

**Collection Systems: Methods for Evaluating and Improving Performance**  
**Office of Water Programs**  
**California State University, Sacramento**  
(3.0 Continuing Education Units)

### **Objective**

This course explains how to use collection system O&M program performance indicators, benchmarking data, and surveys to evaluate and improve system performance.

### **Scope**

This course is a practical guide to evaluating and improving collection system performance through the review of data presented in detailed case studies and survey results from 21 collection systems. A discussion of the evaluation process includes:

- Identifying O&M program areas that affect system performance
- Verifying and validating what is being done well currently in the O&M program
- Identifying areas where the O&M program can be more cost-effective
- Identifying areas of potential liability in the system
- Adapting successful ideas and solutions from other agencies nationwide

A discussion of typical collection system problems and needs is included. Case studies are presented using the original 1998 survey data in comparison with data gathered from a 2008 follow-up survey. The examples discussed throughout the manual are representative of small, medium, and large agencies from diverse geographical areas.

You are presented with information about situations and issues encountered by most collection system operators and managers as well as examples of O&M program adjustments that vary with the age of the system, extent and effectiveness of the programs, local conditions, and funding. With this in mind, you can adapt the information and procedures in this manual to fit your particular situation when developing a plan to evaluate and improve your system's performance.

### **Learning Objectives**

#### **Chapter 1, Understanding Wastewater Collection System Problems and Needs**

1. Describe the purpose of a wastewater collection system.
2. Identify the causes of problems that prevent collection systems from performing as intended.
3. Describe the purpose and explain the benefits of collection system O&M programs.
4. Outline the types of collection system maintenance programs.
5. Justify the use of collection system performance indicators and benchmarking.

## Chapter 2, Researching Trends in Collection System Performance

1. Conduct a search of relevant collection system literature.
2. Develop a survey to collect benchmark data needed to develop performance indicators.
3. Prepare tables to summarize collection system O&M program categories.

## Chapter 3, Developing Benchmark Data

1. Develop a profile of benchmark data survey respondents.
2. Prepare tables summarizing O&M benchmark data.
3. Evaluate collection system financial benchmark information.
4. Explain the importance of the training and certification of collection system O&M staff.
5. Help a collection system agency evaluate the level of service provided and identify any trends using benchmark data.
6. Prepare a summary of regulatory compliance for a collection system agency.

## Chapter 4, Developing, Analyzing, and Interpreting O&M Performance Indicators

1. Develop, analyze, and interpret collection system O&M performance indicators.
2. Identify and use appropriate performance indicators.
3. Describe the benchmarking process.
4. Set target performance levels.
5. Make recommendations and changes to enhance performance.

## Chapter 5, Improving Collection System Performance

1. Suggest methods for improving collection system performance.
2. Identify sources of collection system problems.
3. Select solutions for solving stoppage, backup, and overflow problems.
4. Develop a collection system emergency response plan.
5. Collect and manage collection system data.

## Chapter 6, Case Histories and Benchmarking Surveys

1. Describe how the agencies discussed in the case histories achieved effective collection system performance.
2. Evaluate and compare the performance of other collection system agencies with the performance of your agency.

## Chapter 7, How Has Performance Improved?

1. Collect, compare, and analyze performance data from a variety of collection systems agencies to evaluate changes in performance and determine averages and trends.
2. Prepare objectives and data collection procedures for a collection system performance survey.
3. Identify and explain the factors and causes that influence changes in collection system performance.
4. Describe the characteristics and essential elements of a high-performing collection system agency.

### Other Sections

- Appendix A, Literature Review
- Appendix B, Data Collection Forms
- Appendix C, Benchmarking Worksheets
- Answer Key
- Glossary
- Index

### Time Assignment

This course time assignment outlines the components of a distance learning (correspondence) training course offered by OWP for continuing education units (CEUs) or contact hours.

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**Title of course and training manual:** Collection Systems: Methods for Evaluating and Improving Performance, Third Edition

**Number of text pages:** 224

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**Average word count:** 434 words per page

**Average reading speed:** 130 words per minute; 3.3 minutes per page

The training manual used for this course contains text, tables, graphs, illustrations, and chapter review questions to enhance the presentation of information and the student learning experience. The course is designed for students to spend the same amount of time reading the tables, graphs, and illustrations as they spend reading the equivalent amount of related chapter text.

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**Number of chapter review questions:** The course contains 72 review questions, located in the "Chapter Review" at the end of each chapter. Question types include fill-in, multiple choice, and matching.

**Average chapter review question/answer speed:** 2 minutes per question

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**Objective test questions:** The course contains 140 test questions. There is one objective test per chapter. Question types include true/false; best answer (one correct answer); and multiple choice (one or more correct answers).

**Average objective test question/answer speed:** 2 minutes per question

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The table summarizes the course components outlined above and shows the calculations for the total time assignment values in minutes and hours.

Course component	Number of component units		Minutes required to complete component unit		Total time assignment for component
Text pages	224	×	3.3	=	739
Chapter review questions	72	×	2	=	144
Objective test questions	140	×	2	=	280
					<b>1,163 minutes</b>
					<b>19 hours</b>