Chapter 1 - Introduction

Purpose and Scope

This report presents the results of a Water System Master Plan (WSMP) intended to provide current information on which future operations the City of Stanfield's municipal water system can be based. This WSMP is also intended to satisfy the criteria of the Oregon Health Authority - Drinking Water Services (DWS) and Oregon Administrative Rule 333-061-0060. DWS requires communities with at least 300 connections to maintain a current WSMP that evaluates the water system needs for at least a 20-year period. The City's last WSMP was prepared in 1998; therefore, this WSMP is intended to fulfill DWS requirements for a current WSMP. Preparation of this WSMP was authorized by agreement between the City and Anderson Perry & Associates, Inc. (AP), dated August 17, 2016. The purposes of this WSMP are to develop water system design criteria for a 20-year planning period, develop design standards and service goals for the planning period, identify present and future system needs, and develop improvement alternatives to address any identified deficiencies.

Organization of Study

This WSMP is divided into seven main chapters with an Executive Summary. Specifically, the WSMP includes the following:

A. The Executive Summary of the overall WSMP describes water quality and service goals (design criteria), present and future water system deficiencies, the City's selected improvements for achieving the goals and correcting the deficiencies, and the recommended implementation schedule and financing program for constructing improvements.

B. Chapter 1, "Introduction," discusses the objectives of the WSMP, describes the community and environment, and provides a brief history of past development and operation of the City's water system.

C. Chapter 2, "Water System Requirements," develops the data upon which recommended improvements to the water system are based. Data relating to elements such as service area, population, land use, water use, fire flows, state and federal regulations, and the design criteria developed for this WSMP are presented. A description of the water quality and level of service goals (design criteria) for the water system considering existing and anticipated future regulatory requirements, non-regulatory water quality needs of water users, flow and pressure requirements, capacity needs related to water use, and fire flow needs is also provided.

D. Chapter 3, "Water Supply," discusses the operation and capacity of the existing water supply system with respect to existing and future system demands and regulations. Information concerning water rights and permits for the appropriation of water from various sources is presented.

E. Chapter 4, "Water Storage," discusses the existing storage reservoirs and presents the four primary components of water storage relative to the City's design criteria.

F. Chapter 5, "Distribution System," presents information related to the existing distribution system facilities, water quality test results, and fire protection information. Results from computer modeling of the system are presented. Existing deficiencies and deficiencies likely to develop during the planning period are identified. Improvements to address the identified deficiencies are recommended.

G. Chapter 6, "Recommended Water System Improvements and Capital Improvements Plan," presents information related to water supply, storage, and distribution system improvements developed through the analysis of the system. Recommended improvements are prioritized in a Capital Improvements Plan. Cost estimates are developed for each recommended water system improvement.

H. Chapter 7, "Project Financing and Implementation," provides a description of alternatives to finance water system improvements including local financing such as user rates, taxes, and financing assistance programs. Operation, maintenance, and replacement costs are projected for both the existing system and future system improvements. Potential water rate needs are developed and rate implementation procedures are identified. A recommended water system improvement implementation process, including an evaluation of financing alternatives and identification of key implementation steps, is also provided.

I. The appendices contain key materials referenced in this WSMP, which are provided for future reference by City staff. This information includes well log and water rights information, testing results, applicable ordinances, and other applicable water system information.

Sources of Information

The conclusions and recommendations outlined in this WSMP are based on data, information, and records provided by the City. This information includes, in part, past flow records (supply and usage); financial data (operational cost, revenues, and cost distribution); descriptions of system operation, condition of system components, and identification of problem areas; water quality data; and system layout and sizing. The recommendations and conclusions are, therefore, dependent on the completeness and accuracy of the information provided.

Review and Updating of Water System Master Plan

This WSMP should be periodically reviewed and updated to stay current with population growth, water system demands, and changing state and federal regulations. This WSMP is recommended to be reviewed at 5-year intervals and be updated at 10-year intervals, or as growth dictates.

Objectives of Water System Master Plan

The primary objectives of this WSMP are to provide the following information:

1. Establish planning criteria including service area boundaries; population growth projections; past, present, and future water usage patterns; fire flow requirements; federal and state standards; system pressures; and service goals.

2. Analyze the individual components of the existing water supply system considering capacity, compliance with current water quality standards, water rights, condition of components,

operational dependability, and cost of operation. Develop the water supply needs for the planning period and identify cost-effective alternatives for meeting long-term water needs including alternatives for correcting existing system deficiencies.

3. Analyze the existing water storage facilities considering capacity, condition of the reservoirs, and distribution system pressures. Assess the City's storage capacity considering operational storage, equalization storage, emergency storage, and fire flow storage. Identify the storage requirements of the water system for the planning period.

4. Review the condition and adequacy of the distribution system piping utilizing existing distribution system maps and City records. Identify system deficiencies and alternatives for meeting current and future system needs. Provide estimated costs for implementation of recommended improvements.

5. Analyze hydraulic capacity and system pressures in the existing water distribution system under average daily and peak daily demand conditions using a computer model. Identify distribution system deficiencies such as low system pressures, low fire flow capacities, dead-end or undersized lines, etc. Identify opportunities for distribution system improvements to address any noted deficiencies.

6. Review the status of the existing Water Department financial condition considering historical water system revenues, operation and maintenance (O&M) costs, and debt service including the adequacy of existing water user fees. Project the future cost of O&M, capital improvement investments, and debt service for the water system. Develop a financing plan for meeting long-term system needs, including general user rate charges and outside financial assistance.

7. Provide information on potential state and federal grant and loan programs that may be available to assist the City in implementing any necessary system improvements.

8. Prepare a summary identifying current and future water system needs with their associated estimated cost. Make recommendations for meeting the water system needs for the planning period.

9. Provide an implementation schedule for recommended water system improvements outlining the key steps the City would need to undertake to implement the improvements.

Location

The City of Stanfield is located on U.S. Highway 395, between Interstate 84 (I-84) and the City of Hermiston, Oregon, as shown on Figure 1-1. Because the City is also located on an east-west railroad line near Hinkle (a major railroad switching yard) and near the Columbia River, it is ideally located with respect to freeway and railroad transportation.

Environment

Topography and Drainage

The City of Stanfield is located in the northwest portion of Umatilla County. The general topography is relatively flat near the river with gently rolling hills away from the river floodplain. The prevailing

topographical feature is the Umatilla River with rolling hills on its north and east sides. The Umatilla River originates in the Blue Mountains in eastern Oregon and drains into the Columbia River at the City of Umatilla.

A portion of the City lies within the 100-year floodplain defined by the National Flood Insurance Program of the Federal Emergency Management Agency as shown on Figure 1-2. A designated floodway passes through the center of the City and is labeled as a special flood hazard area. This area is subject to flooding by the 100-year flood. The floodway shown on the figures should be kept free of encroachment so the 100-year floodwaters can be carried without substantial increase in flood heights.

Climate

In the summer the climate is typically dry with clear days. Winter brings snow and frozen soils. According to the Western Regional Climate Center, temperatures vary from an extreme minimum of -16° Fahrenheit (F) to an extreme maximum of 110° F, and the average annual precipitation in Stanfield is approximately 7.82 inches. Windy conditions are quite common during most of the year due to the City's proximity to the Columbia River Gorge.

Soils

The soils in the Stanfield area are generally well-drained and suitable for agriculture. Soils are predominantly silts or gravels, depending on the specific location. Four main types of soil are present in the floodplain areas. The Umatilla River floodplain areas (Umatilla Meadows) are largely Powder silt loam or Pedigo silt loam, and the Stage Gulch Ditch floodplain areas are mainly Esquatzel silt loam or Kimberly fine sandy loam.

Because nearly all of the soil types in the Stanfield area provide agricultural opportunity and irrigation water is readily available, the land is used extensively for agricultural or grazing purposes.

Water System History

General

The majority of historical information for the water system was obtained from City records and the 1998 WSMP. According to the 1998 WSMP, the City's original water system was constructed in 1920 and was improved in the 1960s, 1970s, and 1980s. The original system consisted of a well located at the present police station site (no longer in use), the elevated Reservoir No. 1, and installation of 4-inch diameter steel water lines throughout the City.

Previous Studies

The last WSMP written for the City of Stanfield was completed in 1998 by AP. The primary recommendation of the 1998 WSMP was to build a new well to provide an additional water supply source, construct a new reservoir to increase available water storage, and increase distribution system capacities. The Water Management and Conservation Plan for Stanfield was completed in 2016 by AP, and also provided recent data for this WSMP.

Water Supply Sources

The current water supply for the City of Stanfield consists of five sources. The first source, Well No. 3, is the oldest water supply well currently in use by the City. The well was originally constructed in 1959. Several improvements to the well have been completed to improve capacity. Currently, the well is used during peak demand periods as a supplemental source.

The second source was constructed in 1978 and is referred to as Well No. 4. This well was the primary water supply for the City until construction of Well No. 5 in 2013. Well No. 4 has experienced water quality issues and caving. Currently, the well is utilized as a supplemental source during peak demand periods.

The Pilot Well was built in 1995 to serve the Pilot Travel Center located adjacent to I-84. As part of the water system improvements completed in 2013 and 2014, the well was connected to the City system to be operable in case of an emergency. The well was constructed with a removable 6-inch casing to allow the well to be deepened and enlarged in the future.

In response to recommendations from the 1998 WSMP, Well No. 5 was constructed in 2013 to a depth of 1,116 feet. Well No. 5 is adjacent to the Pilot Travel Center. Since its construction in 2013, Well No. 5 has been the main source of municipal water for the City.

In addition to the four wells utilized for drinking water supply, the City has an irrigation well referred to the Railroad Well (Well No. 2). The well was originally constructed in the 1940s for the Union Pacific Railroad. Due to the shallow depth of the well, it is believed the well could have water quality issues in the future. The City utilizes the well to irrigate Coe City Park, which relieves park irrigation demand from the other municipal wells.

Water Storage Reservoirs

The City of Stanfield has three water storage reservoirs. Reservoir No. 1 was built as part of the original water system in 1920. It has a 50,000-gallon storage capacity. Due to issues with leaks and structural integrity, the reservoir has been taken out of service. The City would like to maintain the reservoir as a landmark. Recommendations to rehabilitate Reservoir No. 1 are included in Chapter 5.

Reservoir No. 2 is a 625,000-gallon ground-level welded steel reservoir constructed in 1976. Recently recoated as part of the 2013 improvements, the reservoir is located in north Stanfield. The reservoir is filled by Reservoir No. 3 or Well No. 4. Water from Reservoir No. 2 is pumped via the North Stanfield booster pump station into the North Stanfield pressure zone of the distribution system.

Reservoir No. 3 is a 1,000,000-gallon ground-level welded steel storage reservoir constructed in 2014. Reservoir No. 3 is located in South Stanfield near the Pilot Travel Center and adjacent to Well No. 5. Water from Well No. 5 and the Pilot Well is used to fill Reservoir No. 3. Water from Reservoir No. 3 is provided to the distribution system and Reservoir No. 2 via the booster pump station located adjacent to the reservoir (South Stanfield booster pump station). Reservoir No. 3 and the South Stanfield booster pump station serve both the Old Town and South Stanfield pressure zones. The locations of the primary components of the water system including the wells, reservoirs, and booster pump stations are shown on Figure 1-3.

Distribution System

The City's distribution system consists of lines that vary in size from 2 to 16 inches in diameter. Some of the older pipes are steel and the newer pipes are primarily polyvinyl chloride. The majority of the City's water main lines were installed with the development of the water system in 1920. However, distribution system improvements have been made in recent years to improve flow and pressure in the system. The distribution system is generally laid out with looped piping to assist with water circulation throughout the system. The City indicated that water lines in the distribution system are generally in fair condition. The distribution system is discussed in more detail in Chapter 5.

PROJECT LOCATION

VICINITY MAP

WATER SYSTEM SERVICE AREA BOUNDARY

STANFIELD

Hinkle Yards

URBAN GROWTH BOUNDARY

CITY LIMITS

To Hermiston

U.S. HWY 395

To Boardman

INTERSTATE 84/US HWY. 30

To Pendleton

To Echo

Umatilla Meadows

Echo Meadows

Pleasant View Cem

Rest Area BM 581

BM 581 Rest Areas

Mile 20

Mile 21

Mile 25

T. 3-4 N., R. 29 E., W.M.

SCALE IN FEET

2000 1 2 0 2000

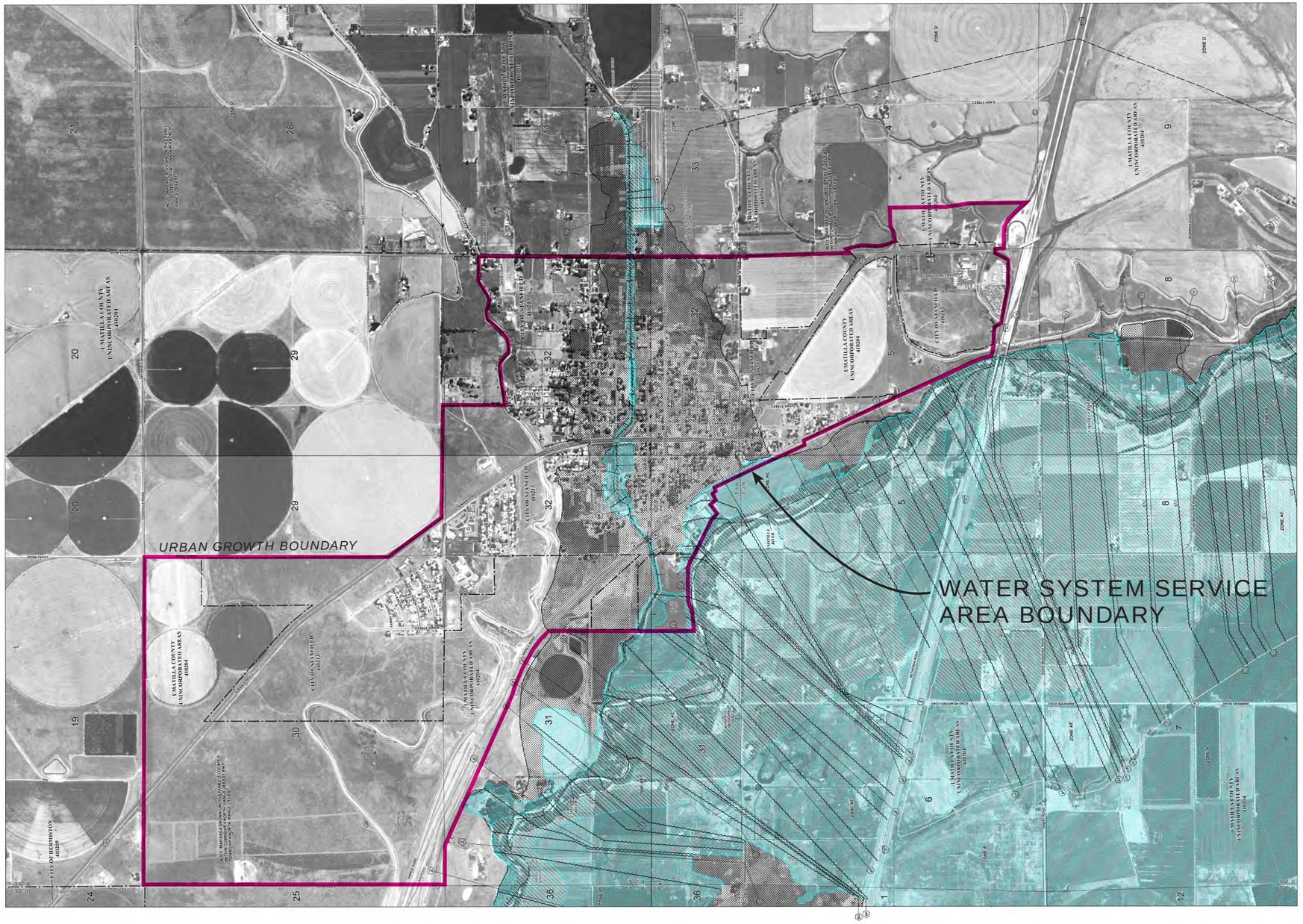
CITY OF
STANFIELD, OREGON
WATER SYSTEM MASTER PLAN

LOCATION AND VICINITY MAPS

anderson perry & associates, inc.

FIGURE
1-1

Job# 339-102-020 Mar. 16, 2017 lbauer



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line

FLOOD INFORMATION OBTAINED FROM FIRM (FLOOD INSURANCE RATE MAP) UMATILLA COUNTY, OREGON
MAP NO. 41059C0611G - SEPT. 3, 2010
MAP NO. 41059C0612G - SEPT. 3, 2010
MAP NO. 41059C0613G - SEPT. 3, 2010
MAP NO. 41059C0614G - SEPT. 3, 2010

T. 3-4 N., R. 29 E., W.M.

SCALE IN FEET

2000 0 2000

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CITY OF
STANFIELD, OREGON
WATER SYSTEM MASTER PLAN

FLOODPLAIN MAP

FIGURE
1-2

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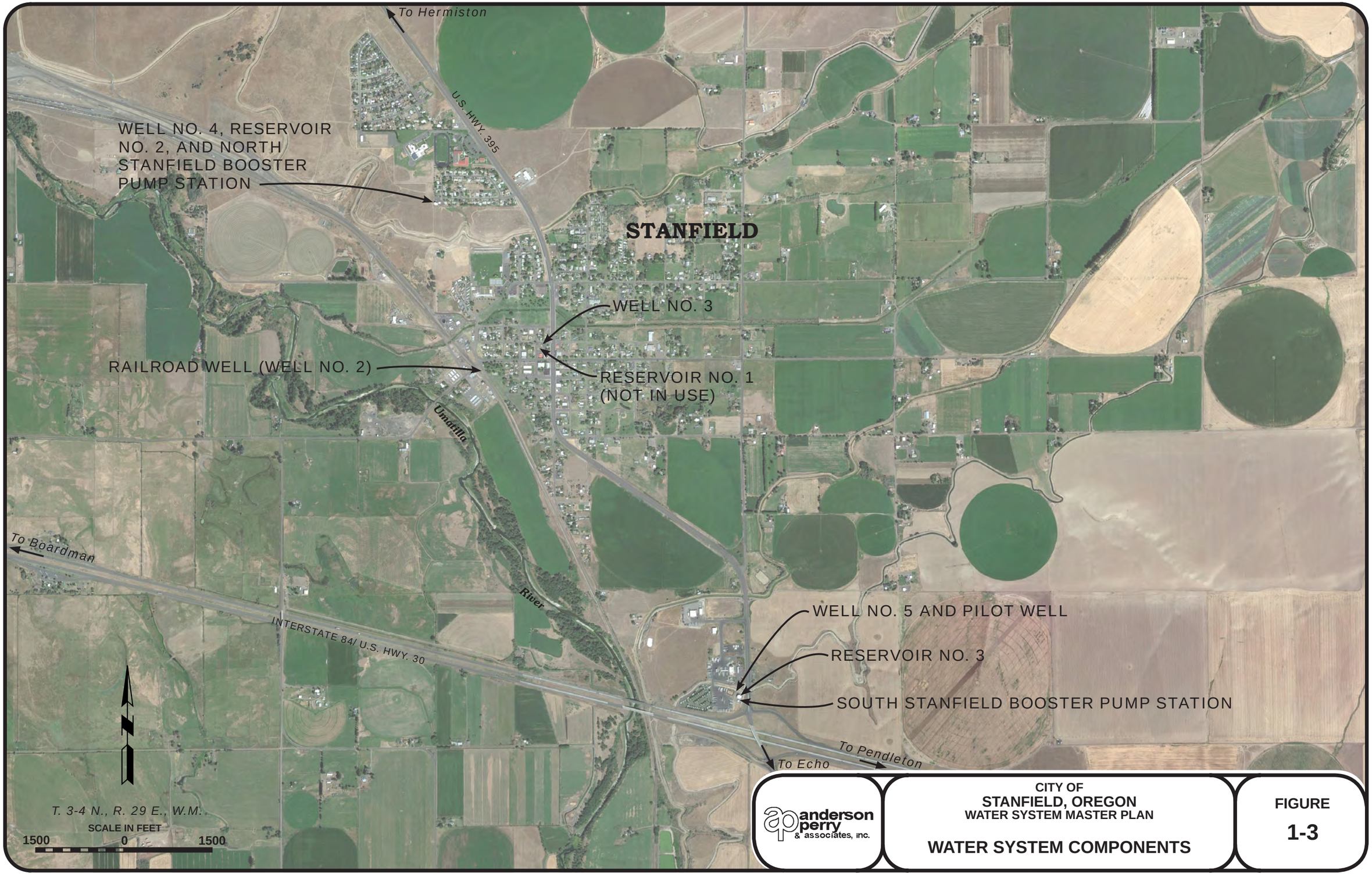

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CITY OF
STANFIELD, OREGON
WATER SYSTEM MASTER PLAN

WATER SYSTEM COMPONENTS

FIGURE
1-3

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