United States
Environmental Protection
Agency

Office of Water
Office of Wastewater Management (4204)

February 1997
EPA 832-B-97-004

EPA

Combined Sewer Overflows—Guidance for Financial Capability Assessment and Schedule Development

Final

TABLE OF CONTENTS

I. INTRODUCTION . . . 1
- Background . . . 1
- History of CSO Policy . . . 1
- Key Elements of the CSO Policy . . . 3
- Guidance to Support Implementation of the CSO Policy . . . 6
- Goal of this Guidance . . . 6
- Organization of Guidance . . . 8
- Audience . . . 8

II. CSO FINANCIAL CAPABILITY ASSESSMENT APPROACH . . . 9
- The Two-Phase Approach . . . 10
- Financial Benchmarks and Informational Sources . . . 11

III. PHASE ONE: THE RESIDENTIAL INDICATOR . . . 12
- Developing CPH Estimates . . . 12
- Developing the MHI . . . 16
- Developing the Residential Indicator . . . 19
- Analyzing the Residential Indicator . . . 19

IV. PHASE TWO: PERMITTEE FINANCIAL INDICATORS . . . 20
- Debt Indicators . . . 21
  - Bond Rating . . . 21
  - Overall Net Debt as a Percent of Full Market Property Value . . . 24
- Socioeconomic Indicators . . . 28
  - Unemployment Rate . . . 28
  - Median Household Income . . . 30
- Financial Management Indicators . . . 32
  - Property Tax Revenues as a Percent of Full Market Property Value . . . 32
  - Property Tax Revenue Collection Rate . . . 34
- Analyzing Permittee Financial Capability Indicators . . . 36
- The Financial Capability Matrix . . . 39

V. CSO SCHEDULE DEVELOPMENT . . . 42
- Environmental Considerations . . . 44
  - Discharges to Sensitive Areas . . . 44
  - Use Impairment . . . 44
- Primary Financial Considerations . . . 46
  - Financial Capability . . . 46
  - Secondary Financial Considerations . . . 47
  - Grant and Loan Availability . . . 47
  - Sewer User Fees . . . 48
  - Other Viable Funding Mechanisms and Sources of Financing . . . 48
  - Scheduling Considerations . . . 48

ACRONYM LIST . . . 52

STATE DATA CENTERS . . . 53

ANNUALIZATION FACTORS 55
PRESENT VALUE FACTORS 57
INFLATION ADJUSTMENT FACTORS 58
REFERENCES . . . . . .

Worksheet 1 - Cost Per Household 15
Worksheet 2 - Residential Indicator 17
Worksheet 3 - Bond Rating 23
Worksheet 4 - Overall Net Debt as a Percent of Full Market Property Value 27
Worksheet 5 - Unemployment Rate 29
Worksheet 6 - Median Household Income 31
Worksheet 7 - Property Tax Revenues as a Percent of Full Market Property Value 33
Worksheet 8 - Property Tax Revenue Collection Rate 35
Worksheet 9 - Summary of Permittee Financial Capability Indicators 38
Worksheet 10 - Financial Capability Matrix Score 40

Table 1 - Roles and Responsibilities 5
Table 2 - Permittee Financial Capability Indicator Benchmarks 37
Table 3 - Financial Capability Matrix 41
Table 4 - Financial Capabilities General Scheduling Boundaries 46
Table 5 - Scheduling Considerations for Hypothetical Permittees 50

I. INTRODUCTION

Background

Combined sewer systems (CSSs) are wastewater collection systems designed to carry sanitary sewage (consisting of domestic, commercial and industrial wastewater) and storm water (surface drainage from rainfall or snow melt) in a single pipe to a treatment facility. CSSs serve about 43 million people in approximately 1,100 communities nationwide. Most of these communities are located in the Northeast and Great Lakes regions. During dry weather, CSSs convey domestic, commercial, and industrial wastewater. In periods of rainfall or snow melt, total wastewater flows can exceed the capacity of the CSS and/or treatment facilities. When this occurs, the CSS is designed to overflow directly to surface water bodies, such as lakes, rivers, estuaries, or coastal waters. These overflows - called combined sewer overflows (CSOs) - can be a major source of water pollution in communities served by CSSs.

Because CSOs contain untreated domestic, commercial, and industrial wastes, as well as surface runoff, many types of contaminants can be present. Contaminants may include pathogens, oxygen-demanding pollutants, suspended solids, nutrients, toxics, and floatable matter. Because of these contaminants and the volume of the flows, CSOs can cause a variety of adverse impacts on the physical characteristics of surface water, impair the viability of aquatic habitats, and pose a potential threat to drinking water supplies. CSOs have been shown to be a major contributor to use impairment and aesthetic degradation of many receiving waters and have contributed to shellfish harvesting restrictions, beach closures, and even occasional fish kills.

History of the CSO Control Policy

Historically, the control of CSOs has proven to be extremely complex. This complexity stems partly from the difficulty in quantifying combined sewer overflow (CSO) impacts on receiving water quality and the site specific variability in the volume, frequency, and characteristics of CSOs. In addition, the financial considerations for communities with CSOs can be significant. The U.S. Environmental Protection Agency (EPA) estimates the CSO abatement costs for the 1,100 communities served by CSSs to be approximately $41.2 billion.

To address these challenges, EPA's Office of Water issued a National Combined Sewer Overflow Control Strategy on August 10, 1989 (54 *Federal Register* 37370). This Strategy reaffirmed that CSOs are point source discharges subject to National Pollutant Discharge Elimination System (NPDES) permit requirements and Clean Water Act (CWA) requirements.

The CSO Strategy recommended that all CSOs be identified and categorized according to their status of compliance with these requirements. It also set forth three objectives:

- Ensure that if CSOs occur, they are only as a result of wet weather
- Bring all wet weather CSO discharge points into compliance with the technology-based and water quality-based requirements of the CWA
- Minimize the impacts of CSOs on water quality, aquatic biota, and human health.

In addition, the CSO Strategy charged all States with developing state-wide permitting strategies designed to reduce, eliminate, or control CSOs.

Although the CSO Strategy was successful in focusing increased attention on CSOs, it fell short in resolving many fundamental issues. In mid-1991, EPA initiated a process to accelerate implementation of the Strategy. The process included negotiations with representatives of the regulated community, State regulatory agencies, and environmental groups. These negotiations were conducted through the Office of Water Management Advisory Group. The initiative resulted in the development of a CSO Control Policy, which was published in the *Federal Register* on April 19, 1994 (59 *Federal Register* 18688). The intent of the CSO Control Policy is to:

- Provide guidance to permittees with CSOs, NPDES permitting and enforcement authorities, and State water quality standards (WQS) authorities
- Ensure coordination among the appropriate parties in planning, selecting, designing, and implementing CSO management practices and controls to meet the requirements of the CWA
- Ensure public involvement during the decision-making process.

The CSO Control Policy contains provisions for developing appropriate, site-specific NPDES permit requirements for all CSSs that overflow due to wet weather events. It also announces an enforcement initiative that requires the immediate elimination of overflows that occur during dry weather and ensures that the remaining CWA requirements are complied with as soon as possible.

Key Elements of the CSO Control Policy

The CSO Control Policy contains four key principles to ensure that CSO controls are cost-effective and meet the requirements of the CWA:

- Provide clear levels of control that would be presumed to meet appropriate health and environmental objectives

- Provide sufficient flexibility to municipalities, especially those that are financially disadvantaged, to consider the site-specific nature of CSOs and to determine the most cost-effective means of reducing pollutants and meeting CWA objectives and requirements

- Allow a phased approach for implementation of CSO controls considering a community's financial capability

- Review and revise, as appropriate, WQS and their implementation procedures when developing long-term CSO control plans to reflect the site-specific wet weather impacts of CSOs.

In addition, the CSO Control Policy clearly defines expectations for permittees, State WQS authorities, and NPDES permitting and enforcement authorities. These expectations include the following:

- Permittees should immediately implement the nine minimum controls (NMC), which are technology-based actions or measures designed to reduce CSOs and their effects on receiving water quality, as soon as possible but no later than January 1, 1997. More information on the NMC can be found in the EPA document *Combined Sewer Overflows: Guidance for Nine Minimum Controls* (EPA 832-B-95-003)

- Permittees should give priority to environmentally sensitive areas

- Permittees should develop long-term control plans (LTCPs) for controlling CSOs. A permittee may use one of two approaches: 1) demonstrate that its plan is adequate to meet the water quality-based requirements of the CWA ("demonstration approach"), or 2) implement a minimum level of treatment (e.g., primary clarification of at least 85 percent of the collected combined sewage flows) that is presumed to meet the water quality-based requirements of the CWA, unless data indicate otherwise ("presumption approach")

- WQS authorities should review and revise, as appropriate, State WQS during the CSO long-term planning process

- NPDES permitting authorities should consider the financial capability of permittees

when reviewing CSO control plans.

Table 1 illustrates the roles and responsibilities of permittees, NPDES permitting and enforcement authorities, and state WQS authorities.

In addition to these key elements and expectations, the CSO Control Policy also addresses important issues such as ongoing or completed CSO control projects, public participation, small communities and watershed planning.

ROLES AND RESPONSIBILITIES
Table 1

Permittee	NPDES Permitting Authority	NPDES Enforcement Authority	State WQS Authorities
• Evaluate and implement NMC • Submit documentation of NMC implementation by January 1, 1997 • Develop LTCP and submit for review to NPDES permitting authority • Support the review of WQS in CSO-impacted receiving water bodies • Comply with permit conditions based on narrative WQS • Implement selected CSO controls from LTCP • Perform post-construction compliance monitoring • Reassess overflows to sensitive areas • Coordinate all activities with NPDES permitting authority, State WQS authority, and State watershed personnel	• Reassess/revise CSO permitting strategy • Incorporate into Phase I permits CSO-related conditions (e.g., NMC implementation and documentation and LTCP development) • Review documentation of NMC implementation • Coordinate review of LTCP components throughout the LTCP development process and accept/approve permittee's LTCP • Coordinate the review and revision of WQS as appropriate • Incorporation into Phase II permits CSO-related conditions (e.g., continued NMC implementation and LTCP implementation) • Incorporate implementation schedule into an appropriate enforceable mechanism • Review implementation activity reports (e.g., compliance schedule progress reports)	• Ensure that CSO requirements and schedules for compliance are incorporated into appropriate enforceable mechanisms • Monitor compliance with Jan 1, 1997, deadline for NMC implementation and documentation • Take appropriate enforcement action against dry weather overflows • Monitor compliance with Phase I, Phase II, and post-Phase II permits and take enforcement action as appropriate	• Review WQS in CSO-impacted receiving water bodies • Coordinate review with LTCP development • Revise WQS as appropriate Development of site-specific criteria Modification of designated use to - Partial use reflecting specific situations - Define use more explicitly Temporary variance from WQS

Guidance to Support Implementation of the CSO Control Policy

To help permittees and NPDES permitting and WQS authorities implement the provisions of the CSO Control Policy, EPA has developed the following documents:

- *Combined Sewer Overflows—Guidance for Long-Term Control Plan* (EPA 832-B-95-002)
- *Combined Sewer Overflows—Guidance for Nine Minimum Controls* (EPA 832-B-95-003)
- *Combined Sewer Overflows—Guidance for Screening and Ranking* (EPA 832-B-95-004)
- *Combined Sewer Overflows—Guidance for Monitoring and Modeling* (EPA 832-B-97-001)
- *Combined Sewer Overflows—Guidance for Financial Capability Assessment and Schedule Development* (EPA 832-B-97-004)
- *Combined Sewer Overflows—Guidance for Funding Options* (EPA 832-B-95-007)
- *Combined Sewer Overflows—Guidance for Permit Writers* (EPA 832-B-95-008)

Goal of this Guidance

The CSO Policy recognizes the need to address the relative importance of environmental and financial issues when developing an implementation schedule for CSO controls to be contained in the LTCP and the NPDES permit or other enforceable mechanism. According to the CSO Policy, an implementation schedule "may be phased based on the relative importance of adverse impacts upon WQS and designated uses, priority projects identified in the long-term plan, and on a permittee's financial capability."

This guidance has two goals. The first goal is to provide a planning tool for evaluating the financial resources a permittee has available to implement CSO controls. This assessment will involve the use of the following financial capability indicators listed in the CSO Policy:

- Total annual wastewater and CSO control cost per household as a percent of median household income
- Bond ratings
- Overall net debt as percent of full market property value

- Unemployment rate
- Median household income
- Property tax revenue collection rate
- Property tax revenues as a percent of full market property value

It must be emphasized that the financial indicators found in this guidance might not present the most complete picture of a permittee's financial capability to fund the CSO controls. However, the financial indicators do provide a common basis for financial burden discussions between the permittee and EPA and state NPDES authorities. Since flexibility is an important aspect of the CSO Policy, permittees are encouraged to submit any additional documentation that would create a more accurate and complete picture of their financial capability.

Although this guidance focuses on the role of financial capability for development of an implementation schedule for CSO controls, the financial capability analysis process can be useful for the identification and evaluation of long-term control alternatives in the LTCP.

The second goal is to assist the permittee, EPA and state NPDES authorities in cooperatively developing CSO control implementation schedules. This will involve an evaluation of the following environmental and financial considerations listed in the CSO Policy:

- Eliminating overflows to sensitive areas
- Use impairment
- Financial capability
- Grant and loan availability
- Previous and current sewer user fees and rate structures
- Other viable funding mechanisms and sources of financing

This guidance does not recommend specific schedules for implementation of the CSO controls based on financial capability or other considerations identified in the CSO Policy. It does, however, provide general boundaries to aid all parties in negotiating reasonable and effective schedules for implementation of the CSO controls.

It is important to recognize that scheduling flexibility is not the only form of relief available to permittees. The CWA and EPA regulations provide mechanisms for the review and revision of WQS. The CSO Policy also encourages the "review and revision, as appropriate, of water quality standards and their implementation procedures when developing CSO control plans to reflect the site-specific wet weather impacts of CSOs." During the process of developing the

LTCP, the permittee should consult with NPDES and WQS authorities to share information on the water quality impacts of CSOs, the attainability of WQS, and the appropriate water quality-based requirements of the permit. It may be appropriate to conduct a use attainability analysis and revisit existing designated uses in order to ensure that the LTCP selected will be sufficient to attain WQS. EPA's "Interim Economic Guidance for Water Quality Standards-Workbook"(EPA-823-B-95-002) provides an approach for assessing whether a water pollution project will impose "substantial and widespread social and economic impacts," as defined in EPA regulations.

Organization of Guidance

Section II summarizes a two phase approach for assessing a permittee's financial capability to implement CSO controls. Section III describes the first phase which calculates the financial impact of wastewater and CSO controls on individual households. Section IV describes the second phase used to calculate a permittee's debt, socioeconomic and financial conditions. The results of the first and second phases are combined to give an overall assessment of a permittee's financial capability to be used in CSO schedule development. Although financial capability is only one factor in schedule development, a major portion of this guidance is devoted to financial capability assessment because of the complexity of the process and its importance. Section V describes the schedule development process for implementing CSO controls, and details how environmental and financial considerations influence schedule development.

Audience

This guidance is designed for use by permittees, EPA and state NPDES authorities, and other personnel with CSO planning and permitting responsibilities. It is written in a format that allows individuals with limited municipal financial assessment experience to conduct CSO financial capability assessments and negotiate reasonable CSO implementation schedules. Individuals with experience in establishing schedules for enforcement orders and reviewing financial capability assessments under the Water Quality Standards, Construction Grants and State Revolving Fund (SRF) programs will be able to quickly and efficiently conduct the assessment detailed in this guidebook.

II. CSO FINANCIAL CAPABILITY ASSESSMENT APPROACH

This section describes a process for evaluating parameters that measure a permittee's financial capability to implement CSO controls. The process reflects the experience of EPA in the Water Quality Standards (WQS) program, Construction Grants program, State Revolving Fund (SRF) program and the water enforcement program. Experience with these programs provides the foundation upon which EPA has built the CSO financial capability assessment approach.

In the WQS program, economic factors are considered in the process of modifying WQS. State WQS authorities conduct economic analysis of the impacts that will result from treatment levels beyond the technology-based requirements of the Clean Water Act. EPA's "Interim Economic Guidance for Water Quality Standards" (EPA 823-B-95-002) provides an approach for assessing substantial and widespread social and economic impacts of specific water pollution control projects. The process to identify "substantial" impacts is similar to the process used in this guidance to analyze financial capability and its implications for scheduling CSO controls.

Under the Construction Grants Program, financial capability assessments were conducted by municipalities and reviewed by EPA to demonstrate that municipalities had the ability to pay for the capital investments and the costs for operation and maintenance of the wastewater facilities. The assessments measured the financial conditions of the municipality and the financial burden the proposed projects imposed on households. Some of the financial indicators used in the demonstrations were similar to those used in this guidance. The demonstration procedure is described in EPA's "Financial Capability Guidebook" (1984).

As part of SRF program implementation, states devised financial capability assessment procedures for loan applicants. Often the procedures include a review of the same financial indicators described in this document.

The Agency's water enforcement program conducts detailed evaluations of a permittee's current financial conditions to assess the amount of penalty that can be borne by the permittee for violations of the CWA. The evaluations frequently include financial indicators used in this guidance.

The CSO financial capability assessment process also reflects the approach taken by bond rating agencies and other investment industry firms to assess a municipality's or wastewater utility's overall financial condition and credit capacity. The bond rating agencies generally use the same types of financial information when they evaluate specific bond issues. Rating agencies evaluate this information to determine the overall financial health of an issuer and identify any factors that could make it difficult for the permittee to repay its bonds. The approach developed for the CSO financial capability assessment incorporates the principles used by the rating agencies.

The Two-Phase Approach

The guidance presents a two-phase approach to assessing a permittee's financial capability. The first phase identifies the combined impact of wastewater and CSO control costs on individual households. The second phase examines the debt, socioeconomic, and financial conditions of a permittee. The results of the two-phase analysis are combined in a Financial Capability Matrix. Permittees and the WQS and NPDES authorities can use this matrix to assess the financial burden of the CSO control costs and establish reasonable schedules to implement the CSO controls.

Phase one determines a Residential Indicator. This indicator is the permittee's average cost per household (CPH) for wastewater treatment (WWT) and CSO controls as a percentage of the local median household income (MHI). It reflects the residential share of current and planned WWT and CSO controls needed to meet the requirements of the CWA. A value range for this indicator characterizes whether the costs impose a "low," "mid-range" or "high" financial impact on residential users.

The second phase develops the Permittee Financial Capability Indicators. Six indicators are used to evaluate the debt, socioeconomic, and financial conditions that affect a permittee's financial capability to implement the CSO controls. These indicators serve as the basis for a second phase analysis that will characterize the permittee's financial capability as "weak," "mid-range" or "strong."

A Financial Capability Matrix combines the Residential Indicator (first phase) and Permittee Financial Capability Indicators (second phase) to give an overall assessment of the permittee's financial capability. This assessment can be used to help establish an appropriate CSO control implementation schedule.

Since flexibility is an important component of the CSO Policy, WQS authorities, NPDES authorities, EPA personnel, and permittees should communicate throughout the CSO control planning process to coordinate the development of an effective LTCP. This guidance document provides all CSO participants with a structured yet flexible approach for evaluating the financial burden CSO controls place on permittees. It also recognizes the importance of this financial burden when establishing a CSO control implementation schedule. The financial capability information developed in this guidance provides a basis for the permittee and the NPDES authorities to negotiate the implementation schedule for the CSO controls. However, when a permittee believes that there are unique circumstances that would affect the conclusion of this guidance, the permittee may submit documentation of its unique financial conditions to the appropriate EPA or State NPDES authorities for consideration.

Financial Benchmarks and Information Sources

The information used to develop the indicators needed for the financial assessment is drawn from several different sources. In general, this information should be available through a combination of local, state, and Federal sources. Project cost information is available in the LTCP. Socioeconomic information, such as median household income, is available from census data. Detailed financial information is available from a community's annual financial statements. Financial statements may be obtained directly from a community or, in most states, from the state auditor's office which maintains a central file of audited reports. When the permittee's service area involves more than one jurisdiction, it will be necessary to examine data for each jurisdiction to develop the necessary data.

III. PHASE ONE: THE RESIDENTIAL INDICATOR

The Residential Indicator measures the financial impact of the current and proposed WWT and CSO controls on residential users. Development of this indicator starts with the determination of the current and proposed WWT and CSO control costs per household (CPH). Second, the service area's CPH estimate and the median household income (MHI) are used to calculate the Residential Indicator. Finally, the Residential Indicator is compared to established financial impact ranges to determine whether CSO controls will produce a possible high, mid-range or low financial impact on the permittee's residential users. Worksheets are provided to aid in developing the Residential Indicator.

Developing CPH Estimate

The first step in developing the CPH is to determine the permittee's total WWT and CSO costs by adding together the current costs for existing wastewater treatment operations and the projected costs for any proposed WWT and CSO controls. The next step is to calculate the residential share of the total WWT and CSO costs. The final step is to calculate the CPH by dividing the residential share of total WWT and CSO costs by the number of households in the permittee's total wastewater service area.

Current WWT costs are defined as current annual wastewater operating and maintenance expenses (excluding depreciation) plus current annual debt service (principal and interest). This fairly represents cash expenses for current wastewater treatment operations. (Expenses for funded depreciation, capital replacement funds, or other types of capital reserve funds are not included in current WWT costs, because they represent a type of savings account rather than an actual operation and maintenance expense.)

Estimates of projected costs are made for any proposed WWT projects and the CSO controls. Any concerns about including specific proposed WWT projects or CSO controls in the projected costs, or the length of the planning period, should be discussed with the appropriate NPDES permitting and enforcement authorities. These costs are adjusted to current dollars (i.e., deflated). These include projected operation and maintenance expenses plus projected debt service costs for any proposed WWT and the CSO controls. The residential or household costs exclude the portion of expenses attributable to commercial, governmental and industrial wastewater discharges. The information and calculations used to develop the CPH and the Residential Indicator are presented in Worksheets 1 and 2 and their instructions.

Worksheet 1 Instructions

Enter the requested data on lines 100 through 109. The operation and maintenance costs on lines 100 and 103 should include all significant cost categories, such as labor, chemicals, utilities, administration, and equipment replacement. Do not include depreciation on line 100 or line 103. Adjust the projected annual WWT and CSO costs to current dollars using the average annual national Consumer Price Index (CPI) inflation rate for the past five years available from the Bureau of Labor Statistics. The CPI is used as a simple and reliable method of indexing projected WWT costs and household income. For example, if the most recent five year average CPI is 4 percent, and the projected annual O& M and debt service costs will begin in 2 years, adjust the projected costs with the following formula:

$$Adjusted\ Projected\ Costs\ (Current\ Dollars) = Projected\ Costs \times Adjustment\ Factor$$

The adjustment factor can be calculated using the following formula or the present value factor from the table on page 55:

$$Adjustment\ Factor = \frac{1}{(1+CPI)^{years}} = \frac{1}{(1+.04)^2} = .925$$

The annualized debt service cost information for the projected WWT facilities and projected CSO controls (Line 104) can be calculated using an annualization factor obtained from the table on page 56, which reflects the local borrowing interest rate and borrowing term of the permittee. For example, if the adjusted projected debt costs (current dollars) are $25,000,000 and typical borrowing terms include an interest rate of eight percent over 20 years, then costs can be annualized with the following calculation:

$$Annual\ Debt\ Service\ Costs = Adjusted\ Debt\ Costs \times Annualization\ Factor$$

$$Annual\ Debt\ Service\ Cost = \$25{,}000{,}000 \times .1019 = \$2{,}547{,}500$$

The annualization factor can be calculated using the following formula:

$$Annualization\ Factor = \frac{Interest\ Rate}{(1+Interest\ Rate)^{years} - 1} + Interest\ Rate = \frac{.08}{(1+.08)^{20} - 1} + .08 = .1019$$

The annualized debt service cost for the projected WWT facilities and projected CSO controls is entered on line 104. Add the current and projected wastewater treatment and projected CSO control costs to estimate the total WWT and CSO costs (line 102 + line 105).

Calculate the residential share of the total cost (line 106) and enter on line 107. The residential share of total costs (line 107) is computed by multiplying the percent of total wastewater flow including infiltration and inflow attributable to residential users by the total costs (line 106). For example, for a permittee with the following characteristics:

Total Costs:	$12,000,000
Residential Flow:	10.5 Million Gallons per Day
Total Flow:	13.1 Million Gallons per Day

The residential share of the total cost is:

$$\textit{Residential Share of Costs} = \textit{Total Costs} \times \frac{\textit{Residential Wastewater Flow}}{\textit{Total Wastewater Flow}}$$

$$\textit{Residential Share of Costs} = \$12{,}000{,}000 \times \frac{10.5\ \textit{Million Gallons Per Day}}{13.1\ \textit{Million Gallons Per Day}}$$

$$\$9{,}600{,}000$$

Calculate the CPH (line 109) by dividing total residential share costs (line 107) by the total number of households (line 108) in the permittee's total wastewater service area.

Data Sources

The permittee's latest financial reports should be available to develop the current wastewater treatment costs. In order to comply with accounting requirements, most permittees develop a combined statement of revenues, expenses, and changes in fund balance. These reports should be available directly from the permittee, or, in some states, from central records kept by the state auditor or other state offices. (Many states conduct audits and generate financial reports - i.e., balance sheet, statement of revenues, expenses, and changes in fund balance, and statement of cash flows, for each permittee.) Projected costs and households in the wastewater service area should be available through planning documents. The Bureau of Labor Statistics frequently has data on the number of households in the service area.

The Consumer Price Index rate (CPI) should be the average rate for the previous five years. The CPI is available through the Bureau of Labor Statistics.

COST PER HOUSEHOLD
Worksheet 1

		Line Number
Current WWT Costs		
• Annual Operations and Maintenance Expenses (Excluding Depreciation)	_____	100
• Annual Debt Service (Principal and Interest)	_____	101
Subtotal (Line 100 + Line 101)	_____	102
Projected WWT and CSO Costs (Current Dollars)		
• Estimated Annual Operations and Maintenance Expenses (Excluding Depreciation)	_____	103
• Annual Debt Service (Principal and Interest)	_____	104
Subtotal (Line 103 + Line 104)	_____	105
Total Current and Projected WWT and CSO Costs (Line 102 + Line 105)	_____	106
Residential Share of Total WWT and CSO Costs	_____	107
Total number of Households in Service Area	_____	108
Cost Per Household (Line 107 ÷ Line 108)	_____	109

Developing the MHI Estimate

The second step in developing the Residential Indicator is to determine the adjusted median household income (MHI) for the permittee's entire wastewater service area. Information and calculations used to develop the adjusted MHI value are presented in Worksheet 2 and its instructions.

Worksheet 2 Instructions

Enter the requested information on Worksheet 2, lines 201 through 203. MHI from the latest census year should be adjusted to current year dollars with the average CPI inflation rate from the latest census year to the current year using the following formula.

$$Adjusted\ MHI = MHI \times Adjustment\ Factor$$

The MHI adjustment factor can be calculated using the following formula or the inflation adjustment factor from the table on page 58:

$$MHI\ Adjustment\ Factor = (1+CPI)^{Current\ Year - Census\ Year}$$

For example, if a permittee's MHI was $30,000 in the 1990 census year, the average annual CPI since 1990 was 4 percent and the current year is 1992, the following calculation would be made to adjust the MHI to current dollars:

$$Adjustment\ Factor = (1+.04)^{1992-1990} = 1.0816$$

$$Adjusted\ MHI = \$30{,}000 \times 1.0816 = \$32{,}448$$

On Worksheet 2, calculate the adjusted MHI by entering the latest census MHI value on line 201. Then enter the MHI Adjustment Factor on line 202. Finally, multiply the MHI (line 201) by the Adjustment Factor (line 202) and enter the Adjusted MHI on line 203.

RESIDENTIAL INDICATOR
Worksheet 2

Median Household Income (MHI)		Line Number
• Census Year MHI	_____	201
• MHI Adjustment Factor	_____	202
• Adjusted MHI (Line 201 x Line 202)	_____	203
Annual WWT and CSO Control Cost Per Household (CPH) (Line 109)	_____	204
Residential Indicator:		
Annual Wastewater and CSO Control Costs per Household as a percent of Adjusted Median Household Income (CPH as % MHI) (Line 204 ÷ Line 203 x 100)	_____	205

If the permittee's service area includes more than one jurisdiction, it may be necessary to develop a weighted MHI for the entire service area. The Bureau of Census's designated MHI areas generally encompass most permittees' service areas. For this reason, the calculation of a weighted MHI usually will not be necessary to reasonably represent the permittee's MHI. When a weighted MHI must be acquired, a weight would be assigned to each jurisdiction to reflect its share of the total households.

The following example illustrates how to develop a weighted MHI value before adjusting it to current year dollars. If a permittee is a regional authority that serves three local jurisdictions, the weighted average MHI would be calculated as follows:

Jurisdiction	MHI	Number of Households (HH)
A	$30,000	100,000
B	$45,000	25,000
C	$25,000	50,000
		175,000

$$\text{Weighted MHI} \quad MHI_A\left(\frac{HH_A}{Total\ HH}\right) + MHI_B\left(\frac{HH_B}{Total\ HH}\right) + MHI_C\left(\frac{HH_C}{Total\ HH}\right)$$

$$\$30{,}000\left(\frac{100{,}000}{175{,}000}\right) + \$45{,}000\left(\frac{25{,}000}{175{,}000}\right) + \$25{,}000\left(\frac{50{,}000}{175{,}000}\right)$$

$$\$17{,}143 + \$6{,}429 + \$7{,}143$$

$$\$30{,}715$$

Data Sources

Median household income is available for most communities from the latest census. In the few cases where a local jurisdiction's MHI is not available, the surrounding county's MHI may be sufficient. Each state has a state data center that serves as a local source of census data for public use. This center may be contacted to obtain the information available from the Bureau of Census for use during this assessment (see Appendix B).

Developing the Residential Indicator

Worksheet 2 Instructions

To calculate the Residential Indicator (line 205 of Worksheet 2), divide the annual WWT and CSO control cost per household (line 109 transferred to line 204) by the Adjusted MHI (line 203) and multiply by 100.

Analyzing the Residential Indicator

The Residential Indicator will be used in the Financial Capability Matrix in Section IV to help permittees, and EPA and state NPDES authorities determine reasonable and workable long-term CSO control schedules. (The Residential Indicator does not provide special recognition for low income groups since their influence is automatically reflected in the median household income component of the indicators.)

To assess the financial impact CSO controls may have on the permittee's residential users, the Residential Indicator is compared to the financial impact ranges that reflect EPA's previous experience with water pollution control programs. These ranges are as follows:

Financial Impact	**Residential Indicator (CPH as % MHI)**
Low	Less than 1.0 Percent of MHI
Mid-Range	1.0 - 2.0 Percent of MHI
High	Greater than 2.0 Percent of MHI

When the Residential Indicator is less than 1.0 percent, between 1.0 and 2.0 percent, and greater than 2.0 percent, the financial impact on residential users to implement the CSO controls will be characterized as "low," "mid-range," and "high," respectively. Unless there are significant weaknesses in a permittee's financial and socioeconomic conditions, second phase reviews for permittees that have a low residential indicator score (less than 1.0) are unlikely to result in longer implementation schedules. Permittees with low residential indicators may wish to forego the second phase analysis and proceed with the normal engineering and construction implementation schedule developed as part of the CSO planning process.

In situations where a permittee believes that there are unique circumstances that would affect the conclusion of the first phase, the permittee may submit documentation of its unique financial conditions to the appropriate state NPDES and EPA authorities for consideration.

IV. PHASE TWO: PERMITTEE FINANCIAL CAPABILITY INDICATORS

In the second phase, selected indicators are assessed to evaluate the financial capability of the permittee. These indicators will examine the permittee's debt burden, socioeconomic conditions, and financial operations. The second-phase review examines three general categories of financial capability indicators for the permittee:

- Debt Indicators - Assess current debt burden of the permittee or the communities within the permittee's service area and their ability to issue additional debt to finance the CSO controls. The indicators selected for this purpose are:
  - Bond Ratings (General Obligation and/or Revenue Bond Fund)
  - Overall Net Debt as a Percent of Full Market Property Value
- Socioeconomic Indicators - Assess the general economic well-being of residential users in the permittee's service area. The indicators selected for this purpose are:
  - Unemployment Rate
  - Median Household Income
- Financial Management Indicators - Evaluate the permittee's overall ability to manage financial operations. The indicators selected for this purpose are:
  - Property Tax Revenue Collection Rate
  - Property Tax Revenues as a Percent of Full Market Property Value

Even though the financial capability analysis reflects current conditions, pending changes in the service area should be considered in development of the second phase indicators. For example, if the current unemployment rate is high, but there is a new plant opening that will stimulate economic growth, the unemployment indicators for the service area would need to be modified to reflect the projected impact of the new plant. The permittee should submit documentation of such conditions to the appropriate EPA and state NPDES authorities for consideration. When the permittee is a sanitary district, sewer authority or similar entity, the second phase indicators related to property values and tax revenues may not be applicable. In those circumstances, the permittee may simply use the remaining indicators or submit other related documentation that will help assess its financial capability to implement the CSO controls.

DEBT INDICATORS

The debt indicators described below were selected to assess the current debt burden conditions and the ability to issue new debt. These indicators are the bond rating and overall net debt as a percent of full market property value. When these indicators are not available for the permittee, other financial data which illustrates debt burden and debt issuing capacity may be used to assess the permittee's financial capability in this area.

Bond Rating

The information needed to evaluate the bond ratings is presented in Worksheet 3. Recent bond ratings for the permittee and service area communities summarize a bond rating agency's assessment of a permittee's or community's credit capacity. General obligation (G.O.) bonds are bonds issued by a local government and repaid with taxes (usually property taxes). They are the primary long-term debt funding mechanism in use by local governments. General obligation bond ratings reflect financial and socioeconomic conditions experienced by the community as a whole.

"Revenue bond" ratings, by comparison, reflect the financial conditions and management capability of the wastewater utility. They are repaid with revenues generated from user fees. Revenue bonds are sometimes referred to as water or sewer bonds. In some cases these bonds may have been issued by the state on behalf of local communities. (Additional information on bonds is contained in EPA's Combined Sewer Overflows—Guidance For Funding Options (EPA 832-B-95-007).

Bond ratings normally incorporate an analysis of many financial capability indicators. These analyses evaluate the long term trends and current conditions for the indicators. The ultimate bond ratings reflect a general assessment of the current financial conditions. However, if security enhancements like bond insurance have been used for a revenue bond issue, the bond rating may be higher than justified by the local conditions.

Many small and medium-sized communities and permittees have not used debt financing for projects and, as a result, have no bond rating. The absence of bond rating does not indicate strong or weak financial health. When a bond rating is not available, this indicator may be excluded from the financial analysis.

Worksheet 3 Instructions

Enter the most recent bond ratings on Worksheet 3, lines 301 and 302. Note that ratings are requested for general obligation bonds and revenue bonds. When there are several different bond ratings, enter the most recent bond rating on Line 303 as the summary bond rating.

Data Sources

Municipal bond reports from rating agencies (e.g., Moody's Bond Record, Standard & Poor's Corporation) provide recent ratings.

Benchmarks

Moody's Investor Services

"Baa" is the minimum investment grade rating. See *Moody's on Municipals - an Introduction to Issuing Debt* for a description of bond ratings.

Moody's Investor Services' Ratings

- Weak: Ba, B, Caa, Ca, C
- Mid-Range: Baa
- Strong: Aaa, AA, A

Standard & Poor's

"BBB" is the minimum investment grade rating. See Standard & Poor's *Municipal Finance Criteria* for a description of bond ratings.

Standard and Poor's Ratings

- Weak: BB, B, CCC, CC, C, D
- Mid-Range: BBB
- Strong: AAA, AA, A

BOND RATING
Worksheet 3

		Line Number
• Most Recent General Obligation Bond Rating	_____	
Date:	_____	
Rating Agency:	_____	
Rating:	_____	301
• Most Recent Revenue (Water/Sewer or Sewer) Bond		
Date:	_____	
Rating Agency:	_____	
Bond Insurance (Yes/No)	_____	
Rating:	_____	302
Summary Bond Rating:	_____	303

Overall Net Debt as a Percent of Full Market Property Value

Description

Overall net debt is debt repaid by property taxes in the permittee's service area. It excludes debt which is repaid by special user fees (e.g., revenue debt). This indicator provides a measure of the debt burden on residents within the permittee's service area and measures the ability of local governmental jurisdictions to issue additional debt. It includes the debt issued directly by the local jurisdiction and debt of overlapping entities, such as school districts. This indicator compares the level of debt owed by the service area population with the full market value of real property used to support that debt and serves as a measure of financial wealth in the permittee's service area. Information needed to develop overall net debt as a percent of full market value is identified on Worksheet 4.

Worksheet 4 Instructions

Enter requested data on Worksheet 4, lines 401 - 405.

Line 401 - Direct Net Debt - Enter the amount of each jurisdiction's general obligation debt outstanding that is supported by the property in the permittee's service area. General obligation bonds are secured by the "full faith and credit" of the community and are payable from general tax revenues. This debt amount excludes general obligation bonds that are payable from some dedicated user fees or specific revenue source other than the general tax revenues. These general obligation bonds are called "double-barreled bonds."

Line 402 - Debt of Overlapping Entities - Calculate the permittee's service area's share of any debt from overlapping entities using the process illustrated below.

1. Identify in Column A below each overlapping entity that has incurred debt that must be partially supported by the permittee's service area. (Check the State assessor's office for this information).
2. Identify the total amount of tax-supported outstanding debt for each overlapping entity in Column B. Money in a sinking fund is not included in the outstanding debt since it represents periodic deposits into an account to ensure the availability of sufficient monies to make timely debt service payments.
3. Identify the percentage of each overlapping entity's outstanding debt charged to persons or property in the permittee's service area in Column C. The percentage is based on the estimated full market value of real property of the respective jurisdictions.

4. Multiply the total outstanding debt of each overlapping entity by the percentage identified for the permittee's service area (Column B x C).
5. Add the figures in Column D to arrive at total overlapping debt for permittee's service area.

(A) Overlapping Entities	(B) Outstanding Debt (less Sinking Fund)	(C) Percent Chargeable to Permittee's Service Area	(D) Outstanding Debt Attributable to Permittee's Service Area
County	$10,500,000	25%	$2,625,000
School District	16,800,000	95%	15,960,000
Total Overlapping Debt			$18,585,000

Line 403 - Overall Net Debt - Add lines 401 and 402.

Line 404 - Market Value of Property - The property value should reflect the full market value of property within the permittee's service area. It is possible that the tax assessed property value will not reflect full market value. This occurs when the tax assessment ratio is less than one. In such cases the full market value of property is computed by dividing the total tax assessment value by the assessment ratio (the assessment ratio represents the percentage of the full market value that is taxed at the established tax rate). For example, if the assessed value is $1,000,000 and the assessment ratio is 50 percent then the full market value of real property is $1,000,000/.50= $2,000,000.

Line 405 - Overall Net Debt as a Percent of Full Market Property Value - Divide line 403 by line 404 and multiply by 100.

Data Sources

Debt information is available from the financial statements of each community. In most cases the most recent financial statements are on file with the state (e.g., State Auditor's Office). Overlapping debt may or may not be provided in a community's financial statements. The property assessment data should be readily available through the community or the State's assessor office. The boundary of most permittees' service areas generally conforms to one or more community boundaries. Therefore, prorating community data to reflect specific service area boundaries is not normally necessary for evaluating the general financial capability of the permittee.

Benchmarks

- Weak: Above 5%
- Mid-range: 2-5%
- Strong: Below 2%

OVERALL NET DEBT AS A PERCENT OF FULL MARKET PROPERTY VALUE
Worksheet 4

		Line Number
• Direct Net Debt (G.O. Bonds Excluding Double-Barreled Bonds)	_____	401
• Debt of Overlapping Entities (Proportionate Share of Multijurisdictional Debt)	_____	402
• Overall Net Debt (Lines 401+402)	_____	403
• Market Value of Property	_____	404
• Overall Net Debt as a Percent of Full Market Property Value (Line 403 divided by Line 404 x 100)	_____	405

SOCIOECONOMIC INDICATORS

The socioeconomic indicators are used to assess the general economic well-being of residential users in the permittee's service area. The indicators used to assess economic conditions are unemployment rate and median household income. When the permittee has additional socioeconomic data, it may want to submit the data to the appropriate EPA and state NPDES authorities to facilitate a better understanding of the permittee's unique economic conditions. Several examples of this type of socioeconomic data could be poverty rate, population growth, and employment projections.

Unemployment Rate

Unemployment information is entered on Worksheet 5. The unemployment rate is defined as the percent of a permittee's service area residents on the unemployment rolls.

Worksheet 5 Instructions

Unemployment values are entered on lines 501 - 503 on Worksheet 5. If the unemployment rate for a permittee's service area is not available, the unemployment rate for the county in which the service area is located may be used as a substitute. On line 503, enter the average national unemployment rate.

Data Sources

The Bureau of Labor Statistics (BLS) maintains current unemployment rate figures for municipalities and counties over 25,000 population. National and state unemployment data are also available for comparison purposes. This information can be obtained from the BLS by request at (202) 606-6392.

Benchmarks

Compare the permittee's unemployment values with the national average values. National averages are readily available through the Bureau of Labor Statistics.

- Weak: More than 1 percentage point above the National Average
- Mid-range: ± 1 percentage point of the National Average
- Strong: More than 1 percentage point below National Average

For example, if the national average unemployment rate is 6 percent, an unemployment rate greater than 7 percent would be considered weak, while an unemployment rate less than 5 percent would be considered strong.

UNEMPLOYMENT RATE
Worksheet 5

		Line Number
• Unemployment Rate - Permittee	_____	501
Source:	_____	
• Unemployment Rate - County (use if permittee's rate is unavailable)	_____	502
• Source:	_____	

Benchmark:

• Average National Unemployment Rate:	_____	503
• Source:	_____	

Median Household Income

Median household income (MHI) is defined as the median amount of total income dollars received per household during a calendar year in a given area. It serves as an overall indicator of community earning capacity. Worksheet 6 is used to present information for this indicator.

Worksheet 6 Instructions

Median household income was discussed during the first phase assessment and is presented on Worksheet 2. On line 601 of Worksheet 6, enter the adjusted MHI from Worksheet 2 (line 203). Use the MHI adjustment factor from Worksheet 2 (line 202) to calculate the adjusted national MHI from the latest census, national MHI value (line 602) and enter the value on Line 604.

Data Sources

Median household income is available through state data centers. Refer to Worksheet 2 for MHI of the permittee's service area. Refer to Appendix B for the address and telephone number of the state's data center to acquire the latest census national MHI value.

Benchmarks

Compare the permittee's MHI to the adjusted national MHI:

- Weak: More than 25% below Adjusted National MHI
- Mid-Range: ± 25% of the Adjusted National MHI
- Strong: More than 25% above Adjusted National MHI

MEDIAN HOUSEHOLD INCOME
Worksheet 6

		Line Number
• Median Household Income - Permittee (Line 203)	_____	601
• Source:	_____	

Benchmark:

• Census Year National MHI	_____	602
• MHI Adjustment Factor (line 202)	_____	603
• Adjusted National MHI: (line 602 x line 603)	_____	604
• Source:	_____	

FINANCIAL MANAGEMENT INDICATORS

The financial management indicators used to evaluate a permittee's financial management ability are property tax revenue as a percent of full market value of real property and property tax revenue collection rate.

Property Tax Revenues as a Percent of Full Market Property Value

This indicator can be referred to as the "property tax burden" since it indicates the funding capacity available to support debt based on the wealth of the community. It also reflects the effectiveness of management in providing community services.

Worksheet 7 Instructions

Property tax burden is computed on Worksheet 7. The full market value of real property was calculated in Worksheet 4, line 404. Enter the full market value on line 701. Enter the most recent year's property tax revenue on line 702. General fund revenues are primarily property tax receipts.

Data Sources

The property assessment data should be readily available through the community or the State's assessor office (see Worksheet 4, Line 404). Property tax revenues are available in communities' annual financial statements. Occasionally, the assessment and tax revenue data of communities partially serviced by the permittee may have to be prorated to provide a clearer picture of the permittee's property tax burden.

Benchmarks

- Weak: Above 4%
- Mid-range: 2%-4%
- Strong: Below 2%.

PROPERTY TAX REVENUES AS A PERCENT OF FULL MARKET PROPERTY VALUE
Worksheet 7

		Line Number
• Full Market Value of Real Property (Line 404)	_____	701
• Property Tax Revenues	_____	702
• Property Tax Revenue as a Percent of Full Market Property Value (702 ÷ 701 x 100)	_____	703

Property Tax Revenue Collection Rate

The property tax revenue collection rate is an indicator of the efficiency of the tax collection system and the acceptability of tax levels to residents.

Worksheet 8 Instructions

The property tax revenue collection rate is calculated on Worksheet 8. The property tax revenues collected was listed in Worksheet 7, Line 702. Enter this value on line 801. Enter the property taxes levied on line 802. Divide the property tax revenue collected by the property taxes levied and multiply by 100 to present the collection rate as a percentage on line 803.

Data Sources

Property taxes levied can be computed by multiplying the assessed value of real property by the property tax rate, both of which are available from a community's financial statements or the state assessor's office (see Worksheet 4, Line 404). Property tax revenues are available in communities' annual financial statements. Occasionally, the assessment and tax revenue data of communities partially serviced by the permittee may have to be prorated to provide a clearer picture of the permittee's property tax revenue collection rate.

Benchmarks

- Weak: Below 94%
- Mid-range: 94-98%
- Strong: Above 98%.

PROPERTY TAX REVENUE COLLECTION RATE
Worksheet 8

		Line Number
• Property Tax Revenue Collected (Line 702)	_____	801
• Property Taxes Levied	_____	802
• Property Tax Revenue Collection Rate (line 801 ÷ line 802 x 100)	_____	803

Analyzing Permittee Financial Capability Indicators

This section describes how the indicators in the second phase may be used to generate an overall score of a permittee's financial capability. The indicators are compared to national benchmarks to form an overall assessment of the permittee's financial capability and its effect on implemention schedules in the long-term CSO control plan.

In situations where a permittee believes that there are unique circumstances that would affect the conclusion of the second phase, the permittee may submit documentation of its unique financial conditions to the appropriate EPA and state NPDES authorities for consideration. The purpose of additional information is to clarify unique circumstances which are not fairly represented by the overall scores of the selected indicators. An example could be where a state or community imposes restrictions on property taxes.

Worksheet 9 Instructions

The indicators generated from the worksheets are compared to the state, national or industry benchmarks presented in Table 2. Information compiled from Worksheets 3 through 8 is summarized in Column A on Worksheet 9. Score each of these values using the rating standards in Table 2 and the following score benchmarks and enter the appropriate number in Column B. The score definitions are:

Benchmarks	Score
• Weak	1
• Mid-Range	2
• Strong	3

To calculate an average score for the indicators, total the values in Column B and divide by the number of entries. Enter the average score on Line 907.

If it is not possible to develop one or more of the six indicators, the permittee should explain why the indicator is inappropriate or unavailable. Since the point of the analysis is to measure the overall financial burden of the CSO controls, the debt and socioeconomic indicators are generally better measures of this burden than the financial management indicators. Consequently, if one of the debt or socioeconomic indicators is not available, the two financial management indicators should be averaged and used as a single indicator to average with the available debt and socioeconomic indicators. This averaging is necessary so that undue weight is not given to the financial management indicators.

PERMITTEE FINANCIAL CAPABILITY INDICATOR BENCHMARKS
Table 2

Indicator	Strong	Mid-Range	Weak
Bond Rating	AAA-A (S&P) or Aaa-A (Moody's)	BBB (S&P) Baa (Moody's)	BB-D (S&P) Ba-C (Moody's)
Overall Net Debt as a Percent of Full Market Property Value	Below 2%	2% - 5%	Above 5%
Unemployment Rate	More than 1 Percentage Point Below the National Average	± 1 Percentage Point of National Average	More than 1 Percentage Point Above the National Average
Median Household Income	More than 25% Above Adjusted National MHI	±25% of Adjusted National MHI	More than 25% Below Adjusted National MHI
Property Tax Revenues as a Percent of Full Market Property Value	Below 2%	2% - 4%	Above 4%
Property Tax Collection Rate	Above 98%	94% - 98%	Below 94%

SUMMARY OF PERMITTEE FINANCIAL CAPABILITY INDICATORS
Worksheet 9

Indicator	Column A: Actual Value	Column B: Score	Line Number
Bond Rating (Line 303)	_____	_____	901
Overall Net Debt as a Percent of Full Market Property Value (line 405)	_____	_____	902
Unemployment Rate (Line 501)	_____	_____	903
Median Household Income (Line 601)	_____	_____	904
Property Tax Revenues as a Percent of Full Market Property Value (Line 703)	_____	_____	905
Property Tax Revenue Collection Rate (Line 803)	_____	_____	906
Permittee Indicators Score (Sum of Column B ÷ Number of Entries)		_____	907

The Financial Capability Matrix

The results of the Residential Indicator and the Permittee Financial Capability Indicators analyses are combined in the Financial Capability Matrix to evaluate the level of financial burden the CSO controls may impose on a permittee. This matrix can be used by permittees, EPA and state NPDES authorities to establish reasonable and workable CSO control implementation schedules.

Worksheet 10 Instructions

First, enter the value of the Residential Indicator (Cost Per Household as a % of MHI) from Line 205 (Worksheet 2) on Line 1001 of Worksheet 10. Enter the Permittee Financial Capability Indicators score from Line 907 (Worksheet 9) on Line 1002. With this information, find the financial burden category for the permittee in the Financial Impact Matrix (Table 3). Enter the category on line 1003.

For example, if the Residential Indicator from Line 1001 is 1.3% and the Permittee Financial Capability Indicators score from Line 1002 is 2.1, the Financial Capability Matrix would indicate that implementation of the CSO control would be "Medium Burden" for the permittee.

The result from the Financial Capability Matrix is used to develop a CSO implementation schedule as described in Section V: CSO Schedule Development.

FINANCIAL CAPABILITY MATRIX SCORE
Worksheet 10

		Line Number
• Residential Indicator Score (Line 205)	_____	1001
• Permittee Financial Capability Indicators Score (Line 907)	_____	1002
• Financial Capability Matrix Category (see matrix next page)	_____	1003

FINANCIAL CAPABILITY MATRIX
Table 3

Permittee Financial Capability Indicators Score (Socioeconomic, Debt and Financial Indicators)	**Residential Indicator** (Cost Per Household as a % of MHI)		
	Low (Below 1.0 %)	Mid-Range (Between 1.0 and 2.0%)	High (Above 2.0 %)
Weak (Below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (Between 1.5 and 2.5)	Low Burden	Medium Burden	High Burden
Strong (Above 2.5)	Low Burden	Low Burden	Medium Burden

V. CSO SCHEDULE DEVELOPMENT

The CSO Policy recognizes that the causes and impacts of CSOs are site-specific water pollution control problems. Identification of CSO controls involves evaluation of significant technical, environmental, and financial issues. Therefore, the CSO Policy provides an opportunity for flexible, phased implementation of CSO controls to achieve compliance with the technology-based and water quality based requirements of the Clean Water Act.

Under the CSO Policy, permittees with combined sewer systems are expected to implement the nine minimum CSO controls as expeditiously as possible but no later than January 1, 1997. The nine minimum controls are technology-based controls that can reduce the magnitude, duration, and frequency of CSOs and their effects on receiving waters (See guidance: *Combined Sewer Overflows—Guidance for Nine Minimum Controls* (EPA, 832-B-95-003)). These minimum controls are not intended to require significant engineering activities or major construction.

Permittees with combined sewer systems are also expected to develop long-term control plans (LTCPs) that include provisions for public participation, monitoring of CSOs and their impacts, evaluation and selection of control alternatives, and implementation schedules for long-term controls. A permittee is expected to develop its LTCP as soon as practicable, but generally within two years after a requirement to develop an LTCP has been specified in its NPDES permit or other enforceable mechanism. The development and implementation of an LTCP will be coordinated with implementation of the nine minimum controls. Development of the LTCP involves negotiations with the EPA and state NPDES authorities and if appropriate, state WQS authorities. Among other components the LTCP contains fixed-date implementation and financing schedules to design and construct the needed CSO controls.

The CSO Policy recognizes the need to address the relative importance of environmental and financial issues when developing an implementation schedule for CSO controls to be contained in the LTCP and the NPDES permit or other enforceable mechanism. According to the CSO Policy, an implementation schedule "may be phased based on the relative importance of adverse impacts on WQS and designated uses, priority projects identified in the long-term plan, and on a permittee's financial capability." The CSO Policy identifies the following environmental and financial considerations that may affect the phasing of an implementation schedule for CSO controls:

- Eliminating overflows to sensitive areas
- Use impairment
- Financial capability
- Grant and loan availability
- Previous and current sewer user fees and rate structures

- Other viable funding mechanisms and sources of financing.

These factors, may warrant phasing the CSO control implementation schedules in a manner other than would be prescribed by logical engineering sequencing and normal construction practices. This section illustrates how these considerations may affect scheduling and provides some general scheduling boundaries to aid all parties in negotiating the final implementation schedule for CSO controls.

Scheduling is first considered during the permittee's development of an LTCP. The LTCP should assess CSO control alternatives including estimated design and construction time requirements for various components of the CSO controls. In general, CSO controls should be implemented as expeditiously as possible.

The permittee should first develop a tentative implementation schedule based on logical engineering sequencing and normal construction practices. The permittee should complete a critical path analysis to identify the shortest implementation schedule that will achieve the control objectives identified in the LTCP (See guidance: *Combined Sewer Overflows-Guidance for Long-term Control Plan (EPA 832-13-95-002)*). As a result of negotiations with state NPDES and EPA authorities, it may be appropriate to modify the tentative design and construction schedule based on the environmental and financial considerations listed above.

In general, the final negotiated schedule for CSO controls would reflect two types of modifications to the engineering and construction schedule. First, where CSOs discharge to sensitive or significantly use-impaired water bodies, the final schedule would provide for expedited implementation of the controls for these discharges. Second, the schedules may be phased or extended to reflect the significance of various financial considerations, particularly financial capability. The number of years to implement the CSO controls would be negotiated between the permittee, EPA and state NPDES authorities.

The following discussion provides more information on environmental and financial considerations that affect implementation schedules for CSO controls..

ENVIRONMENTAL CONSIDERATIONS

Discharges to Sensitive Areas

The CSO Control Policy states that a permittee's LTCP should give the highest priority to "sensitive areas." Sensitive areas are identified by the NPDES permitting authorities. They include the following:

- Outstanding National Resource Waters
- National Marine Sanctuaries
- Waters with threatened or endangered species and their habitat
- Waters with primary contact recreation
- Public drinking water intakes or their designated protection areas
- Shellfish beds.

For discharges to sensitive areas, the CSO Control Policy provides the following approaches:

- Prohibit new or significantly increased overflows
- Eliminate or relocate overflows
- Where elimination or relocation is not feasible, provide treatment to meet WQS and regularly reassess the feasibility of prohibition, elimination, or relocation.

During the planning process the permittee should characterize existing CSO conditions and identify receiving waters that are sensitive areas. The LTCP should give priority to sensitive areas and any implementation schedule should sequence projects to mitigate impacts on sensitive areas as early as possible. Giving high priority to sensitive areas might mean in some cases that discharges to non-sensitive areas would be addressed later in the implementation schedule than would be the case under a normal engineering and construction schedule.

Use Impairment

Long-term control plans should also give priority to receiving waters that experience recurring adverse impacts from CSOs on aquatic life, human health or aesthetics. Such waters may be the subject of public or media concern.

As a result of public participation and discussion with the permitting authority, the permittee should develop an implementation schedule that gives high priority to waters with impaired uses

and addresses them as soon as possible. As was the case for sensitive areas, giving high priority to certain use-impaired waters might mean that discharges to other waters would be addressed later in the implementation schedule than would be the case under a normal engineering and construction schedule.

The EPA document *Combined Sewer Overflows—Guidance for Screening and Ranking (EPA-832-B-95-004)* can provide assistance in identifying which CSO discharge points are likely to have the greatest adverse impact on water quality, aquatic life, or human health.

PRIMARY FINANCIAL CONSIDERATIONS

Financial Capability

The CSO Control Policy recognizes that financial capability is a significant factor in schedule development. A permittee's financial capability is assessed according to where the permittee falls on the Financial Capability Matrix calculated in worksheet 10. The matrix characterizes the financial burden on the permittee to implement CSO controls as either "Low Burden," "Medium Burden," or "High Burden."

To aid permittees, and EPA and state NPDES authorities during the negotiations necessary to establish implementation schedules for CSO controls, general time periods are presented in Table 4 that correspond with the permittee's Financial Capability Matrix Score summarized in Worksheet 10. The general implementation schedule time boundaries provide a basis for developing consistent and reasonably uniform implementation schedules across the nation in situations where permittee's CSO controls impose similar financial burdens. The time boundaries are not intended to replace the negotiations and deliberations necessary to balance all of the environmental and financial considerations that influence the site specific nature of the controls and implementation schedules.

FINANCIAL CAPABILITY GENERAL SCHEDULING BOUNDARIES
Table 4

Financial Capability Matrix Category	Implementation Period
Low Burden	Normal Engineering/Construction
Medium Burden	Up to 10 years
High Burden	Up to 15 Years*
	*(Schedule up to 20 years based on negotiation with EPA and state NPDES authorities)

Generally, a permittee in the "Low Burden" category would be expected to implement CSO control projects based on a normal engineering and construction schedule. In all cases, discharge to sensitive areas and impaired waters would be addressed on a high priority basis.

For permittees in the "Medium Burden" category, an implementation schedule up to 10 years might be appropriate. A permittee in the "High Burden" category is likely to incur substantial financial impacts to implement CSO controls; in such cases, an implementation schedule up to 15 years might be appropriate. In unusually "High Burden" situations, an implementation schedule up to 20 years may be negotiated with state NPDES and EPA authorities.

SECONDARY FINANCIAL CONSIDERATIONS

The three financial considerations--grant and loan availability, sewer user fees, and other viable funding mechanisms--are normally investigated early in the process of establishing CSO controls. They are described in more detail in the EPA document *Combined Sewer Overflows—Guidance for Funding Options* (EPA-832-B-95-007). They are typically addressed and resolved in the development of the financial schedule for the LTCP prior to design and construction. Therefore, these considerations normally do not have a significant impact on the length of time needed to implement CSO controls. An exception could occur in a case where a permittee's CSO controls can be constructed quickly but where the only available CSO funding source takes an inordinately long time to implement.

Grant and Loan Availability

During the long-term planning process, the permittee should develop a financing plan that identifies sources of capital funds. Generally, these will include some form of loan or grant. Typically, availability of grants and loans will not have a significant impact on the implementation schedule. In evaluating the effect of grant and loan availability on the permittee's schedule, the following funding sources would be considered:

- State wastewater treatment grant programs
- SRF Program
- State loan program (other than SRF program)
- Rural Utility Services Program (formerly: Rural Development Administration loan program)
- CoBank loan program
- Commercial loans
- Local revenue bonds
- Local general obligation bonds

Sewer User Fees

As part of the long-term planning process, the permittee should identify existing user fees and rate structures for wastewater treatment and then develop a new rate structure that includes recovery of the costs for CSO controls. Depending upon how CSO user fees are apportioned among residential, commercial, and industrial users, implementation of the LTCP may cause fees to increase significantly. In most cases, construction of the CSO controls occurs over an extended period allowing time for an orderly increase in the user fees. Thus, user fees typically are unlikely to have a significant impact on the implementation schedule. Combining increases in user fees with an ongoing public education program can help ease the effects of "rate shock" related to the higher user fees. The EPA document "Building Support for Increasing User Fees," (EPA 430/09-89-006) provides specific details on creating a public education program to successfully raise user fees.

Other Viable Funding Mechanisms and Sources of Funding

The permittee may have to consider alternate sources of funding if loans and grants are not available or if a need exists to reduce the financial impact of CSO controls on the users. In some cases, alternative funding mechanisms or financing sources may require additional time to set up. To evaluate the scheduling impacts of other viable funding mechanisms and sources of financing, the permittee's ability to accomplish the following actions would be assessed:

- Establish special assessment districts
- Increase user fees
- Impose/increase taxes (such as income taxes, sales taxes, or property taxes)
- Privatize wastewater treatment.

Most permittees would be expected to have several of these options available; therefore other viable funding mechanisms and sources of funding typically are not likely to have a significant impact on the implementation schedule.

SCHEDULING CONSIDERATIONS

Establishing an implementation schedule for the CSO controls is a negotiating process involving the permittee and EPA and state NPDES authorities. Normally, the time period for the CSO control implementation schedule is defined by the time required for normal engineering and construction practices. However, environmental and financial considerations can influence the time allowed to complete the CSO controls. The implementation schedule would always give high priority to addressing the environmental considerations involving discharges to sensitive areas and use-impaired water bodies. The CSO controls for these discharges would be constructed as expeditiously as possible. The implementation schedule can lengthen by phasing construction of the CSO controls when financial considerations create a financial burden. The primary financial

consideration which usually results in an extended implementation schedule with phased construction is the financial capability consideration.

Application of environmental and financial considerations to the development of implementation schedules for three hypothetical permittees is presented in Table 5.

Permittee number 1 required an eight year normal engineering/construction schedule to implement the CSO controls. Negotiations between the permittee and EPA and the state NPDES authorities resulted in agreement that four years would be allowed for the special circumstances of the permittee's low-burden financial capability category. Therefore, the eight-year engineering schedule took precedence over the financial consideration (therefore were no environmental considerations), and the schedule for implementation of CSO controls was eight years.

Permittee number 2 required three years to implement long-term controls under a normal engineering/construction schedule. Negotiations with the NPDES and WQS authorities concluded that four years would be necessary to obtain SRF loans. A four-year implementation schedule for CSO controls was established by the NPDES permitting authority to accommodate the most time consuming funding option.

Implementation of permittee number 3's CSO controls required a six-year normal engineering/construction schedule. However, the following environmental and financial considerations affected the final schedule:

- One of the permittee's CSO outfalls discharges to a bathing beach. Bathing beaches are defined as sensitive areas in the CSO Control Policy. Although a normal engineering/construction schedule would have eliminated this outfall in four years, it was determined that the schedule could be modified to eliminate this outfall in two years.

- The permittee's cost per household as percent of median household income is 2.2 percent, yielding a Residential Indicator of "Weak." The other socioeconomic, debt, and financial indicators yield a Permittee Indicators score of 1.7, or "Mid-Range." According to Table 3, these two indicators place the permittee in the "High-Burden" category for financial capability.

- User fees will have to increase significantly.

The unusual nature of permittee number 3's "high burden" financial capability category resulted in a sixteen-year schedule for this financial consideration after negotiations with the EPA and state NPDES authorities. Therefore, the permittee would receive a sixteen-year schedule to implement all CSO controls, with a special requirement that the CSO discharge to the bathing beaches be removed in the first two years of the schedule.

It is important to note that the final CSO control implementation schedule established for each permittee should be a time period that is negotiated between the permittee and EPA and state NPDES authorities based on the specific circumstances of each permittee's environmental and financial situation, plus the specific nature of any engineering and construction requirements.

SCHEDULING CONSIDERATION FOR HYPOTHETICAL PERMITTEES
Table 5

Scheduling Consideration	**Permittee #1**	**Permittee #2**	**Permittee #3**
Engineering/ Construction Schedule	8 years	3 years	6 years
Sensitive Areas	n/a	n/a	2 years to remove discharges from sensitive areas
Use Impairment	n/a	n/a	16 years
Financial Capability	4 years	0 years	0 years
Grant/Loan Availability	0 years	4 years	0 years
User fees/rate Structures	0 years	0 years	0 years
Other Funding Mechanisms	0 years	0 years	0 years
Schedule:	8 years	4 years	16 years (removal of discharge from sensitive area would occur within first 2 years)

The time periods presented in this guidance should be viewed as general boundaries to aid all parties in establishing reasonable and effective CSO control implementation schedules.

It is important to note that the final CSO control implementation schedule established for each permittee should be a time period that is negotiated between the permittee and EPA and state NPDES authorities based on the specific circumstances of each permittee's environmental and financial situation, plus the specific nature of any engineering and construction requirements. The time periods presented in this guidance should be viewed as general boundaries to aid all parties in establishing reasonable and effective CSO control implementation schedules.

ACRONYM LIST

CPH	Cost Per Household
CPI	Consumer Price Index
CSS	Combined Sewer System
CSO	Combined Sewer Overflow
CWA	Clean Water Act
EPA	Environmental Protection Agency
LTCP	Long Term Control Plan
MHI	Median Household Income
NMC	Nine Minimum Controls
NPDES	National Pollutant Discharge Elimination System
SRF	State Revolving Fund
WQS	Water Quality Standards
WWT	Wastewater Treatment

State Data Centers

Alabama
Center for Business and Economic Research
University of Alabama
Tuscaloosa, AL 35487
(205) 348-6191

Alaska
Research and Analysis
Department of Labor
Juneau, AK 99802
(907) 465-4500

Arizona
Arizona Department of Economic Security
Phoenix, AZ 85005
(602) 542-5984

Arkansas
University of Arkansas
Little Rock, AR 72204
(501) 569-8530

California
Department of Finance
Sacramento, CA 95814
(916) 322-4651

Colorado
Colorado Department of Local Affairs
Denver, CO 80203
(303) 866-2156

Connecticut
Connecticut Office of Policy and Management
Hartford, CT 06106
(203) 566-8285

Delaware
Delaware Development Office
Dover, DE 19903
(302) 739-4271

District of Columbia
Mayor's Office of Planning
Washington, D.C. 20004
(202) 727-6533

Florida
Executive Office of the Governor
Tallahassee, FL 32399
(904) 487-2114

Georgia
Office of Planning and Budget
Atlanta, GA 30334
(404) 656-0911

Guam
Guam Department of Commerce
Tamuning, Guam 96911
(671) 646-5841

Hawaii
State Department of Business and Economic Development
Honolulu, HI 96804
(808) 548-3082

Idaho
Idaho Department of Commerce
Boise, ID 83720
(208) 334-2470

Illinois
Illinois Bureau of the Budget
Springfield, IL 62706
(217) 782-1381

Indiana
Indiana State Data Center
Indiana State Library
Indianapolis, IN 46204
(317) 232-3733

Iowa
State Library of Iowa
Des Moines, IA 50319
(515) 281-4350

Kansas
State Library
Topeka, KS 66612
(913) 296-3296

Kentucky
Urban Research Institute
University of Louisville
Louisville, KY 40292
(502) 588-7990

Louisiana
Office of Planning and Budget
Baton Rouge, LA 70804
(504) 342-7410

Maine
Maine Department of Labor
Augusta, ME 04330
(207) 289-2271

Maryland
Maryland Department of State Planning
Baltimore, MD 21201
(301) 225-4450

Massachusetts
Institute for Social and Economic Research
University of Massachusetts
Amherst, MA 01003
(413) 545-3460

Michigan
Department of Management and Budget
Lansing, MI 48909
(517) 373-7910

Minnesota
State Demographer's Office
Minnesota State Planning Agency
St. Paul MN 55155
(612) 297-2360

Mississippi
Center for Population Studies
University of Mississippi
University, MS 38677
(601) 232-7288

Missouri
Missouri State Library
Jefferson City, MO 65102
(314) 751-3615

State Data Centers

Montana
Montana Department of Commerce
Helena, MT 59620
(406) 444-2896

Nebraska
Center for Applied Urban Research
University of Nebraska- Omaha
Omaha, NE 68182
(402) 595-2311

Nevada
Nevada State Library
Carson City, NV 89710
(702) 885-5160

New Hampshire
Office of State Planning
Concord, NH 03301
(603) 271-2155

New Jersey
New Jersey Department of Labor
Trenton, NJ 08625
(609) 984-2593

New Mexico
Economic Development and Tourism Department
Sante Fe, NM 87503
(505) 474-6005

New York
Department of Economic Development
Albany, NY 12245
(518) 474-6005

North Carolina
Office of State Budget and Management
Raleigh, NC 27603
(919) 733-7061

North Dakota
Department of Agricultural Economics
North Dakota State University
Fargo, ND 58105
(701) 237-8621

Ohio
Department of Development
Columbus, OH 43266
(614) 466-2115

Oklahoma
Department of Commerce
Oklahoma City, OK 73126
(405) 841-5184

Oregon Center for Population Research and Census
Portland State University
Portland, OR 97207
(717) 948-6336

Puerto Rico
Puerto Rico Planning Board
San Juan, PR 00940
(809) 723-6200

Rhode Island
Office of Municipal Affairs
Providence, RI 02908
(401) 277-6493

South Carolina
South Carolina Budget and Control Board
Columbia, SC 29201
(803) 734-3780

South Dakota
Business Research Bureau
University of South Dakota
Vermillion, SD 57069
(605) 677-5287

Tennessee
State Planning Office
Nashville, TN 37219
(615) 741-1676

Texas
Department of Commerce
Capital Station
Austin, Tx 78711
(512) 472-9667

Utah
Office of Planning and Budget
Salt Lake City, UT 84114
(801) 538-1036

Vermont
Office of Policy Research and Coordination
Montpelier, VT 05602
(802) 828-3326

Virgin Islands
Caribbean Research Institute
University of the Virgin Islands
Charlotte Amalie
St. Thomas, VI 00802
(809) 776-9200

Virginia
Virginia Employment Commission
Richmond, VA 23219
(804) 786-8308

Washington
Office of Financial Management
Olympia, WA 98504
(206) 586-2504

West Virginia
Office of Community and Industrial Development
Charleston, WV 25305
(304) 348-4010

Wisconsin
Demographic Service Center
Madison, WI 53707
(608) 266-1927

Wyoming
Department of Administration and Fiscal Control
Cheyenne, WY 82002
(307) 777-7504

Present Value Factors

Years	Interest Rate 1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.877	0.870
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	0.812	0.797	0.783	0.769	0.756
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	0.731	0.712	0.693	0.675	0.658
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	0.659	0.636	0.613	0.592	0.572
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	0.593	0.567	0.543	0.519	0.497
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	0.535	0.507	0.480	0.456	0.432
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	0.482	0.452	0.425	0.400	0.376
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	0.434	0.404	0.376	0.351	0.327
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	0.391	0.361	0.333	0.308	0.284
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	0.352	0.322	0.295	0.270	0.247
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	0.317	0.287	0.261	0.237	0.215
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	0.286	0.257	0.231	0.208	0.187
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	0.258	0.229	0.204	0.182	0.163
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	0.232	0.205	0.181	0.160	0.141
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	0.209	0.183	0.160	0.140	0.123
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218	0.188	0.163	0.141	0.123	0.107
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198	0.170	0.146	0.125	0.108	0.093
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180	0.153	0.130	0.111	0.095	0.081
19	0.828	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164	0.138	0.116	0.098	0.083	0.070
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149	0.124	0.104	0.087	0.073	0.061
25	0.780	0.610	0.478	0.375	0.295	0.233	0.184	0.146	0.116	0.092	0.074	0.059	0.047	0.038	0.030
30	0.742	0.552	0.412	0.308	0.231	0.174	0.131	0.099	0.075	0.057	0.044	0.033	0.026	0.020	0.015

Annualization Factors

Year	Interest Rate 0.005	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.055	0.06
1	1.0050	1.0100	1.0150	1.0200	1.0250	1.0300	1.0350	1.0400	1.0450	1.0500	1.0550	1.0600
2	0.5038	0.5075	0.5113	0.5150	0.5188	0.5226	0.5264	0.5302	0.5340	0.5378	0.5416	0.5454
3	0.3367	0.3400	0.3434	0.3468	0.3501	0.3535	0.3569	0.3603	0.3638	0.3672	0.3707	0.3741
4	0.2531	0.2563	0.2594	0.2626	0.2658	0.2690	0.2723	0.2755	0.2787	0.2820	0.2853	0.2886
5	0.2030	0.2060	0.2091	0.2122	0.2152	0.2184	0.2215	0.2246	0.2278	0.2310	0.2342	0.2374
6	0.1696	0.1725	0.1755	0.1785	0.1815	0.1846	0.1877	0.1908	0.1939	0.1970	0.2002	0.2034
7	0.1457	0.1486	0.1516	0.1545	0.1575	0.1605	0.1635	0.1666	0.1697	0.1728	0.1760	0.1791
8	0.1278	0.1307	0.1336	0.1365	0.1395	0.1425	0.1455	0.1485	0.1516	0.1547	0.1579	0.1610
9	0.1139	0.1167	0.1196	0.1225	0.1255	0.1284	0.1314	0.1345	0.1376	0.1407	0.1438	0.1470
10	0.1028	0.1056	0.1084	0.1113	0.1143	0.1172	0.1202	0.1233	0.1264	0.1295	0.1327	0.1359
11	0.0937	0.0965	0.0993	0.1022	0.1051	0.1081	0.1111	0.1141	0.1172	0.1204	0.1236	0.1268
12	0.0861	0.0888	0.0917	0.0946	0.0975	0.1005	0.1035	0.1066	0.1097	0.1128	0.1160	0.1193
13	0.0796	0.0824	0.0852	0.0881	0.0910	0.0940	0.0971	0.1001	0.1033	0.1065	0.1097	0.1130
14	0.0741	0.0769	0.0797	0.0826	0.0855	0.0885	0.0916	0.0947	0.0978	0.1010	0.1043	0.1076
15	0.0694	0.0721	0.0749	0.0778	0.0808	0.0838	0.0868	0.0899	0.0931	0.0963	0.0996	0.1030
16	0.0652	0.0679	0.0708	0.0737	0.0766	0.0796	0.0827	0.0858	0.0890	0.0923	0.0956	0.0990
17	0.0615	0.0643	0.0671	0.0700	0.0729	0.0760	0.0790	0.0822	0.0854	0.0887	0.0920	0.0954
18	0.0582	0.0610	0.0638	0.0667	0.0697	0.0727	0.0758	0.0790	0.0822	0.0855	0.0889	0.0924
19	0.0553	0.0581	0.0609	0.0638	0.0668	0.0698	0.0729	0.0761	0.0794	0.0827	0.0862	0.0896
20	0.0527	0.0554	0.0582	0.0612	0.0641	0.0672	0.0704	0.0736	0.0769	0.0802	0.0837	0.0872

Annualization Factors

Year	Interest Rate 0.065	0.07	0.075	0.08	0.085	0.09	0.095	0.1	0.105	0.11	0.115	0.12
1	1.0650	1.0700	1.0750	1.0800	1.0850	1.0900	1.0950	1.1000	1.1050	1.1100	1.1150	1.1200
2	0.5493	0.5531	0.5569	0.5608	0.5646	0.5685	0.5723	0.5762	0.5801	0.5839	0.5878	0.5917
3	0.3776	0.3811	0.3845	0.3880	0.3915	0.3951	0.3986	0.4021	0.4057	0.4092	0.4128	0.4163
4	0.2919	0.2952	0.2986	0.3019	0.3053	0.3087	0.3121	0.3155	0.3189	0.3223	0.3258	0.3292
5	0.2406	0.2439	0.2472	0.2505	0.2538	0.2571	0.2604	0.2638	0.2672	0.2706	0.2740	0.2774
6	0.2066	0.2098	0.2130	0.2163	0.2196	0.2229	0.2263	0.2296	0.2330	0.2364	0.2398	0.2432
7	0.1823	0.1856	0.1888	0.1921	0.1954	0.1987	0.2020	0.2054	0.2088	0.2122	0.2157	0.2191
8	0.1642	0.1675	0.1707	0.1740	0.1773	0.1807	0.1840	0.1874	0.1909	0.1943	0.1978	0.2013
9	0.1502	0.1535	0.1568	0.1601	0.1634	0.1668	0.1702	0.1736	0.1771	0.1806	0.1841	0.1877
10	0.1391	0.1424	0.1457	0.1490	0.1524	0.1558	0.1593	0.1627	0.1663	0.1698	0.1734	0.1770
11	0.1301	0.1334	0.1367	0.1401	0.1435	0.1469	0.1504	0.1540	0.1575	0.1611	0.1648	0.1684
12	0.1226	0.1259	0.1293	0.1327	0.1362	0.1397	0.1432	0.1468	0.1504	0.1540	0.1577	0.1614
13	0.1163	0.1197	0.1231	0.1265	0.1300	0.1336	0.1372	0.1408	0.1444	0.1482	0.1519	0.1557
14	0.1109	0.1143	0.1178	0.1213	0.1248	0.1284	0.1321	0.1357	0.1395	0.1432	0.1470	0.1509
15	0.1064	0.1098	0.1133	0.1168	0.1204	0.1241	0.1277	0.1315	0.1352	0.1391	0.1429	0.1468
16	0.1024	0.1059	0.1094	0.1130	0.1166	0.1203	0.1240	0.1278	0.1316	0.1355	0.1394	0.1434
17	0.0989	0.1024	0.1060	0.1096	0.1133	0.1170	0.1208	0.1247	0.1285	0.1325	0.1364	0.1405
18	0.0959	0.0994	0.1030	0.1067	0.1104	0.1142	0.1180	0.1219	0.1259	0.1298	0.1339	0.1379
19	0.0932	0.0968	0.1004	0.1041	0.1079	0.1117	0.1156	0.1195	0.1235	0.1276	0.1316	0.1358
20	0.0908	0.0944	0.0981	0.1019	0.1057	0.1095	0.1135	0.1175	0.1215	0.1256	0.1297	0.1339

Inflation Adjustment Factors

Years	Interest Rate 1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%
1	1.010	1.020	1.030	1.040	1.050	1.060	1.070	1.080	1.090	1.100	1.110	1.120	1.130	1.140	1.150
2	1.020	1.040	1.061	1.082	1.103	1.124	1.145	1.166	1.188	1.210	1.232	1.254	1.277	1.300	1.323
3	1.030	1.061	1.093	1.125	1.158	1.191	1.225	1.260	1.295	1.331	1.368	1.405	1.443	1.482	1.521
4	1.041	1.082	1.126	1.170	1.216	1.262	1.311	1.360	1.412	1.464	1.518	1.574	1.630	1.689	1.749
5	1.051	1.104	1.159	1.217	1.276	1.338	1.403	1.469	1.539	1.611	1.685	1.762	1.842	1.925	2.011
6	1.062	1.126	1.194	1.265	1.340	1.419	1.501	1.587	1.677	1.772	1.870	1.974	2.082	2.195	2.313
7	1.072	1.149	1.230	1.316	1.407	1.504	1.606	1.714	1.828	1.949	2.076	2.211	2.353	2.502	2.660
8	1.083	1.172	1.267	1.369	1.477	1.594	1.718	1.851	1.993	2.144	2.305	2.476	2.658	2.853	3.059
9	1.094	1.195	1.305	1.423	1.551	1.689	1.838	1.999	2.172	2.358	2.558	2.773	3.004	3.252	3.518
10	1.105	1.219	1.344	1.480	1.629	1.791	1.967	2.159	2.367	2.594	2.839	3.106	3.395	3.707	4.046
11	1.116	1.243	1.384	1.539	1.710	1.898	2.105	2.332	2.580	2.853	3.152	3.479	3.836	4.226	4.652
12	1.127	1.268	1.426	1.601	1.796	2.012	2.252	2.518	2.813	3.138	3.498	3.896	4.335	4.818	5.350
13	1.138	1.294	1.469	1.665	1.886	2.133	2.410	2.720	3.066	3.452	3.883	4.363	4.898	5.492	6.153
14	1.149	1.319	1.513	1.732	1.980	2.261	2.579	2.937	3.342	3.797	4.310	4.887	5.535	6.261	7.076
15	1.161	1.346	1.558	1.801	2.079	2.397	2.759	3.172	3.642	4.177	4.785	5.474	6.254	7.138	8.137
16	1.173	1.373	1.605	1.873	2.183	2.540	2.952	3.426	3.970	4.595	5.311	6.130	7.067	8.137	9.358
17	1.184	1.400	1.653	1.948	2.292	2.693	3.159	3.700	4.328	5.054	5.895	6.866	7.986	9.276	10.761
18	1.196	1.428	1.702	2.026	2.407	2.854	3.380	3.996	4.717	5.560	6.544	7.690	9.024	10.575	12.375
19	1.208	1.457	1.754	2.107	2.527	3.026	3.617	4.316	5.142	6.116	7.263	8.613	10.197	12.056	14.232
20	1.220	1.486	1.806	2.191	2.653	3.207	3.870	4.661	5.604	6.727	8.062	9.646	11.523	13.743	16.367
25	1.282	1.641	2.094	2.666	3.386	4.292	5.427	6.848	8.623	10.835	13.585	17.000	21.231	26.462	32.919
30	1.348	1.811	2.427	3.243	4.322	5.743	7.612	10.063	13.268	17.449	22.892	29.960	39.116	50.950	66.212

REFERENCES

International City/County Management Association. 1994. *Evaluating Financial Condition: - A Handbook for Local Government*. Washington, D.C. International City/County Management Association.

Moody's Investor Services, Inc. 1995. *Medians - Selected Indicators of Municipal Performance*. New York, N.Y. Moody's Investor Services, Inc.

Moody's Investor Services, Inc. 1989. *Moody's on Municipals - An Introduction to Issuing Debt*. New York, N.Y. Moody's Investor Services, Inc.

Standard and Poor's Corporation. 1993. *Municipal Finance Criteria* New York, N.Y. Standard and Poor's Corporation.

U.S. Environmental Protection Agency. 1984. *Financial Capability Guidebook*.

U.S. Environmental Protection Agency. 1992. *The Road to Financing - Assessing and Improving Your Community's Creditworthiness*. EPA 832-B-92-004.

U.S. Environmental Protection Agency. 1995. *Combined Sewer Overflows-Guidance for Long-term Control Plan*. EPA-832-B-95-002.

U.S. Environmental Protection Agency. 1995. *Combined Sewer Overflows—Guidance for Nine Minimum Controls*. EPA 832-B-95-003.

U.S. Environmental Protection Agency. 1995. *Combined Sewer Overflows—Guidance for Funding Options*. EPA 832-B-95-007.

U.S. Environmental Protection Agency. 1995. *Combined Sewer Overflows—Guidance for Screening and Ranking*. EPA 832-B-95-004.

U.S. Environmental Protection Agency. 1995. *Interim Economic Guidance for Water Quality Standards*. EPA 823-B-95-002.

US Environmental Protection Agency. 1989. Building Support For Increasing User Fees. EPA 430/09-89-006.