects studied in the PWIP report are not

¹Economic Development Administration, U.S. Department of Commerce. *An Evaluation of the Public Works Impact Program (PWIP)*. Springfield, VA, National Technical Information Service (PB-263 098), January 1975.

fully comparable to many typical water projects, the report does provide an empirical basis for relating public works expenditures to employment of unemployed workers. Case 1, below, covers situations in which there is no “local hire” rule; it is taken directly from the PWIP report, as PWIP has no local hire rule. Case 2 covers situations in which there is a local hire rule; the reference data are modified to account for an 80-percent local hire by scaling up the actual local hires (for skilled and unskilled workers) to 80 percent, but retaining the distribution of local hires previously employed to local hires previously unemployed.

(1) Case 1, NED benefits, no local hire rule. Multiply the total wages determined by categories of workers (skilled, unskilled, and other) by the following percentages to obtain NED benefits by year of construction:

Skilled--30
Unskilled--47
Other--35

(b) Case 2, NED benefits, local hire rule. Apply the following percentages in Case 2 situations:

Skilled--43
Unskilled--58
Other—35

Because the 80-percent local hire rule is a goal, not a requirement, support these percentages by data that indicate the local hire goal is likely to be met. If this is unlikely, reduce Case 2 percentages to numbers between the standard Case 1 and Case 2 percentages.

(2) Annual NED benefits. Convert the NED benefits by year of construction to an annual equivalent basis using the current discount rate.

(b) Alternative methods. The percentages of unemployment hires may be changed from those used in the standard method if the change can be supported by an empirical study that shows different percentages of unemployed and underemployed workers on a similar project, or on a segment of the same project, for labor market conditions similar to those of the proposed project. In using this method, it may be necessary to vary the categorization of construction workers used in the standard method. The opinions of experts such as local State employment security agencies, local construction firms, associations of contractors, and labor unions may not be substituted for empirical data. Studies used to document alternative percentages for specific types or locations of projects should be cited if not included in the project report.

(c) The percentages are used in the standard method to measure wages paid directly to previously unemployed workers. Previously employed workers may vacate jobs that then become available to unemployed workers, but there are no empirical data to support a quantification of such indirect effects, and no estimates of these effects should be included in the NED account.

- e. Report and Display Procedures. Include the employment benefits of each alternative plan as a line item in the display of NED benefits in the system of accounts for any project or portion of a project located in an area that contains unemployed or underemployed resources.
- f. Problems in Application.

(1) An IWR publication provides guidance for estimating benefits associated with the direct use of otherwise unemployed labor resources during project construction. The Report of Survey of Corps of Engineers Construction Workforce (IWR Research report 81-R05) provides an empirical basis for changing the percentages of unemployed specified in this section. The IWR report introduces a new evaluation technique and new techniques must be approved by the Water Resources Council. Therefore, if the approach in the IWR report is used, the techniques specified in this section should also be used to demonstrate the sensitivity of the results to the different methods.

(2) Unemployment benefits shall not be used in project formulation, scaling, or NED plan determination. These benefits shall not be used to justify a project where the BCR is otherwise less than unity.

ER 1105-2-100
22 Apr 2000

Table D- 7: Occupational Tables
(For use in evaluation of unemployed or underemployed labor)

BLUE COLLAR UNSKILLED

OCCUPATIONS

Bricklayer Apprentice	Mason Helper
Carpenter Apprentice	Mason Laborer
Apprentice Carpenter	Mason Tender
Carpenter Helper	Mortarman
Chairman	Mortarmier
Deck Hand	Pipe Layer
Electrician Apprentice	Pipe Helper
Apprentice Electrician	Pipe Fitter
Apprentice Wireman	Plasterer Tender
Electrician Trainer	Powerman
Iron Worker Apprentice	Pusher
Laborer	Rakeman
Asphalt Distributor	Reboundman
Assistant Carpenter	Road Laborer
Bottom Laborer	Roof Helper
Brick Tender	Sand Blaster
Carpenter Aid	Set-up-man
Carpenter Helper	Sprinkler Apprentice
Chainsawman	Stake Setter
Common Laborer	Tender
Concrete Barker	Termite Operator
Concrete Laborer	Tile Setter Operator
Concrete Saw	Vibrator Operator
Construction Laborer	Water Truckman
Ditch Laborer	Lumberman and Nurseryman
Drill Helper	Tree Thinner
Flag Person	Treeman
Hod Carrier	Treeplanter
Kettleman	Operating Engineer Apprentice
Laborer	B. M. Apprentice
Laborer Apprentice 3rd	EO Group III
Laborer Group I	EO Group 222
Laborer Group V	Plumber Apprentice
Labor Shop Man	Plumber Apprentice
Laborer Topman	Plumber Helper
Laborer Utilityman	Painter's Helper
Landscape Laborer	Sheet Metal Apprentice
	Vibrator Operator
	Watchman

Night Watchman

BLUE COLLAR SKILLED
OCCUPATIONS

Blaster
Boilermaker
Boilermaker Foreman
Bricklayer Foreman
 Block Layer
 Truckpointer
 Brick Mechanic
Carpenter
 Form Setter
 Journeyman Carpenter
 Soft Floor Layer
Carpenter Foreman
Carpenter Superintendent
Cement Mason
 Finisher
 Journeyman Finisher
Cement Mason Foreman
Diver
Driller
 Drill Rig Operator
Electrician
 Journeyman Electrician
 Mechanical Electrician
 Wireman
 Journeyman Wireman
Electrical Foreman
General Foreman
 General Labor Foreman
 Project Foreman
Glazier
Iron Worker
 Reinforcing Ironworker
 Structural Ironworker
 Steel Worker
 Steel Erector

Steel Setter
Reinforcing Steel Worker
Iron Worker Foreman
Labor Foreman
Construction Foreman
Foreman
Job Foreman
Lead Foreman
Lather
Lather Foreman
Master Mechanic
Mechanic
 Mechanic Welder
 Repairman
Mechanic (Continued)
 Repairman Leadman
Oiler
Oiler Equipment Operator
 Oiler Operator Group II
 Oiler Track Type
Operating Engineer
 Asphalt Distributor Operator
 Asphalt Heaterman
 Backhoe Operator
 Blade Operator
 Bobcat Operator
 Bulldozer Operator
 Case Operator
 Class A Operator
 Class C Operator
 Crane Operator
 Digger Operator
 Distributing Operator
 Dragline Operator
 Equipment Operator
 Equipment Operator Group III
 Front End Lift Fork Operator
 Heavy Equipment Operator
 Hi-Lift Operator
 Lift Fork Operator
 Loader Operator

ER 1105-2-100
22 Apr 2000

Maintenance Loadman
Motor Grader Operator
Operator Group III
Pan Operator
Park Equipment Operator
Power Drive Moister Operator
Power Equipment Operator
Operating Engineer Foreman
Leader Operator
Painter
Brush Painter
Roller Painter
Spray Painter
Painter Foreman
Pile Driver
Pipe Fitter
Sp. Box Man
Pipe Fitter Foreman
Sprinkler Foreman
Plasterer
Plasterer Foreman
Plumber
Pipe Layer
Plumber Foreman
Plumber General Foreman
Plumber Superintendent
Rigger Foreman
Roofer Sheet Metal Worker
Journeyman Sheet Metal
Sheet Metal Mechanic
Sheet Metal Operator

D-8. Social Effects

a. Other Social Effects (OSE) Account. Most water and land resource plans have beneficial and adverse effects on social well-being. These effects reflect a highly complex set of relationships and interactions between inputs and outputs of a plan and the social and cultural setting in which these are received and acted upon. These effects will be reported as appropriate in the system of accounts for each alternative plan. The OSE account is a means of displaying and integrating into water resource planning information on alternative plan effects from perspectives

that are not reflected in the other three accounts. The categories of effects in the OSE account include the following: Urban and community impacts; life, health, and safety factors; displacement; long-term productivity; and energy requirements and energy conservation.

b. Metric. With emphasis on their incidence or occurrence, beneficial effects on social well-being are contributions to the equitable distribution of real income and employment and to other social opportunities. Since they are integrally related to the basic values and goals of society, these effects are usually not subject to monetary evaluation. The normal market exchange process, however, produces monetary values which can be utilized to aid in measuring the distributional impacts of plans on real incomes.

c. Adverse Effects. Adverse effects of a plan have detrimental impacts on the equitable distribution of real income and employment or otherwise diminish or detract from the attainment of other social opportunities. Such adverse effects include not only those incurred in the designated planning area, but also include adverse consequences elsewhere in the Nation resulting from implementation of the plan.

(1) Measurement standards:

(a) Effects on income, employment, and population distribution, fiscal condition, energy requirements, and energy conservation may be reported on a positive or negative basis. Effects on life, health, and safety may be reported as either beneficial or adverse. Other effects may be reported on either a positive/negative basis or a beneficial/adverse basis.

(b) Effects that cannot be satisfactorily quantified or described with available methods, data, and information or that will not have a material bearing on the decision making process may be excluded from the OSE account.

(2) With and without analysis. Existing conditions encompassed by the relevant social factors will be described and presented in terms that best characterize the planning perceptions and social setting of the affected area in the situation without the plan. Planners will also prepare similar descriptions for future social conditions to be expected with and without the plan throughout the period of analysis. The situation existing before the initiation of planning will provide the data from which to evaluate significant social effects under alternative plans.

(3) Limitations. In evaluating well-being effects the obtaining of detailed breakdowns and analytically useful correlations relating to various indicators, index numbers, and similar comparative statistical indicators, as well as dollar values where possible, presents many complex definitional, data, and measurement problems. Consequently, planning studies should explicitly recognize the limitations of present methods and explore innovative approaches to the identification

and measurement of the social well-being effects. Such procedures should be carefully documented in the report.

d. Urban and Community Impacts. A formal treatment of urban related impacts is not required for implementation studies. However, types and locations of significant impacts, broken down by salient population groups and geographic areas, may be reported in the Other Social Effects Account. The principle types of urban and community impacts are as follows:

(1) Effects on real incomes. Beneficial effects on real income occur when designated persons or groups receive income generated as a result of the plan. Current guidelines defining the family poverty line may be used as the data from which to measure and portray the estimated absolute and percentage increase toward meeting or exceeding this standard for specific geographic planning areas.

(2) Effects on employment distribution, especially the share to minorities;

(3) Effects on population distribution and composition;

(4) Effects on the fiscal condition of the State and local sponsor;

(e) Effects on educational, cultural, and recreational opportunities. Beneficial effects to this component include contributions to (1) improved opportunities for community services such as utilities, transportation, schools, and hospitals, (2) more cultural and recreational opportunities such as historic and scientific sites, lakes, and reservoirs, and recreations areas. Beneficial effects to improved community services may be described in appropriate quantitative terms, while increased cultural and recreational opportunities will be set forth as the numerical increase in the relevant facilities, otherwise accounting for size, use potential, and quality. Beneficial effects to improved community services may be described in appropriate quantitative terms, while increased cultural and recreational opportunities will be set forth as the numerical increase in the relevant facilities, otherwise accounting for size, use potential, and quality. Conversely, adverse effects are identified and measured or described as detrimental effects on education, cultural, and recreational opportunities

(f) Effects on security of life, health, and safety. Beneficial effects include contributions to (1) reducing risk of flood, drought, or other disaster affecting the security of life, health, and safety; (2) reducing the number of disease-carrying insects and related pathological factors; (3) reducing the concentration and exposure to water and air pollution; and (4) providing a year-round consumer choice of food that contributes to the improvement of national nutrition. In those limited situations where historical experience is sufficiently documented to provide confidence in projecting likely future hazards, an estimate of the number of lives saved or the number of persons

affected may be provided. In most instances, however, a descriptive-qualitative interpretation and evaluation of the improvement and expected results will be applicable.

(g) Displacement effects include the displacement of people, businesses, and farms.

(h) Long-term productivity effects include maintenance and enhancement of the productivity of resources, such as agricultural land, for use by future generations.

(i) Effects on emergency preparedness. Beneficial effects include contributions to (1) extending, maintaining, and protecting major components of the national water transportation system; (2) provision of flexible reserves of water supplies; (3) provision of critical power supplies (ample, stable, quickly responsive); (4) provision of reserve food production potential; (5) provision for the conservation of scarce fuels; (6) provision for dispersal of population and industry; and (7) supplying international treaty requirements. While these beneficial effects will be measured in appropriate quantitative units where readily practicable, they will be largely characterized in descriptive-qualitative terms. Conversely, adverse effects are identified and measured or described as overloading capacities of water resource systems and increasing the risk of interruption in the flow of essential goods and services needed for special requirements of national security.

(j) Other. Other effects on social well-being may be identified and displayed as relevant to alternative plans.