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## **Guidelines for the management of assets of water supply and wastewater systems —**

Part 4:

### **Wastewater treatment plants, sludge treatment facilities, pumping stations, retention and detention facilities**

*Lignes directrices pour la gestion d'actifs des systèmes d'eau potable  
et d'eaux usées —*

*Partie 4: Stations d'épuration des eaux usées, installations de  
traitement des boues, stations de pompage, installations de rétention  
et de retenue*



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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 224, *Service activities relating to drinking water supply, wastewater and stormwater systems*.

A list of all parts in the ISO 24516 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

This document is written within the overall concept of management of assets, which is an activity all organizations undertake in some manner and to some degree. It focuses on the details of managing the physical assets at the operational level rather than the organizational (corporate management, structure or process) level.

Wastewater utilities are reliant on their assets to deliver their services to the users in their service areas. The assets (e.g. underground pipes, retention and detention tanks and treatment plants) collectively form the physical infrastructure of the wastewater utilities and are the consequence of the accumulated capital investments and operational expenditures on maintenance and rehabilitation over many years. In many of these utilities, the replacement value of these past investments will amount to many millions (even billions) of US dollars depending on the size of the community served. The infrastructure represents a major societal investment in essential services contributing to public health and the protection of the environment.

In many countries, these assets have been identified as critical infrastructure and programs are in place to ensure their protection or their sustainability. Like many other organisations with assets, wastewater utilities undertake programs of activities to manage the assets to ensure they continue to meet the needs of the community. These management activities can be at the strategic, tactical or operational level. The activities can be part of a formal management system, or the result of specific legislative requirements, or simply the result of due diligence by the service operators and managers.

This document can serve as a supporting document for utilities operating an asset management system regardless of whether or not the utilities make use of any management system standard, for example ISO 55001.

In many countries, there is a recognized sustainability problem, sometimes referred to as the infrastructure gap, which recognizes that, for various reasons, the infrastructure has not been maintained over the years on a truly sustainable basis, i.e. funding and implementation of rehabilitation programs have been postponed, with a focus instead on short-term repairs, or an allowed decrease in the level of service provided.

The condition of wastewater infrastructures greatly influences the adequacy of the wastewater service from the aspects of quality, quantity, safety, reliability, environmental impact, sustainability, the degree of treatment and efficiency. System condition-based rehabilitation approaches serve to meet these requirements with a focus on a holistic approach of condition-based, risk-oriented maintenance.

As the installation and development of wastewater assets matures, the optimization of the wastewater infrastructure will become necessary in many places in order to compensate for ageing and wear and tear and to respond to changing societal and economic conditions. Consequently, wastewater infrastructure assets are subject not only to ageing and wear and tear but also to adaptation processes resulting from growth, new legislative requirements, technical innovations or changing user-service-level expectations. This requires wastewater utilities not only to focus on maintenance and rehabilitation but also to keep future requirements and developments in mind. Rehabilitation will thus become essential in management of assets, with ever more stringent requirements on the design and execution of rehabilitation.

In recent years, much effort has been applied to the whole issue of management of assets on two levels:

- What are the principles and structure of an asset management system?
- What are the good practices that can be implemented on a technical level to assess the condition of the assets and help decide when asset interventions (repair, renovation or replacement) should take place?

This document describes the information required and how to collect and process reliable inventory, condition, operational and context data about technical assets of wastewater systems, including failures. These data should serve as the basis for a systematic management of assets and can also contribute data needed for benchmarking purposes. A reliable database that supports analysis of failures and

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of operational data (including a description of the condition of facilities or units) is of particular significance for establishing a risk-based investigation to determine maintenance and rehabilitation.

This document also provides guidance on how to define a strategy for management of assets with regard to the overall performance expected by the owner and other stakeholders. It includes several aspects of operation and maintenance, including asset condition assessment and investment strategies (new assets and rehabilitation).

The approaches offered in this document are intended to be universally applicable, regardless of the structure of a given wastewater system. Any empirical numeric values given are mere support values; concrete plans should always rely on utility and/or object-specific values.

The usual and expected goal of the effective management of assets is to provide maximum life and value in a cost-effective manner. However, in some circumstances where the assets are being operated to satisfy a short-term goal, this will not be to maximize the life of the assets, but could, for example, be to minimize costs while meeting other objectives within the planned timeframe.

Additional information on objectives and functional requirements of management of assets is provided in [Annex A](#); an example of the content of a wastewater master plan is provided in [Annex B](#); and examples of inventory, condition and operational data are provided in [Annex C](#). Methods for the risk-based assessment for rehabilitation are shown in [Annex D](#).