



State of Oregon Department of Environmental Quality
**Clean Water State Revolving Fund
 Cost and Effectiveness Analysis**

Contact: [Project Officer](#)

After a loan is signed and before construction can begin, loan recipients will submit design documents to the DEQ project officer, and will have required permits in place. Among these documents is a Cost and Effectiveness Certification. This is required for any municipality or intermunicipal, interstate, or state agency that applies for a Clean Water State Revolving Fund loan to demonstrate that the proposed project is the most cost effective approach to achieving the project's water quality goals. This is required by section [602\(b\)\(13\)](#) of the Clean Water Act.

This guide will help you draft the analysis for all the alternatives considered in demonstrating the cost and effectiveness of the proposed project, including:

- Total project cost
- Associated operations and maintenance cost
- The cost of replacing the project or activity
- Processes, materials, techniques, and technologies
- Non-cost factors including water and energy conservation

SECTION 1: Development and Evaluation of Alternatives

Step 1: Identification of Project Category and System Type

General project categories are point source and nonpoint source.

For treatment projects, alternative approaches should be considered with respect to ownership, management, system design and sharing of services. These are categorized as:

- Building new centralized facilities
- Optimizing existing centralized facilities
- Developing decentralized systems
- Developing an optimum combination of centralized and decentralized systems

Instructions. Refer to checklists in Appendix 1 in this document and in the CWSRF [Design-Bid-Build Construction Manual](#).

- Use the first checklist to indicate project category
- Use the second checklist to:
 - Indicate facility or system type, as described above, and
 - The reasons for the selection of the system type such as availability, cost, permit feasibility, or other factors such as groundwater elevation

Step 2: Development of Alternatives

Instructions. See appendix C (C.2(4)) of the [Planning Guideline](#) for the recommended methodology for development and description of alternatives. Once a system is selected, specific alternatives can be developed.

Note

For urban growth boundaries or unincorporated communities with populations greater than 2,500, the review must include a determination of whether each alternative is permitted by the local comprehensive plan and development regulations, and if conditions or limitations are required. An amendment to the comprehensive plan and/or consultation with the Oregon Department of Land Conservation and Development may be necessary.

Step 3: Evaluation of Alternatives

Evaluation of alternatives generally requires consideration of costs and non-monetary factors (examples below). Although for simpler projects only costs need be considered. The evaluation may also be used to eliminate non-feasible alternatives. The instructions below are based on whether a project is considered a Tier One or a Tier Two project. If it isn't clear which tier your projects falls within, contact your DEQ project officer to verify.

Tier One projects do not include a treatment process. Generally, Tier One projects are: collection system or force main projects, pump station projects, and stormwater non-treatment projects.

Tier Two projects are treatment works projects, which refers to facilities that improve the quality of wastewater or stormwater through a treatment process.

Instructions

Tier One Projects: Only require a cost analysis.

Tier Two Projects: Require both a cost analysis and a non-monetary analysis, as described below.

Evaluation of Cost of Each Alternative – Appendix C (C.2(5)(a)) of the Planning Guideline describes the recommended method for developing a cost evaluation. This method generates a life cycle present worth value.

Evaluation of Non-Monetary Factors for Each Alternative

The primary parameters to be considered are:

- Water conservation
- Energy conservation
- Community considerations
- Environmental considerations
- Sustainability

The above parameters should be evaluated for each alternative against the list of criteria in Appendix 1. Additional parameters, such as ones that are community-specific, may be identified by the loan recipient.

The water conservation and energy conservation parameters are of high importance:

- A) Amendment section 602(b)(13) to the Clean Water Act requires that the loan recipient “has selected, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation...”
- B) The community considerations parameter recognizes the unique challenges faced by many loan recipients and also allows a community to promote and protect its values.
- C) The environmental considerations parameter encompasses a broad range of items.
- D) The sustainability parameter can also be defined broadly. However, the basic theme is the need to consistently meet water and energy conservation requirements or objectives. Therefore, a more sustainable alternative is one with a lower degree of risk.

SECTION 2: Writing and Certifying the Cost and Effectiveness Analysis

The analysis provides a process for selecting an alternative that takes into account both overall cost and important non-monetary factors. In theory, the lowest-cost alternative should be selected unless non-monetary factors indicate otherwise. Cost estimates have a relatively high level of uncertainty at the planning stage, thus a number of alternatives may carry equivalent cost estimates. In this case, selection of the recommended alternative should be based on non-monetary factors, if practical. This approach is also recommended for situations where one or more non-monetary factors are of extreme importance to the loan recipient.

Step 1: Memorandum

Following the alternative evaluation, the loan recipient shall write a memorandum that summarizes both the cost analysis and the analysis of non-monetary factors, and recommends an alternative as the basis for the proposed project. For brevity, the summary of cost estimates may cite tables and findings that are described elsewhere in the planning document.

The description of non-monetary factors should portray the extent to which each of the five parameters is addressed by the recommended alternative; a description for other alternatives considered is not required.

An example of the desired level of description using energy conservation as a parameter: *This project will utilize premium efficiency motors, and to the extent feasible, variable-frequency drives. However, it isn't feasible for us to use a renewable energy source. We have estimated total power consumption for each alternative considered, which is a line item within our table of O&M costs for each alternative and thus is factored into the cost evaluation. The power consumption for the recommended alternative was second-lowest of the five alternatives considered, as shown on Table X.*

A similar description should be included for each of the primary parameters included in developing any alternatives

Step 2: Certification

The loan recipient's consulting engineer will complete, sign and submit the Cost and Effectiveness Certification Form to the DEQ project officer with the planning document, or at a later date as appropriate for non-planning loans.

Step 3: Proposed Project (Recommended Alternative)

The wastewater planning document must contain a description of the proposed project in accordance with the [Facilities Plan](#).

Appendix 1: Identification of Project Category and System Type

PROJECT TYPE CHECKLIST: SELECT ALL THAT APPLY					
POINT SOURCE		NON POINT SOURCE			
<input type="checkbox"/> Treatment		<input type="checkbox"/> Stormwater			
<input type="checkbox"/> Collection		<input type="checkbox"/> Irrigation System			
<input type="checkbox"/> Pump Station		<input type="checkbox"/> Source Water Protection			
<input type="checkbox"/> Stormwater		<input type="checkbox"/> Riparian Restoration / Bank Stabilization			
<input type="checkbox"/> Other		<input type="checkbox"/> Other, e.g. agricultural, wetland restoration, stream crossing			
SYSTEM TYPE CHECKLIST: SELECT ONE FOR POINT SOURCE TREATMENT PROJECTS		REASON(S) FOR SELECTING SYSTEM TYPE (AND REASONS FOR NOT SELECTING OTHER TYPES)			
<input type="checkbox"/> Regional, New	<input type="checkbox"/> Not Available	<input type="checkbox"/> Cost	<input type="checkbox"/> Permitting	<input type="checkbox"/> Other (Describe ==>)	
<input type="checkbox"/> Regional, Existing	<input type="checkbox"/> Not Available	<input type="checkbox"/> Cost	<input type="checkbox"/> Permitting	<input type="checkbox"/> Other (Describe ==>)	
<input type="checkbox"/> On-Site (Decentralized)	<input type="checkbox"/> Not Available	<input type="checkbox"/> Cost	<input type="checkbox"/> Permitting	<input type="checkbox"/> Other (Describe ==>)	
<input type="checkbox"/> Hybrid, Regional & On-Site	<input type="checkbox"/> Not Available	<input type="checkbox"/> Cost	<input type="checkbox"/> Permitting	<input type="checkbox"/> Other (Describe ==>)	

Appendix 2: Criteria for Non-Monetary Parameters:

Water Conservation

- Water reuse
- Efficient water use

Energy Conservation

- Energy efficiency of major equipment
- Efficient total power use
- Renewable energy source
- Low greenhouse gas emissions
- Energy assessment and energy audit software

Community Considerations

- Community mission statement or objectives
- Community concerns regarding visual or odor effects
- Other community concerns

Environmental Considerations

- Findings From Development Of Environmental Report, If Available
- Minimize Impact To Flood Plains, Wetlands, Endangered Species, Historical And Archaeological Properties
- Volume Of Waste Generation And Ease Of Handling Wastes

- Minimize Carbon Footprint

Sustainability

- Identify And Minimize Risk To Consistently Meeting Water Quality Objectives During Planning Period
 - Operational Simplicity
 - Operator Certification Requirements
 - Redundancy
 - Reliability

Alternative formats

DEQ can provide documents in an alternate format or in a language other than English upon request. Call DEQ at 800-452-4011 or email deqinfo@deq.state.or.us.