

2000 COMPREHENSIVE SEWER SYSTEM PLAN

PREPARED BY:

***PENHALLEGON ASSOCIATES CONSULTING ENGINEERS, INC.
AND
URS CORPORATION***

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Midway Sewer District

Board of Commissioners

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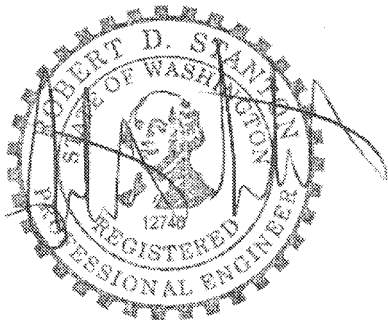
District Manager

Ken Kase

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**MIDWAY SEWER DISTRICT
COMPREHENSIVE SEWER SYSTEM PLAN
ENGINEER'S CERTIFICATION**

The technical material and data contained in this report was prepared by Penhallegon Associates Consulting Engineers, Inc. and URS Corporation under the supervision of the below listed individuals. Those responsible staff members who are registered professional engineers are licensed in the State of Washington.



EXPIRES 1/18/01

Robert D. Stanton, P.E., Vice President
Penhallegon Associates Consulting Engineers, Inc.

Susan E. Boyd, Project Manager
Penhallegon Associates Consulting Engineers, Inc.

J. Richard Grodt, P.E., Project Manager
URS Corporation

**MIDWAY SEWER DISTRICT
COMPREHENSIVE SEWER SYSTEM PLAN
EXECUTIVE SUMMARY**

This Comprehensive Plan is the compilation of results and findings of recent planning and engineering analyses completed for Midway Sewer District. The purpose of the analyses was to assess the ability of the existing sanitary sewer and treatment systems to accommodate the wastewater flows from the existing and projected population of the District. The Plan updates and supercedes the District's previous Comprehensive Plan and has been prepared in accordance with all applicable statutes and guidelines and with consideration of the land use plans of the cities within which the District provides service. It has been prepared by Penhallegon Associates Consulting Engineers, Inc., with assistance and expertise from URS Corporation regarding treatment plant related aspects of the system.

Midway Sewer District consists of approximately 10 square miles of land located in south King County. The District provides sanitary sewer collection and wastewater treatment services to approximately 7,500 direct service connections of the utility. The majority of these connections are single family residential (87%), The District serves the majority of the City of Des Moines and the southern portion of the City of Sea Tac, core areas of these cities in which commercial facilities, schools, nursing homes and major facilities such as the Federal Detention Center are located. The District also provides service to smaller areas within Burien, Kent, Normandy Park, Federal Way and unincorporated King County. Domestic flows from Sea-Tac International Airport, in the northern portion of the District's service area, are also directed to Midway Sewer District for treatment and disposal through a single connection from the Airport's on-site system.

The primary purpose of this planning process was to develop a document which establishes a program for future improvements to and expansion of Midway Sewer District's sanitary sewer system. Insofar as possible, this was achieved using previous plans, studies and other documentation accomplished by the District, District consultants and the jurisdictions within which the District operates. The planning process included development of a comprehensive computerized mapping system of the District, which was developed using a combination of resources, including King County Geographical Information Survey (GIS) data, District as-built drawings and information provided by other jurisdictions. This mapping system provides the District with an up-to-date and dynamic tool for future use in the District's record keeping efforts.

Analysis of the collection and treatment systems required development of population and employment projections for the service area put forth in Section 2 of the Plan. Although significant increases are not expected over the six year life of the Plan, there is significant development and/or re-development potential recognized and proposed within the service area for the twenty year planning horizon. Midway Sewer District currently (year 2000) serves an estimated population of approximately 43,000 and an employment population of over 15,000 (excluding SeaTac Airport). This is expected to increase to nearly 50,000 residents and 18,000 employees by 2020, not including the proposed Pacific Ridge development, which could add as many as 6,000 additional residents and 16,000 employees to the 2020 estimates.

Section 3 of the Plan provides an overview of how these anticipated and potential increases will impact flows through the collection system and at the treatment plant. The District currently treats base flows (domestic wastewater without consideration of infiltration and inflow) of nearly 4.6 million gallons per day (MGD), average wet weather flows of 6.9 MGD, and has experienced instantaneous peaks of approximately 18.5 MGD at the treatment plant. Projections indicate that flows by the year 2020 could reach as high as 6.5 MGD for base flows, 9.8 MGD for average wet weather and more than 20 MGD for peak instantaneous flow.

Determination of the ability of existing facilities to meet the needs of the current and future populations of the District is a primary objective of the planning process and has been accomplished for both the collection and treatment systems. Analysis of the collection system was accomplished using a combination of practical knowledge and engineering, information provided by District staff and other consultants, and through the use of a computer model constructed as part of this project. The model was constructed using state-of-the-art *Hydragraphics* software, and includes all of the District's pump stations, trunk lines over 10-inches in diameter and other collection facilities which were either determined to be critical in the overall system or were suspected of having capacity issues.

The results of the collection system analysis are presented in Section 6 of the Plan. In general, the collection system and associated pumping facilities were found to be in very good condition and operated in manner which is consistent with the District's main objective of providing reliable sanitary sewer service while protecting the health and safety of the local population and environment. Under existing flow conditions, several areas were identified where pipe upgrades are required to correct specific deficiencies such as line sags, minor flow constrictions and flow issues associated with pipe grades. In addition, the planning process

allowed District maintenance staff the opportunity to identify specific pipelines which have required excessive cleaning and maintenance in the past for further evaluation and repair recommendations. Similar analyses were performed for future flow conditions, and as expected, additional areas of potential capacity problems were identified.

Although the Midway collection system performs very well under both actual and modeled conditions, infiltration and inflow was identified as a primary concern in the future operation of the system. While the District average I & I is within an acceptable range of approximately 1,200 gallons per acre per day (based on actual treatment plant flow records), older areas of the system, especially in Sylvia Pines area, are suspected of having significantly higher rates. Most of the identified capacity issues, however, can be mitigated through reduction of I & I into the system. An aggressive I & I program, which includes correlating monitored flow rates with rainfall data, video inspection and corrective measures to reduce I & I is recommended. Other recommended collection system improvements include routine upgrade of pump stations, consideration of a new regional pump station serving the southern portion of the District, installation of remote monitoring equipment at pump stations, and other associated ongoing system maintenance and upgrade projects. In addition, this Comprehensive Plan contemplates extension of sewers into currently undeveloped and/or unsewered areas. It is expected, however, that the extension of sewer service will be accomplished as required by development within the service area or as requested by existing properties which are currently served by on-site disposal systems.

Midway's Des Moines Creek Treatment Plant is responsible for treating all flows generated by the District's customers except a small area which is diverted to Lakehaven Utility District for treatment. In addition, the District receives domestic flows from the Port of Seattle's Sea-Tac Airport facilities and small amounts of flow from the neighboring Val Vue Sewer District and Lakehaven Utility District. The treatment plant was originally constructed in 1968 and has undergone a series of upgrades since then. The most recent upgrade was accomplished in 1999 and included installation of an additional primary anaerobic digester and emergency generator, as well as conversion from chlorine to ultra-violet light disinfection of wastewater effluent. These upgrades provide much improved capacity and efficiency in the plant and the District has petitioned for re-rating of the facility from 6.0 to 9.0 MGD. Although the final stages of the District's new submarine outfall to the Puget Sound have been started, completion is not anticipated in 2002. The benefits associated with this new facility include increased capacity and improved diffusion. Future improvement requirements to the treatment plant include the addition of a re-cycle line from the tank effluent to the trickling filter feed, installation of an additional sludge filter press and specific improvements to the

plant headworks. Additional recommendations are for the District to review its source control program to insure that influent to the plant remains consistent with anticipated wastewater parameters.

The Capital Improvements Plan identified in Section 9 identifies approximately \$41 million in sewer system improvements, most of which are associated with extension of sewers into currently unserved areas of the District and/or will be financed by Developer Extensions. Projects totaling approximately \$18.4 million are anticipated to commence in the six year life of this Plan. Debt financing, such as Public Works Trust Fund Loans will allow the District to spread costs for some projects over a 20 year period, and reduce the six year capital requirements to approximately \$13.6 million. No rate increase is contemplated at this time, although it is recommended that the District continue to closely monitor revenues and expenditures and consider the impacts of the recommended improvements once additional system monitoring has been accomplished and the scope and magnitude of Infiltration and Inflow projects is better defined.