

# Introduction



## WATER SYSTEM OWNERSHIP AND MANAGEMENT

The City of Stanwood (City) is a municipal corporation that owns and operates a public water system within its corporate boundaries. Water system data on file at the Washington State Department of Health (DOH) for the City’s system is shown below in **Table 1-1**.

**Table 1-1**  
**Water System Ownership Information**

Information Type	Description
System Type	Group A - Community - Public Water System
System Name	City of Stanwood
County	Snohomish
DOH System ID Number	83650H
Owner Number	5635
Address	10220 – 270th Street NW, Stanwood, WA 98292
Contact	Ms. Gina Melander, Water Lead
Contact Phone Number	(425) 508-7829

## OVERVIEW OF EXISTING SYSTEM

In 2013, the City provided water service to approximately 2,554 customer connections, or 4,331 equivalent residential units (ERUs), within the City’s water service area, which extends beyond the City limits. The City limits comprise an area of approximately 2.8 square miles and the water service area is approximately 22.4 square miles. However, most of the water service area is undeveloped at this time. The 2013 population served by the water system was approximately 7,075, whereas the population residing in the City limits was approximately 6,340.

Three wells and a spring source can currently provide water supply to the City, but the Fure Well is currently used only as an emergency source and Hatt Slough Springs is currently offline. The City provides system-wide chlorination of its source water, and the Bryant Well Field Treatment Facility currently treats Bryant Well No. 1 for arsenic, manganese, and hydrogen sulfide using an oxidation and filtration process. This facility will also treat the future Bryant Well No. 3, the replacement for Bryant Well No. 2, which is expected to be online in 2015. Water storage is provided by five reservoirs that have a total capacity of 2.15 million gallons (MG). In addition, the City’s water system has 7 pressure zones with 11 pressure reducing stations, 2 booster pump stations, and more than 65 miles of water main. A summary of 2013 water system data is shown in **Table 1-2**.

**Table 1-2  
2013 Water System Data**

<b>Description</b>	<b>Data</b>
Water Service Population	7,075
Water Service Area	22.4 square miles
Total Connections	2,554
Total ERUs	4,331
Demand per ERU	191 gallons per day
Annual Supply	302,454,000 gallons
Average Day Demand	575 gpm
Distribution System Leakage	14%
Maximum Day/Average Day Demand Factor	1.69
Peak Hour/Maximum Day Demand Factor	1.45
Number of Pressure Zones	7
Number of Wells & Total Capacity <sup>1</sup>	3 (2,050 gpm)
Number of Spring Sources & Total Capacity <sup>2</sup>	1 (260 gpm)
Number of Pump Stations & Total Capacity	2 (2,360 gpm)
Number of Reservoirs & Total Capacity	5 (2.15 MG)
Number of Pressure Reducing Stations	11
Total Length of Water Main	65 miles

1 = The Fure Well, which accounts for 100 gpm of the total, is currently used only as an emergency source.  
2 = Hatt Slough Springs is currently offline.

**AUTHORIZATION AND PURPOSE**

In 2013, the City of Stanwood authorized RH2 Engineering, Inc., (RH2) to prepare this comprehensive water system plan (WSP) as required by state law under Washington Administrative Code (WAC) 246-290-100. In accordance with WAC 246-290-100, the plan shall be updated and submitted to DOH every 6 years. The previous WSP was prepared for the City in December 2009 and revised in June 2010. The purpose of this updated WSP is as follows:

- To evaluate existing water demand data and project future water demands;
- To analyze the existing water system to determine if it meets minimum requirements mandated by DOH and the City's own policies and design criteria;
- To identify water system improvements that resolve existing system deficiencies and accommodate the system's future needs for at least 20 years into the future;
- To prepare a schedule of improvements that meets the goals of the City's financial program;
- To evaluate past water quality and identify water quality improvements, as necessary;
- To document the City's operations and maintenance program;
- To prepare water use efficiency, cross-connection control, wellhead protection, and water quality monitoring plans; and
- To comply with all other WSP requirements of DOH.

## **SUMMARY OF PLAN CONTENTS**

A brief summary of the content of the chapters in the plan is as follows.

- The **Executive Summary** provides a brief summary of the key elements of this WSP.
- **Chapter 1** introduces the reader to the City's water system, the objectives of the WSP, and its organization.
- **Chapter 2** presents the water service area, describes the existing water system, and identifies the adjacent water purveyors.
- **Chapter 3** presents related plans, land use, and population characteristics.
- **Chapter 4** identifies existing water demands and projected future demands.
- **Chapter 5** presents the City's operational policies and design criteria.
- **Chapter 6** discusses the City's water source and water quality monitoring program.
- **Chapter 7** discusses the water system analyses and existing system deficiencies.
- **Chapter 8** discusses the City's operations and maintenance program.
- **Chapter 9** presents the proposed water system improvements, their estimated costs, and implementation schedule.
- **Chapter 10** summarizes the financial status of the water system and presents a plan for funding the water system improvements.
- The **Appendices** contain additional information and plans that supplement the main chapters of the WSP.

### DEFINITION OF TERMS

The following terms are used throughout this WSP.

**Capital Facilities Charge:** A one-time fee paid by a property owner when connecting to the City's water system. This fee pays for the new customers equitable share of the cost of the existing system. This fee offsets the costs of providing water to new customers and recognizes that the existing water system was largely built and paid for by the existing customers.

**Consumption:** The true volume of water used by the water system's customers. The volume is measured at each customer's connection to the distribution system.

**Connection Charge:** A one-time fee paid by a property owner when connecting to the City's system that is made up of both the Capital Facilities Charge and the Meter Installation Charge.

**Cross-Connection:** A physical arrangement that connects a public water system, directly or indirectly, with anything other than another potable water system; therefore, cross-connection presents the potential for contaminating the public water system.

**Demand:** The quantity of water required from a water supply source over a period of time necessary to meet the needs of domestic, commercial, industrial and public uses, and to provide enough water to supply fire fighting, system losses and miscellaneous water uses. Demands are normally discussed in terms of flow rate, such as million gallons per day (MGD) or gallons per minute (gpm), and are described in terms of a volume of water delivered during a certain time period. Flow rates pertinent to the analysis and design of water systems are:

- **Average Day Demand (ADD):** The total amount of water delivered to the system in a year divided by the number of days in the year;
- **Maximum Day Demand (MDD):** The maximum amount of water delivered to the system during a 24-hour time period of a given year; and
- **Peak Hour Demand (PHD):** The maximum amount of water delivered to the system, excluding fire flow, during a 1 hour time period of a given year. A systems peak hour demand usually occurs during the same day as the maximum day demand.

**Distribution System Leakage (DSL):** Water that is measured as going into the distribution system but not metered as going out of the system.

**Equivalent Residential Units (ERUs):** One ERU represents the amount of water used by one single family residence for a specific water system. The demand of other customer classes can be expressed in terms of ERUs by dividing the demand of each of the other customer classes by the demand represented by one ERU.

**Fire Flow:** The rate of flow of water required during fire fighting, which is usually expressed in terms of gpm.

**Head:** A measure of pressure or force exerted by water. Head is measured in feet and can be converted to pounds per square inch (psi) by dividing feet by 2.31.

**Head Loss:** Pressure reduction resulting from pipeline wall friction, bends, physical restrictions, or obstructions.

**Hydraulic Elevation:** The height of a free water surface above a defined datum; the height above the ground to which water in a pressure pipeline would rise in a vertical open-end pipe.

**Maximum Contaminant Level (MCL):** The maximum permissible level of contaminant in the water that the purveyor delivers to any public water system user, measured at the locations identified under WAC 246-290-300, Table 3.

**Meter Installation Charge:** The installation charge or hook-up fee is paid by a property owner to reimburse the City for the cost incurred to make the physical connection to the water system. This cost includes both direct and indirect cost for installing the service line off of the system's water main to the customer's water meter.

**Potable:** Water suitable for human consumption.

**Pressure Zone:** A portion of the water system that operates from sources at a common hydraulic elevation. For example, the 125 Zone refers to the City's lower pressure zone, which has reservoirs with an overflow elevation of 125 feet.

**Purveyor:** An agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or persons or other entity owning or operating a public water system. Purveyor also means the authorized agents of such entities.

**Supply:** Water that is delivered to a water system by one or more supply facilities, which may consist of supply stations, booster pump stations, springs, and wells.

**Storage:** Water that is "stored" in a reservoir to supplement the supply facilities of a system and provide water supply for emergency conditions. Storage is broken down into the following five components which are defined and discussed in more detail in **Chapter 7**: operational storage, equalizing storage, standby storage, fire flow storage, and dead storage.

**LIST OF ABBREVIATIONS**

The abbreviations listed **Table 1-3** are used throughout this WSP.

**Table 1-3  
Abbreviations**

<b>Abbreviation</b>	<b>Description</b>
ADD	Average Day Demand
AWWA	American Water Works Association
CCR	Consumer Confidence Report
CIP	Capital Improvement Program
City	City of Stanwood
County	Snohomish County
DBP	Disinfection By-Product
DOH	Department of Health
DSL	Distribution System Leakage
EPA	Environmental Protection Agency
ERU	Equivalent Residential Unit
fps	feet per second
GMA	Growth Management Act
gpm	gallons per minute
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDD	Maximum Day Demand
MG	Million Gallons
MGD	Million Gallons per Day
mg/l	milligrams per liter
OSHA	Occupational Safety & Health Administration
PHD	Peak Hour Demand
psi	pounds per square inch
PUD	Snohomish County Public Utility District
SDWA	Safe Drinking Water Act
SOC	Synthetic Organic Chemical
SWTR	Surface Water Treatment Rule
THM	Trihalomethane
UGA	Urban Growth Area
USGS	United States Geological Survey
VOC	Volatile Organic Chemical
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety & Health Act

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