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Gravity Sanitary Sewer Design and Construction

Second Edition

Prepared by a Joint Task Force of the
Environmental and Water Resources Institute and the
Pipeline Division Committee on Pipeline Planning of the
American Society of Civil Engineers
and the
Collection Systems Subcommittee of the
Technical Practice Committee of the
Water Environment Federation

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Formed in 1928, the Water Environment Federation (WEF) is a not-for-profit technical and educational organization with 32,000 individual members and 80 affiliated Member Associations representing an additional 50,000 water quality professionals throughout the world. WEF and its member associations proudly work to achieve our mission of preserving and enhancing the global water environment.

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The WEF Technical Practice Committee (formerly the Committee on Sewage and Industrial Wastes Practice of the Federation of Sewage and Industrial Wastes Associations) was created by the Federation Board of Control on October 11, 1941. The primary function of the Committee is to originate and produce, through appropriate subcommittees, special publications dealing with technical aspects of the broad interests of the Federation. These publications are intended to provide background information through a review of technical practices and detailed procedures that research and experience have shown to be functional and practical.

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ABSTRACT

This Manual provides both theoretical and practical guidelines for the design and construction of gravity sanitary sewers.

The initial chapter introduces the organization and administrative phases of the sanitary sewer project. Subsequent chapters are presented in a sequence detailing the parameters necessary to establish the design criteria, complete the design, and award a construction contract. The Manual concludes with a discussion of the commonly used trenchless and conventional methods of sanitary sewer construction.

This Manual is intended to be of practical use to the designer of a gravity sanitary sewer system and is based upon the experience of engineers in the field of sanitary sewer structural and hydraulic design. Charts, illustrations, and example problem solutions are used liberally throughout to reinforce the text.

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FOREWORD

In 1960, a joint committee of the Water Pollution Control Federation (WPCF) and the American Society of Civil Engineers (ASCE) published the Manual of Practice on the Design and Construction of Sanitary and Storm Sewers. In 1964, a second joint committee was formed to revise and expand the Manual; in 1969, the revised edition was published. In subsequent reprintings, the 1969 edition of the Manual was continuously revised to provide information on improved and more current practices.

In 1978, the WPCF authorized preparation of this Manual of Practice devoted to gravity sanitary sewers. In 1979, ASCE entered into an agreement with WPCF to continue their joint publication relationship. Since that time, the Water Environment Federation (WEF, formerly the WPCF) and the Environmental and Water Resources Institute (EWRI) of ASCE have continued to work together on joint publications. As a result, a joint committee of the Water Pollution Control Committee of EWRI, the Pipeline Division of ASCE, and the Collection Systems Subcommittee of WEF's Technical Practice Committee was formed in 2004 to update this Manual.

This Manual should be considered by the practicing engineer as an aid and a checklist of items to be considered in a gravity sanitary sewer project, as represented by acceptable current procedures. It is not intended to be a substitute for engineering experience and judgment, or a treatise replacing standard texts and reference material.

In common with other manuals prepared on special phases of engineering, this Manual recognizes that this field of engineering is constantly progressing with new ideas, materials, and methods coming into use. Other alternatives available to the designer of sanitary sewers include vacuum, pressure, vacuum-pressure, and small-diameter gravity sewers. It is hoped that users will present any suggestions for improvement to the Technical Practice Committee of WEF, to EWRI, and to the Pipeline Division of ASCE for possible inclusion in future revisions to keep this Manual current.

The members of the Committee thank the reviewers of this Manual for their assistance in submitting their suggestions for improvement.