Mid-Coast Water Resources Characteristics

Built Systems

Version 2

Mid-Coast Water Planning Partnership

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2.3 Built Systems

2.3.1. Introduction

This report describes the water-related built systems (potable water, wastewater, and stormwater infrastructure) in the Mid-Coast. Potable (drinking) water, wastewater, and stormwater systems are critical for the health of humans and the economy. These systems also depend on and affect the environment.

The Mid-Coast Place Based Planning Partnership (Partnership) has created this report to help develop a common understanding of water resources characteristics, uses, and needs in the Mid-Coast region. The contents of this report are based on best readily available information. This report is part of a larger report that builds a foundation of understanding of the ecology, water quality, water quantity, and water-related built systems in the Mid-Coast with the purpose of helping balance the instream and out-of-stream water needs in the region.

Given that built systems depend on and influence water quantity, water quality, and ecology, readers of this report are encouraged to read the Water Quantity, Water Quality, and Ecology reports of the Mid-Coast Water Resources Characteristics report for additional information.

The following are notable findings about built systems on the Mid-Coast:

- The Mid-Coast has 52 potable water providers, 31 of which are required to have certified water treatment plant (WTP) operators. These 52 water providers include cities, water districts, RV and mobile home parks, and state parks.
- Few interconnections exist between water providers.
- Many cities and water districts implement water conservation measures, and nine have developed Water Management and Conservation Plans (WMCPs).
- The Mid-Coast has 14 entities (cities, resorts/hotels, and industries) with National Pollutant Discharge Elimination System (NPDES) permits to discharge treated wastewater.
- Discharge locations are the Pacific Ocean, Yaquina River and Bay, Siletz River and Bay, Schooner Creek, and Lint Slough. The discharge locations on streams are all downstream of potable water intakes.
- Information about wastewater systems and, particularly stormwater systems, is lacking. Cities are likely the only water providers managing stormwater systems.
- The Mid-Coast, like much of the rest of the United States, has aging infrastructure and insufficient revenue to address many needed upgrades. Consequently, water systems in the Mid-Coast must be managed for resiliency and recovery.

2.3.2. Built Systems Overview

2.3.2.1 Potable (Drinking) Water Systems

Potable water systems consist of the points of diversion/points of appropriation, raw water and finished water distribution systems, and water treatment plants (WTPs). WTPs remove contaminants from raw water to produce water that is considered safe for human consumption. Most community water systems with surface water sources use the following water treatment steps: coagulation and flocculation, sedimentation, filtration, and disinfection (Centers for Disease Control and Prevention, 2018). The coagulation and flocculation step involves adding chemicals with a positive charge to the water, which neutralize the negative charge of dirt and other dissolved particles. This enables the particles to bind with the chemicals and form larger particles called floc. The sedimentation step involves the floc settling to the bottom of the water supply as a result of its weight. Filtration involves passing the water above the settled floc through filters to remove dissolved particles, such as dirt, parasites, bacteria, viruses, and chemicals. Disinfection involves adding a disinfectant (e.g. chlorine or chloramine) to the filtered water to kill any remaining parasites, bacteria, and viruses to protect the water from these contaminants when the water travels through the water distribution system.

Potable water systems are classified as small water, water distribution, or water treatment based on size and complexity, as determined by the Oregon Health Authority-Drinking Water Services (OHA-DWS). A water system is classified as a Small Water System if it has fewer than 150 connections and either uses only groundwater as its source or it purchases water that needs no further treatment after reaching the purchasing system. Distribution systems, with four levels of complexity, are classified on the basis of population served. WTP classification, also with four levels of complexity, is based on a point system assigned to reflect the complexity of the treatment process used at the plant. A filtration endorsement is required for treatment plants that use conventional filtration. These classifications are used to determine the qualifications required of personnel who are directly responsible for each water system. (Oregon Health Authority/DEQ Certification Programs for Water and Wastewater System Operators, http://www.oregon.gov/deq/FilterDocs/CertProgram2017.pdf).

A list of the 31 Mid-Coast drinking water providers that are required to have certified WTP operators according to Oregon Health Authority are shown in **Exhibit 1**. The water system infrastructure, water conservation measures, and finances of these drinking water providers are detailed later in this report. **Appendix A** shows the source waters of most of these drinking water providers. The 21 drinking water providers that are not required to have certified WTP operators are shown in **Exhibit 2**.

Exhibit 1. List of Drinking Water Providers with Certified Water Treatment Plant Operators Required (as of September 2017).

PWS ID	PWS Name	Owner Type	Connections	Population Served	Primary Source	City (Nearest)
OR4100564	BAY HILLS WATER ASSOCIATION	Private	19	45	SW	NEWPORT
OR4100568	BEVERLY BEACH WATER DISTRICT	Local Government	124	150	SW	NEWPORT
OR4100565	CARMEL BEACH WATER DISTRICT	Local Government	17	61	GW	NEWPORT
OR4100254	DEPOE BAY, CITY OF	Local Government	1,084	1,398	SW	DEPOE BAY
OR4192040	EDDYVILLE CHARTER SCHOOL	Local Government	1	200	GW	EDDYVILLE
OR4105252	FALL CREEK WATER DISTRICT	Private	48	50	GW	ALSEA
OR4100602	GUPTIL SUBDIVISION	Private	20	28	GW	OTIS
OR4100482	HILAND WC - BEAR CREEK	Private	108	275	SW	OTIS
OR4100722	HILAND WC - BOULDER CREEK	Private	140	350	GU	OTIS
OR4100605	HILAND WC - ECHO MOUNTAIN PARK	Private	143	362	GW	OTIS
OR4100601	HILAND WC - RIVERBEND PARK WATER SYSTEM	Private	78	172	GW	OTIS
OR4100567	HILAND WC - WESTWOOD	Private	81	120	GW	OTIS
OR4101527	INN AT OTTER CREST	Private	144	291	SWP	OTTER ROCK, BETWEEN DEPOE BAY AND NEWPORT
OR4101072	JOHNSON CREEK WATER SERVICE	Private	2	363	SW	BETWEEN DEPOE BAY AND NEWPORT
OR4100324	KERNVILLE-GLENEDEN-LINC BCH WD	Local Government	2,378	5,598	SW	GLENEDEN BEACH
OR4101345	KOZY ACRES WATER SYSTEM	Private	19	40	GW	WALDPORT
OR4100483	LINCOLN CITY WATER DISTRICT	Local Government	6,184	20,830	SW	LINCOLN CITY
OR4101428	LOWER SILETZ WATER SYSTEM	Private	155	158	SWP	LINCOLN CITY
OR4100566	NEWPORT, CITY OF	Local Government	4,850	10,160	SW	NEWPORT
OR4100608	OTTER ROCK WATER DISTRICT	Local Government	139	125	GW	NEWPORT
OR4100603	PANTHER CREEK WATER DISTRICT	Local Government	350	700	SW	OTIS
OR4100929	RIVERSIDE MOBILE PARK	Private	22	32	GW	SEAL ROCK, BETWEEN NEWPORT AND WALDPORT
OR4100606	SALMON RIVER MOBILE VILLAGE	Private	38	75	GW	OTIS

Exhibit 1. List of Drinking Water Providers with Certified Water Treatment Plant Operators Required (as of September 2017) Continued.

PWS ID	PWS Name	Owner Type	Connections	Population Served	Primary Source	City (Nearest)
OR4192048	SALMON RIVER RV PARK	Private	45	69	GW	OTIS
OR4101528	SEA CREST	Private	36	72	SWP	BETWEEN DEPOE BAY AND NEWPORT
OR4100798	SEAL ROCK WATER DISTRICT	Local Government	2,531	~5,000 static; ~8,000 in summer	SWP	SEAL ROCK
OR4100821	SILETZ, CITY OF	Local Government	480	1,200	SW	SILETZ
OR4100925	SW LINCOLN CO WATER PUD	Local Government	1,258	3,000	SW	WALDPORT
OR4100899	TOLEDO WATER UTILITIES	Local Government	1,369	3,645	SW	TOLEDO
OR4100926	WALDPORT, CITY OF	Local Government	1,318	2,080	SW	WALDPORT
OR4100966	YACHATS, CITY OF	Local Government	853	1,000	SW	YACHATS

Exhibit 2. List of Drinking Water Providers without Certified Water Treatment Plant Operators (as of September 2017)

PWS ID	PWS Name	Owner Type	Connections	Population Served	Primary Source	City (Nearest)
OR4192033	BOILER BAY RV PARK	Private	28	20	GW	DEPOE BAY
OR4100480	CALKINS ACRES IMPROVEMENT INC	Private	53	10	GW	LINCOLN CITY
OR4192023	DRIFT CREEK CAMP	Private	1	28	GW	SHERIDAN
OR4192038	DRIFT CREEK LANDING	Private	15	35	SW	WALDPORT
OR4193606	FIR RIDGE CAMPGROUND	Private	31	35	GW	BLODGETT
OR4192022	HAPPY LANDING RV PARK/MARINA	Private	9	25	GW	WALDPORT
OR4194280	KING SILVER RV PARK	Private	12	30	GW	WALDPORT
OR4192024	LINCOLN CITY KOA	Private	81	162	GW	OTIS
OR4192053	LINCOLN CO PKS-MOONSHINE PARK	Local Government	2	25	GW	NEWPORT
OR4192052	MAD DOG COUNTRY TAVERN	Private	4	25	SW	NEWPORT
OR4192055	OLALLA VALLEY GOLF COURSE	Private	1	40	GW	TOLEDO
OR4191052	OPRD BEVERLY BEACH STATE PARK	State Government	1	200	SW	NEWPORT
OR4191053	OPRD ELLMAKER STATE PARK	State Government	1	249	GW	NEWPORT
OR4191959	OPRD HB VAN DUZER STATE PARK	State Government	2	500	GW	LINCOLN CITY
OR4192028	OTIS JUNCTION WATER SYSTEM	Private	5	370	GW	OTIS
OR4192036	ROVERS RV PARK	Private	3	27	GW	WALDPORT
OR4192061	SAWYERS LANDING RV PARK	Private	1	25	SW	NEWPORT
OR4192063	TAYLORS LANDING RV PARK	Private	11	62	GW	WALDPORT
OR4192717	USFS BLACKBERRY CG	Federal Government	11	27	GW	WALDPORT
OR4192726	USFS CAPE PERPETUA VISITOR CTR	Federal Government	3	1,250	GW	REEDSPORT
OR4192034	WESTWIND STEWARDSHIP GROUP	Private	5	150	GW	OTIS

2.3.2.2 Wastewater Systems

Overview

Wastewater systems consist of wastewater collection systems (i.e. sewer systems), wastewater treatment plants (WWTPs), effluent discharge infrastructure, and effluent recycling systems (e.g. biosolid land application). Effluent is the treated liquid that comes out of the treatment plant after completion of the treatment process (EPA, 2004). Wastewater is water no longer needed or suitable for its most recent use. The three major components of wastewater are base wastewater flow, groundwater infiltration, and rainfall derived inflow and infiltration (I&I) (EPA, 2014). Inflow refers to surface water that enters the collection system, such as from drains and manhole covers. Infiltration refers to groundwater that enters sewer systems as a result of infrastructure failures. Storms increase the amount of I&I of excess water to the WWTP that does not require treatment, effectively reducing the efficiency and capacity of the WWTP.

Wastewater treatment is used to speed up the natural process by which water is purified (EPA, 1998). WWTPs treat wastewater in two stages, primary and secondary. In the primary stage, wastewater first flows through screen that removes large floating objects that might clog equipment. Next, the wastewater passes through a grit chamber where sand and small stones settle to the bottom. Then the wastewater moves into a sedimentation tank in which suspended solids gradually sink to the bottom and form a mass of solids called raw primary biosolids, or sludge. These biosolids are typically removed from tanks by pumping, and they may be further treated for use as fertilizers, disposed of in a landfill, or incinerated. In the secondary stage, biological processes are used to further purify wastewater. Approximately 85 percent of organic matter in sewage is removed in the stage using bacteria. The secondary stage often uses the activated sludge process, which involves pumping water from the sedimentation/settling tank in the primary stage into an aeration tank where the wastewater is mixed with air and sludge loaded with bacteria, and then left alone for several hours to allow bacteria to break down organic matter into harmless byproducts. This mixture, or sludge, is now activated with billions of bacteria and some of it can be used again by returning it to the aeration tank for mixing with air and new wastewater. After the aeration tank, the partially treated wastewater flows to another sedimentation tank for removal of excess bacteria (EPA, 1998), and scum (e.g. grease, oils, plastics, and soap) (USGS, 2016). Finally, effluent from the sedimentation tank is typically disinfected with chlorine, ultraviolet light, or ozone before the effluent is discharged into waters. For more information about wastewater treatment, visit: https://www.epa.gov/sites/production/files/2015-09/documents/primer.pdf

Wastewater systems are classified by the Oregon Department of Environmental Quality (DEQ) as collection or treatment, and at one of five levels based on a system's size, complexity, and degree of difficulty to operate. These classifications establish the certificate type and grade level requirement for the operator. Some entities have both a collection system and treatment system classification, while others have only one type of system. **Appendix B** shows DEQ's classification of wastewater systems.

Wastewater Discharge

Wastewater discharged from WWTPs into the environment is regulated by DEQ through the NPDES permit program. Under this program, DEQ periodically conducts "mixing zone" studies related to discharge permits for municipal WWTPs. Results of these studies are used in evaluating water quality impacts of WWTPs and for discharge permit condition development (during permit issuance/re-issuance). Results of these studies can be provided on a case-by-case basis upon request (personal communications: D. Waltz, DEQ; Written DRAFT October 3, 2017).

NPDES permittees collect discharge monitoring data according to Schedule B of their permit and submit reports to DEQ at the required frequency (generally, monthly for NPDES Domestic permit holders). The permit program has migrated to an online reporting system for permittees and agency discharge monitoring report (DMR) review, starting with "major" dischargers. Given that the NPDES electronic data reporting effort is actively in development, DEQ will provide more information on accessing this information for Oregon in the near future (personal communications: D. Waltz, DEQ; Written DRAFT October 3, 2017).

Occasionally, the wastewater system is unable to treat the water that enters the wastewater system, such that some wastewater is forced out of the system without treatment, which results in sanitary sewer overflows (SSO, or overflow events) into creeks, the ocean, and neighborhoods. **Appendix C** contains DEQ's Sanitary Sewer Overflows form, which must be submitted to DEQ following an overflow event.

Exhibit 3 presents the 14 NPDES permits in the Mid-Coast and any listed overflow events in the permits. Details of the dates of the NPDES permits are found in the descriptions for each entity listed later in this report. **Appendix D** shows the effluent discharge locations.

Exhibit 3. NPDES Permit Discharge Locations, Discharging Entities, and Overflow Events.

Effluent Discharge Location(s)	Entity Discharging	Overflow Events[1]
Primary: Schooner Creek RM 1.1; Emergencies -- NW 40th and Jetty: Pacific Ocean (multiple), Devils Lake (multiple), unnamed Creek, ground surface (multiple), Coble Creek/Pacific Ocean, Baldy Creek/Pacific Ocean, Schooner Creek, Siletz Bay (see City of Lincoln City description for details)	City of Lincoln City	
Siletz River, River Mile 36.9	City of Siletz	As of 2004, due to high levels of inflow and infiltration within the collection system, sanitary sewage overflows occur during heavy rainfall in the winter (December 2001 noted)
Siletz Bay via Sijota Creek, RM 0.0	Salishan	No permit exceedance.
Treated wastewater: Pacific Ocean RM 188; Emergency Overflows-- Schooner Creek, Pacific Ocean (multiple locations),Yaquina Bay (multiple locations) (see City of Newport description for details)	City of Newport	
Pacific Ocean, Yaquina River RM 13	Georgia Pacific	At Yaquina River emergency overflow outfall: 2000, 1998 (two) exceeded permit limits; 2003 exceeded pH and TSS limitation
Yaquina Bay RM 2.5	Hatfield Marine Science Center – OSU	April 2000 chlorine exceedance
Yaquina River RM 2	Trident Seafoods	
Yaquina River RM 3.3	Port of Newport	None listed
Yaquina River RM 2.3, 2.4	Yaquina Bay Fruit Processing	None since permit issuance.
Yaquina River RM 13.7	City of Toledo	None listed
Lint Slough (Alsea subbasin), River Mile 0.6, where the Alsea Highway crosses Lint Slough	City of Waldport	Violations occurred in 1993, 1994 (3), 1995 (2), 1996, 2002
Pacific Ocean, 300 feet from Ocean View Drive bluff; 10 inch diameter pipe	City of Yachats	4 since the last permit renewal (2004, 2006, and 2007 occurred before the new WWTP and pump station upgrades; 2009 due to loss of electrical power to one of the pump stations; 2008: raw sewage overflow to the Yachats River)
Heavy surf zone of the Pacific Ocean; 6 feet from shore at a depth of approximately 4 feet, submerged at all times	City of Depoe Bay	As of 2011, no sanitary sewer overflows the City's system since the last permit renewal in March 2003.
Pacific Ocean	Inn at Otter Crest	2009 exceeded pH, 2010 exceeded fecal coliform

[1]As per NPDES permits. Reported overflow incidents reported to DEQ are not included in this table and are a current data gap.

The EPA website/database **Enforcement and Compliance History Online (ECHO)** is a public access website to data stored in the U.S. Environmental Protection Agency's (EPA) compliance and enforcement data systems, including Integrated Compliance Information System (ICIS)-NPDES for facilities regulated under the Clean Water Act NPDES program. ECHO allows users to find and download information on permit data, inspections, violations, enforcement actions, and penalties: https://echo.epa.gov/. EPA also provides a series of webinars on ECHO: https://echo.epa.gov/help/training#Series (personal communications: D. Waltz, DEQ; Written DRAFT October 3, 2017).

Biosolids

Wastewater systems produce biosolids, or treated sewage sludge. Biosolids are the solids derived from primary, secondary, or advanced treatment of domestic wastewater that have been treated through one or more controlled processes to significantly reduce pathogens and reduce volatile solids or chemically stabilize solids to the extent that they do not attract disease vectors (DEQ, 2017). These solids are treated to meet state and federal requirements that allow for their beneficial use in land application activities. The land application of biosolids is regulated through biosolids management plans that are reviewed and approved by DEQ, and through detailed site authorization letters issued by DEQ.

Most Class B biosolids generated from domestic wastewater treatment facilities in Oregon are land applied on agricultural land and have some regulatory limitations. Class A biosolids are classified as exceptional quality (EQ) biosolids and may be land applied without regulatory limitations.

Detailed information about DEQ's Biosolids Program can be found at: http://www.oregon.gov/deq/wq/programs/Pages/Biosolids.aspx.

Recycled Wastewater

Some wastewater system operators produce recycled water. The Oregon Water Resources Department's (OWRD) revised water reuse rules substitute "recycled water" for "reclaimed water" because recycled water emphasizes the value of treated effluent as a state water resource and as an important sustainability activity. OWRD identifies four classes of disinfected recycled water and OWRD's Recycled Water Use Rules identified approved beneficial uses under the different recycled water classifications (beneficial purposes identified in rule by OWRD may not be authorized for use with a lower (i.e., treated) class of water. The classifications of recycled water and types of beneficial uses recycled water are presented in **Appendix E** and at: (http://www.oregon.gov/deq/Filtered%20Library/RecycledWater.pdf and http://www.oregon.gov/deq/FilterDocs/BeneficialUseChart.pdf).

2.3.2.3 Stormwater Systems

Stormwater systems collect precipitation (e.g., rainfall and snowmelt) in developed environments to avoid pooling and flooding. In the Mid-Coast, precipitation typically enters drains and then is conveyed through pipelines to outfalls, such as a stream or the ocean. Stormwater is not treated in the Mid-Coast and local stormwater system information is limited.

Sources for more information about stormwater management include:

- The Oregon Department of Transportation
  - http://www.oregon.gov/ODOT/GeoEnvironmental/Pages/Stormwater.aspx
- EPA
  - https://www.epa.gov/npdes/national-menu-best-management-practices-bmps-stormwater#edu

Examples of municipal stormwater management efforts include:

- The City of Portland, Oregon
  - https://www.portlandoregon.gov/bes/31892
- The City of Florence, Oregon
  - http://www.ci.florence.or.us/planning/stormwater-management-plan

2.3.2.4 Water Conservation

Water conservation is an important tool for reducing demand of water sources, particularly peak day demands that typically drive the need for major infrastructure upgrades. Water conservation includes measures related to infrastructure management and customer water uses. Many water providers are required by OWRD to develop a WMCP, which is designed to help water providers examine their water rights, current and future demands, water source reliability and adequacy, and water conservation program. Typically, OWRD requires WMCPs (1) as a condition of an extension of time for water use permits (an extension of time is needed when an amount of water authorized under the permit has not been put to full beneficial use at the date initially specified for complete beneficial use of the permitted water) and (2) for access to water under the permit that was not used as of the date initially specified for complete beneficial use. WMCPs are required to contain descriptions of progress implementing the following water conservation measures: annual water audit, system metering and meter maintenance, rate structures based in part on the quantity of water metered at service connections, leak detection and repair, and public education. Additional conservation measures must also be discussed, depending on the size the population served and the need to expand or initiate diversion of water under the extended permit. These additional measures could include: technical and financial assistance programs, supplier financed retrofit and replacement of existing inefficient water features, billing rate structures and schedules that encourage conservation, and water reuse, recycling, and non-potable water opportunities.

Currently, the Mid-Coast has nine water providers with WMCPs: the Cities of Depoe Bay, Lincoln City, Newport, Toledo, Waldport, and Yachats; Seal Rock Water District; Kernville-Gleneden Beach-Lincoln Beach Water District; and Southwest Lincoln County Water Public Utilities District. Other water providers voluntarily implement water conservation measures. Water provider descriptions later in this report include water conservation activities, which are categorized on the basis of OWRD's water conservation measures, noted above.

For more information on municipal water management and conservation planning in Oregon, visit: http://www.oregon.gov/owrd/pages/mgmt_muni_wmcp.aspx.

2.3.2.5 Financing

Potable water, wastewater, and stormwater infrastructure are critical to public and environmental health, public safety, and a vibrant economy. Meanwhile water utilities face major challenges, including: aging infrastructure built decades ago, costs of modernization that are too big given current utility revenues, infrastructure is vulnerable to earthquakes and other natural disasters capable of costly if not catastrophic disruptions, and lack of information sharing and coordination between agencies that discourage integrated solutions (Center for Sustainable Infrastructure, 2017). A huge funding gap exists for maintaining and improving existing water infrastructure. As described in the documentary *Liquid Assets* (Penn State Public Broadcasting, 2008), during the next 20 years the United States will have $540 billion of pipeline maintenance expenses that it cannot pay for under current spending levels, and pipelines are just one component water infrastructure (Penn State Public Broadcasting, 2008). The National Infrastructure Advisory Council (NIAC) estimates the gap between existing funding and funds needed nationally to maintain current water infrastructure service levels ranges from $400 billion to nearly $1 trillion (Center for Sustainable Infrastructure, 2017). This funding gap is the result of U.S. water customers paying less than 1 percent of their income for water; water rates do not recover the full costs of operating, maintaining, and expanding water system infrastructure. The NIAC also has found that raising additional revenue from taxpayers is often difficult because of long-held expectations by customers for water as a low-cost affordable service that does not account for true costs (Center for Sustainable Infrastructure, 2017). However, increasing the price of water cannot be the only solution to the funding gap as water-related services could become unaffordable and inaccessible to some populations. Globally, the United Nations General Assembly explicitly recognizes the human right to water and sanitation, and acknowledges that clean drinking water and sanitation are essential to the realization of all human rights (United Nations General Assembly, 2010), demonstrating worldwide consensus of the importance of potable water and sanitation. Thus, water system managers in the United States, including the Mid-Coast, have the difficult and monumental task of providing high-quality drinking water and sufficient sanitation while continually being underfunded.

As a consequence, water system managers in the Mid-Coast must focus on resiliency and recovery from challenges, such as infrastructure failures and natural disasters, rather than simply maintaining the current infrastructure as is. In other words, revenue is insufficient to maintain current water infrastructure as a whole, so water system managers must address deficiencies with the resources available, which means prioritizing projects to address the most pressing infrastructure concerns while putting off other lower priority, yet still important, infrastructure concerns. This report initially aspired to quantify the financial needs of operating and maintaining water system infrastructure in the Mid-Coast, but back-of-the-envelope estimates quickly made it apparent that the amount of funding needed is staggering and that a constant stream of major grants or loans would be necessary to repair and replace aging infrastructure. As a result, the available financial information in this report focuses on current revenue and expenditures to provide a snapshot of the magnitude of the revenue expenditures of water systems and does not address longer-term capital improvement needs. More details about finances of the water systems in this report, such as city budgets, can be found by visiting their websites and contacting their offices.

Water system managers have been, and must continue to be, creative in developing practical solutions that focus on resiliency and recovery. One potential strategy is developing and enhancing interconnections between water systems or other regional water supply projects. The scope of these challenges makes the Partnership's effort to identify regional water supply solutions a project of regional significance.

2.3.3. Built Systems in the Mid-Coast

2.3.3.1. Approach

Report Objectives

- To gain a general understanding of water infrastructure in the planning area
- To have an understanding of built system features that are particularly useful for water supply planning, such as:
    - The current major points of diversion
    - Locations of wastewater and stormwater discharge, as well as treatment capacity, how often permit is exceeded, instances of overflows
    - Existing interconnections between water systems
    - Potable WTP and WWTP capacities
    - Limitations on the ability to treat or move water
    - Useful life of major water system infrastructure
    - Current funding needs to address to ensure proper functioning of built systems
- To identify data gaps
- To ensure that potential water supply solutions consider capacities and deficiencies of existing water systems

Report Organization

This report begins by providing an overview of potable water, wastewater, and stormwater systems, as well as conservation programs and finances associated with the systems. Next, this report summarizes the Mid-Coast's potable water systems and wastewater discharge locations identified in NPDES permits. Then, this report describes the potable water, wastewater, and stormwater infrastructure (when applicable) maintained by each water provider with a certified WTP operator in the planning area, along with the water conservation efforts and finances of the water provider.

Report Data Sources (See Appendix F)

Terminology (See Appendix G)

Study Area

The Partnership defines the Mid-Coast as eight major drainage areas. From north to south, these include the Salmon River, Siletz Bay-Ocean Tributaries, Siletz River, Depoe Bay-Ocean Tributaries, Yaquina River, Beaver Creek-Ocean Tributaries, Alsea River, and Yachats River. In

addition to spanning most of Lincoln County, the planning area extends northward and eastward into portions of Tillamook, Benton, and Linn Counties to include the upper Salmon River, upper Siletz, and upper Alsea River watersheds. The Partnership also has prioritized the understanding of water resource characteristics of creeks that flow directly into the ocean and that serve as current or potential public water systems. The Water Quantity report contains more information about surface water and groundwater resources.

Disclaimer
This report attempts to present the most recent information available about built systems. However, infrastructure undergoes constant change, so the information becomes outdated as soon as reports are published if not earlier. Readily available information about individual water systems is uneven in nature. Thus, the data presented in this report are necessarily estimates. The information presented in this report is based on data collected in 2017 or previous years, as noted in some sources. Current water systems managers are the best source for up-to-date information about their specific operations.

2.3.3.2. Water-Related Infrastructure of Water Systems with Certified Water Treatment Plant Operators

The following are descriptions of entities with potable water systems that require certified WTP operators. When applicable and available, information about wastewater treatment systems, stormwater systems, water conservation programs, and finances of these entities are included.

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Bay Hills Water Association (Near Newport)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Intermittent stream dam, pump station to plant	1960, 1984	Reservoir intercepts intermittent stream and springs improved in 1984
Water Treatment Plant, capacity (mgd)	0.0288	1983	Rapid sand filtration, hypo chlorination; certified operator required, Distribution class: I, Treatment class: 2, filtration endorsement required
Storage reservoirs, total capacity (MG)	0.04	1983	
Pump Stations, # and capacity	Raw Water 20 gpm	1983	Dual alternating 5hp pumps to TP
Pipelines, total (feet/miles)	2000 feet	1960, 2012	1600 feet in new distribution system
Population	45		
Connections (#)	19		No additional taps permitted, insufficient water source in summer
Interconnections			
Challenges	Water Association		Volunteers only
Important notes			

Source: OHA, 2017; J. MacKown, personal communication, September 30, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit	Yes		Monthly review based on meter readings
Fully Metered System	Yes		New meters 2012
Meter testing and maintenance	No		
Water rates based, at least in part, on the quantity of water used	Yes		Only residential users first 1000 gallons included, $15 per 1000 gallons in excess
Leak detection and pipeline repair/replacement	No		Replaced mainlines and hydrants in 2012
Public education	Yes	Consumer Confidence Report	Tips provided in Consumer Confidence Report, bylaws spell out uses

Source: J. MacKown, personal communication, September 30, 2017

Finances

Type of Water Infrastructure	Financial Category	Funding FY 2016	Expenditures FY 2016	Number of Connections	Population
Potable Water	Total Operating Capital	$19,730	$10,676	19	45

Beverly Beach Water District (Near Newport)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Wade Creek		
Water Treatment Plant, capacity (mgd)			Rapid sand filtration, hypo chlorination, UV radiation; certified operator required, Distribution class: I, Treatment class: 2, filtration endorsement required
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	150		
Connections (#)	124		
Interconnections			
Challenges	Getting qualified plant operator and responsible treatment people who have necessary licenses. Not many want part time job. If we lose current people may have to turn over to state.		
Important notes	District is small so has high fixed cost to operate; lots of vacation rentals and some low income housing; infrastructure is old, many lines in since 1970's and not to any special code; issues with pulling straight out of creek in winter- heavy flows lots of sediment		

Sources: OHA, 2017; J. Barbay, personal communication, August 3, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit			
Fully Metered System			
Meter testing and maintenance			
Water rates based, at least in part, on the quantity of water used			
Leak detection and pipeline repair/replacement			
Public education			

Finances

Type of Water Infrastructure	Financial Category	Funding FY 2016	Expenditures FY 2016	Number of Connections	Population
Potable Water	Total Operating Capital			124	150

Fiscal Year Audit Report available at: https://secure.sos.state.or.us/muni/public.do

Carmel Beach Water District (Near Newport)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Spring A, Spring B	Approximately 1972	Groundwater
Water Treatment Plant, capacity (gallons per day)	3000 gpd (Spring A and Spring B combined)		Hypo chlorination (post) and GWR 4-log virus compliance mon for disinfection; certified operator required, distribution class: S, treatment class: none
Storage reservoirs, total capacity (MG)	Raw water gathering tank: 1500 G Chlorine Mixing Tank: 20 Finished water holding tank: 5,000 G design, 3,000-4,000 G current capacity	Approximately 1972	
Pipelines, total (feet/miles)	< 4 miles	Approximately 1972	
Population	61		
Connections (#)	17		
Interconnections	No		
Challenges	There have been no major infrastructure challenges at least the past 13 years. One ongoing challenge is that Carmel Beach Water District has no land ownership, so cannot add a water storage tank for fires and fire hydrants. The Water District currently has an easement on someone else's property to access the springs and the storage tanks.		
Important notes	When the Water District runs out of stored water		

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
	to meet demands, it purchases water from the City of Newport, which fills its tank. The Water District is run completely by volunteers.		

Sources: OHA, 2017; R. White, personal communication, September 6, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit	Yes	Typically conduct monthly water audits by comparing pump house readings to total metered consumption	The Water District checks pump house readings weekly.
Fully Metered System	Yes		Typical water use is 10,000 to 12,000 gallons per week
Meter testing and maintenance	Yes		
Water rates based, at least in part, on the quantity of water used	Yes	Pay monthly fee of $40, which includes an allotment of 5000 gallons per home; excess use that results in the need to purchase water from the City of Newport costs the price of the water purchased	
Leak detection and pipeline repair/replacement	Yes	Conducted by tracking and comparing meter readings	
Public education	Yes	The Water District shows	

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
		last month's use on water bills and contacts water users with high water usage; each spring the Water District sends a letter encouraging water conservation	
Technical and Financial Assistance programs	No		
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	No		
Water Reuse, Recycling, and Non-potable Water Opportunities	No		
Other			

Finances
Expenditures: Approximately $9,000 in a bad year in which the Water District must purchase from the City of Newport. The Water District has a little more than $20,000 in emergency reserve.

Fiscal Year Audit Report available at**:** https://secure.sos.state.or.us/muni/public.do

Type of Water Infrastructure	Financial Category	Funding FY 2016	Expenditures FY 2016	Number of Connections	Population
Potable Water	Total Operating Capital			17	61

See **Appendix H** for a schematic of the Water District's water systems.

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City of Depoe Bay

The City is situated in an excellent location along the Oregon coast for whale watching and has the smallest natural navigable harbor in the world, both of which help drive its tourist economy. The City's water delivery area population was estimated to be 1,489 in 2014. The water delivery area consists of the area within its urban growth boundary (UGB), the area formerly served by the now-dissolved Miroco Water District located south of the City, Boiler Bay State Park, and Rocky Creek State Park. The City's potable water supply comes from South Depoe Bay Creek, North Depoe Bay Creek, and Rocky Creek. When the WTP capacity is insufficient to meet demands, the City meets the shortfall by relying on water from the recently built North Reservoir. The City's WWTP serves the City and treats wastewater from the Gleneden Sanitary District. Wastewater is discharged in the ocean's heavy surf zone. As of 2011, the WWTP operates at 47 percent of capacity. The City has a stormwater system, but information about the system is lacking. See **Appendix I** for schematics/maps of the City's water systems.

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	South Depoe Bay Creek: pumped then conveyed 2,200 feet to the North Depoe Bay Creek impoundment when there is excess water (impoundment is used as a bulge in the system) or to the North Depoe Bay Creek transmission line near the WTP for immediate treatment; North Depoe Bay Creek: impounded then discharged at the impoundment outlet, flows 1500 feet using gravity to the WTP Rocky Creek: pumped then conveyed 8550 feet to the WTP		
Water Treatment Plant, capacity (mgd)	510 gpm, including water needed to operate the WTP, conduct backwashing, and de-sludge the clarifier	Upgraded in 1993	At times, the WTP cannot produce enough finished water to meet MDD; the new reservoir (North Reservoir) has alleviated this

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
			issue in the near-term
Water Treatment Plant, location	Within city limits between the North Depoe Bay Creek impoundment and the South Depoe Bay Creek intake		
Storage reservoirs, total capacity (MG)	1.7 MG total, North Reservoir: 1.2 South Reservoir: 0.5	North Reservoir: 2006 South Reservoir: 1979	City also has a 12,000-gallon fire storage tank and booster pumping station on Collins Street installed in the 1990s
Pump Stations, # and capacity	6 (South Depoe Bay Creek, Rocky Creek, Collins Street, Ben Schell Street, View of the Bay subdivision, and Stonebrook subdivision)		
Pipelines, total (feet/miles)	17 miles within City limits (excludes several thousand feet of lines from water mains to customer meters)		
Interconnections	None		

Source: WMCP 2016

Wastewater System Infrastructure

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
Wastewater treatment plant, capacity (mgd)	Average dry weather flow design capacity is 1.60 mgd (average dry weather flow is 0.42 mgd; highest monthly average flow since last permit renewal was 0.887 mgd in January 2006), as of 2011; treatment capacity limit is 3.6 mgd (maximum daily flow	Constructed in 1975, upgraded in 2001 (added a second aeration basin and UV disinfection system)	Activated Sludge Facility, disinfects using UV light, Class II treatment system; WWTP operates at 47% capacity as of 2011.

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
	was 2.447 mgd in January 2009)		
Wastewater treatment plant location	212 S. Point Street, Depoe Bay		
Mains (linear feet)			
Effluent discharge pipe (linear feet)	Approximately half-mile		
Effluent discharge location	1, heavy surf zone of the Pacific Ocean; 6 feet from shore at a depth of approximately 4 feet, submerged at all times		
Pump station overflow locations	Gleneden Beach Sanitary District to Fogarty Creek pump station to Vista pump station to Harbor pump station to WWTP; Little Well Cove pump station to line from Edgewater pump station to WWTP		
Pump station overflow history	No sanitary sewer overflows; the City's system since the last permit renewal in March 2003.		
Manholes			
Lift stations	4 (Vista, Harbor, Little Well Cove, Edgewater);		Gleneden Sanitary District has several small lift stations and one large one (upgraded in early 2000s) at Fogarty Creek State Park, which pumps sewage into the City's collection system

Source: NPDES permit and permit evaluation (2011)

Stormwater System Infrastructure

Stormwater Infrastructure	Description	Year(s) Built	Comments (if any)
Mains (linear feet)			
Storm water drain pipeline (linear feet/miles)			
Outfalls			
Culverts			
Manholes			
Catch basins/area drains			

Water Conservation Program

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit	Yes	Monthly and annual water audits	Non-revenue water was 8.7% in 2014.
Fully Metered System	Yes		Finished Water system is fully metered. Meters at the PODs on Rocky Creek and South Depoe Bay Creek recently installed (2015 or 2016). The City is transitioning meters less than 2 inches to AMR.
Meter testing and maintenance	Yes		SCADA used for AMR meters. Contractor calibrates large meters and City tests small meters. City monitors billing records for unusual meter readings. Master meters checked bimonthly.
Water rates based, at least in part, on the quantity of water used	Yes		Bimonthly basic service rate based on meter size and a consumption charge based on the quantity

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
			of water metered. Miroco Water District also has a base charge for annual water debt service.
Leak detection and pipeline repair/replacement	Yes		SCADA system monitors for potential leaks. City monitors meter readings. Visual inspection. Replacing asbestos cement pipes and black polyethylene service lines between mains and meters.
Public education	Yes		Water conservation brochure. Water conservation discussed at video recorded City Council meetings, which are posted on YouTube for citizens. Short water conservation messages in water bills.
Technical and Financial Assistance programs	Yes		Brochure about leak detection, meter readers distribute toilet leak detection tablets and talk with customers
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	No		
Water Reuse, Recycling, and Non-potable Water Opportunities	Yes		SCADA reduces the need to backwash filters; uses treated effluent at the WWTP for wastewater treatment processes

Source: WMCP 2016

Finances

Type of Water Infrastructure	Financial Category	Funding FY 16-17	Expenditures FY 16-17	Number of Connections
Potable Water	Total Operating Capital			1176
Wastewater	Total Operating Capital			1176
Stormwater	Total Operating Capital			

Source: 2016 WMCP

Eddyville Charter School

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Well (LINC1012)		
Water Treatment Plant, capacity (mgd)			Certified operator required, Distribution class: S, Treatment class: None
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	200		
Connections (#)	1		
Interconnections			
Challenges			Lead and Copper Rule violation
Important notes	Also purchases surface water.		

Source: OHA, 2017

Wastewater System Infrastructure

Water Conservation Program

Finances

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Fall Creek Water District (Alsea)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Wells 1, 2, 3	Wells 1 & 2 : mid-1970s Well 3: 2004	
Water Treatment Plant, capacity (mgd)	See Well logs		Residual maintenance hypochlorination at wellheads; certified operator required, Distribution Class: S, Treatment class: None
Storage reservoirs, total capacity (MG)	35,000 G cement	Mid-1970s	
Pipelines, total (feet/miles)	2 mi	Mid-1970s	
Population	50 (includes 35 full-time, some seasonal)		
Connections (#)	48 (some lots not developed but have hook ups)		
Interconnections	No		
Challenges	EPA/DEQ water quality monitoring forms are difficult.		
Important notes	They have high quality water that comes from a forested hillside.		

Sources: OHA, 2017; L. Daniels, personal communication, September 6, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit	Yes	Compare water pumps to water consumed at least bi-monthly at billing time	
Fully Metered System	Yes		
Meter testing and maintenance	Yes	Meters monitored monthly for malfunctions, and monitor water pump to the reservoir	
Water rates based, at least in part, on the quantity of water used	Yes	Bimonthly bill includes use of up to 5000 gallons and then an inclining block rate structure thereafter to encourage water conservation	
Leak detection and pipeline repair/replacement	Yes	An alarm is triggered if reservoir levels drop below a certain level; compare water pump to water consumed to monitor for leaks	
Public education	Yes	Encourage low use water fixtures	Water is only for household use; the District has a separate water right on the Alsea River for lawn irrigation
Technical and Financial Assistance programs	No		
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	No		

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Water Reuse, Recycling, and Non-potable Water Opportunities	No		
Other			

Finances

Fall Creek Water District brings in approximately $1200 per month ($14,400 per year) from customer water bills to cover expenses and has a $10,000 emergency fund for minor issues, which is shared by the Fall Creek Road Improvement District (essentially the same entity as the Fall Creek Water District). There are no significant funding needs at this time.

Type of Water Infrastructure	Financial Category	Funding FY 2016	Expenditures FY 2016	Number of Connections	Population
Potable Water	Total Operating Capital			48	50

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Guptil Subdivision (Near Otis)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Well 1		
Water Treatment Plant, capacity (mgd)			Certified operator required, Distribution class: S, Treatment class: None
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	28		
Connections (#)	20		
Interconnections			
Challenges	Runs out of water in the summer. Trying to find another source, such as a way to connect to Panther Creek Water District.		In contact with RDA for funding to address water needs.
Important notes			

Sources: OHA, 2017; J. Hume, personal communication, September 6, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Finances

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Hiland Water Company – Bear Creek (Near Otis)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Wells #1 (L16250), Callow Creek, Well #2 (L27364, emergency)		
Water Treatment Plant, capacity (mgd)			Certified operator required, Distribution class: 1, Treatment class: 1
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	275		
Connections (#)	108		
Interconnections			
Challenges			
Important notes			

Source: OHA, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Finances

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Hiland Water Company – Boulder Creek (Near Otis)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Wells #1 and #2 (LINC1453)		
Water Treatment Plant, capacity (mgd)			Certified operator required, Distribution class: 1, Treatment class: 1
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	350		
Connections (#)	140		
Interconnections			
Challenges			
Important notes			

Source: OHA, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Finances

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Hiland Water Company – Echo Mountain (Near Otis)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Wells #5 (LINC404), Well #2 (LINC460, emergency), Well #4 (LINK443, emergency)		
Water Treatment Plant, capacity (mgd)	None.		Certified operator required, Distribution class: S, Treatment class: None
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	362		
Connections (#)	143		
Interconnections			
Challenges			
Important notes			

Source: OHA, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Finances

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Hiland Water Company – Riverbend Park Water System (Near Otis)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Infiltration Gallery on Duncan and Noname Creeks		
Water Treatment Plant, capacity (mgd)	None		Certified operator required, Distribution class: S, Treatment class: None
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	172		
Connections (#)	78		
Interconnections			
Challenges			
Important notes			

Source: OHA, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Finances

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Hiland Water Company – Westwood (Near Otis)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Wells #1 and #2 (LINC1453)		
Water Treatment Plant, capacity (mgd)			Certified operator required, Distribution class: S, Treatment class: None
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	120		
Connections (#)	81		
Interconnections			
Challenges			
Important notes			

Source: OHA, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Finances

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Inn at Otter Crest (Otter Rock, Between Depoe Bay and Newport)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Johnson Creek		
Water Treatment Plant, capacity (mgd)			Certified operator required, Distribution class: S, Treatment class: None
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	144		
Connections (#)	291		
Interconnections			
Challenges			
Important notes	Also purchases surface water.		

Source: OHA, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Finances

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Johnson Creek Water Service (Between Depoe Bay and Newport)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Johnson Creek		
Water Treatment Plant, capacity (mgd)			Certified operator required, Distribution class: 1 Treatment class: 2
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	363		
Connections (#)	2		
Interconnections			
Challenges			
Important notes			

Source: OHA, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Finances

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Kernville-Gleneden Beach-Lincoln Beach Water District (Gleneden Beach)

Kernville-Gleneden Beach-Lincoln Beach Water District (District) supplies water to an estimated population of 5,598 between the City of Depoe Bay to the south and the City of Lincoln City to the north. The District also supplies treated water to the Lower Siletz Water District, which is a wholesale customer. The District's primary source of water supply is Drift Creek; an unnamed tributary to Drift Creek and groundwater serve as backup supplies. The point of diversion on Drift Creek currently is located at the City of Lincoln City's point of diversion. Gleneden Sanitary District manages the wastewater collection system for customers served by the District. The collected wastewater is conveyed to the Depoe Bay Collection System and then to the Depoe Bay WWTP for treatment and subsequent discharge to the ocean. The area served by the District and Gleneden Sanitary District does not have a stormwater system. See **Appendix J** for a schematic/map of the District's potable water systems and **Appendix K** for a schematic/map of Gleneden Sanitary District's wastewater system.

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Primary: Drift Creek Backup supply (storm events): unnamed tributary to Drift Creek	2013 constructed new infiltration gallery, direct surface intake also present	Primary: POD currently located at Lincoln City's POD
Water Treatment Plant, capacity (mgd)	Rated capacity of 1.2 mgd	1991-1992	Slow sand filtration plant; certified operator required, Distribution class: 2, Treatment class: 1
Storage reservoirs, total capacity (MG)	Total: 2.45 MG North Reservoir: 300,000 G Salishan Standpipe: 150,000 G Central Reservoir: 1.0 MG South Reservoir 1.0 MG	North Reservoir: 50+ years old Salishan Standpipe: 1982 Central Reservoir: 1992 South Reservoir: 1971	Must store enough water for Lower Siletz Water District
Pump Stations, # and capacity			
Pipelines, total (feet/miles)	215,020		Majority of pipe materials are PVC (106,649 feet) and AC (102,586 feet)

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Population	Approximately 4853, as of 2015, including Lower Siletz Water District		
Connections (#)	2371		
Interconnections	Supply source for the Lower Siletz Water District		
Challenges			
Important notes			

Source: CH2M Hill, 2017; P. Ingram, personal communications, August 2, 2017

Wastewater System Infrastructure

The Gleneden Sanitary District operates and maintains a collection system to serve communities from the Gleneden Beach area to the north to the Lincoln Beach area to the south, including District customers. The collected wastewater is conveyed to the Depoe Bay Collection System and then to the Depoe Bay WWTP for treatment and disposal. The majority of the sewer system was constructed between 1975 and 1977.

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
Wastewater treatment plant, capacity (mgd)	N/A		Treated at the Depoe Bay Wastewater Treatment Facility
Wastewater treatment plant location	Depoe Bay		
Mains (linear feet)			
Effluent discharge pipe (linear feet)	N/A		
Effluent discharge location	N/A		
Pump stations (#)	16	Fogarty Creek upgraded in 2007	Two pump stations do not have sufficient capacity under existing flow conditions: North Coronado and Laurel Street. Seagrove South and Seagrove North are both old and obsolete, and need to be upgraded
Pump station overflow locations			
Compliance history			
Manholes			
Lift stations			

Source: Ace Consultants, Inc. 2009; Harper, Houf, Peterson, Righellis, Inc. 2016

Water Conservation Program

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit	Yes	Tracks monthly water production and consumption, estimates unmetered uses for firefighting in system flushing, and estimates leakage flow and duration	20.6% nonrevenue water in 2015; averaged 30% from 2011-2015
Fully Metered System	Yes		
Meter testing and maintenance	Yes	New magnetic flow meter installed at finish water line from the WTP in 2009 and on the raw water pipeline in 2012; replaced all customer meters (2285) with advanced metering infrastructure meters	
Water rates based, at least in part, on the quantity of water used	Yes	Base quantity of 3000 gallons, and charge per 1000 gallons in excess	
Leak detection and pipeline repair/replacement	Yes	Purchased an acoustic leak detector in 2011; spent $290,000 from 2006-2010 on pipeline replacement	
Public education	Yes	Conservation tips on its website	
Technical and Financial Assistance programs	No		

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	No		
Water Reuse, Recycling, and Non-potable Water Opportunities	No		
Other			

Source: CH2M Hill, 2016

Finances

Type of Water Infrastructure	Financial Category	Funding FY 2016	Expenditures FY 2016	Number of Connections	Population
Potable Water	Total Operating Capital			2,378	5,598

Fiscal Year Audit Report available at: https://secure.sos.state.or.us/muni/public.do

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Kozy Acres Water System (Near Waldport)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Wells 2 and 3		
Water Treatment Plant, capacity (mgd)			Residential maintained hypo chlorination; certified operator required, Distribution class: S, Treatment class: None
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	40		
Connections (#)	19		
Interconnections			
Challenges			
Important notes			

Source: OHA, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit			
Fully Metered System			
Meter testing and maintenance			
Water rates based, at least in part, on the quantity of water used			
Leak detection and pipeline repair/replacement			
Public education			
Other			

Finances

Type of Water Infrastructure	Financial Category	Funding FY 2016	Expenditures FY 2016	Number of Connections	Population
Potable Water	Total Operating Capital			19	40

City of Lincoln City

The City serves an estimated 14,770 customers, which include the entire population within city limits and customers outside the city limits, but within the City's UGB. Tourism can increase the population to more than 30,000 depending on weather, the time of year, events, and other factors. The City currently only uses Schooner Creek as its water supply source. The City has a second intake on Drift Creek, but the source can be used only as an emergency backup supply. This City's primary location for discharge of treated wastewater is at River Mile 1.1 on Schooner Creek, and the City also produces biosolids that can be land applied as fertilizer. The City has a stormwater system, but information about the system is lacking. See **Appendix L** for schematics/maps of the City's water systems.

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Primary intake: Schooner Creek, Water pumped 400 feet to the City's WTP; emergency intake: Drift Creek, water pumped 1.5 miles to the WTP		
Water Treatment Plant, capacity (mgd)	6 mgd	1982, upgraded in 1995 and 1998	Distribution Class: 3, Treatment Class: 3, Certified Operator Required
Storage reservoirs, total capacity (MG)	7.25 MG (three steel, aboveground storage tanks); 19th St.: 2.0 MG, Surf: 1.0 MG, Roads End: 4.25 MG	19th St.: 1981 Surf: 1973 Roads End: 2008	
Pump Stations	6 total: Bayview Hunters Highland Roads End SE 15th and Oar NE 36th and Quay West Devils Lake Road	Bayview: 2008 Hunters Highland: 2008 Roads End: 2008 SE 15th and Oar: 1980 NE 36th and Quay: 1980 West Devils Lake Road: 1972	
Pipelines, total (feet/miles)	111 miles		4.5 miles of 24-inch line from the WT P to the distribution system; a large

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
			portion of the 111 miles is PVC pipe, but significant quantities of pipeline are asbestos-cement, welded steel, ductile iron
Interconnections	City serves several small "bedroom" communities (Lake Point, Neotsu, San Point, and a few other locally named small ones) outside current city limits but within the current UGB and City maintains the system; Two privately maintained systems are connected to the City water system (Cherry Hill Mobile Park has several small yielding wells; Highland Estates has no independent supply but maintains its own water system), which are separated from the City by backflow devices and are not potential secondary water sources.		

Source: City of Lincoln City, 2016; OHA, 2017

Wastewater System Infrastructure

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
Wastewater treatment plant, capacity (mgd)	Hydraulic capacity: 9.0 mgd, Permitted capacity: 6.0 mgd (average dry weather design flow: 3.0 mgd); (average wet weather design flow: 4.5 mgd)		Activated Sludge Facility, Treatment system class: IV, System Class: III; 5 state certified operators; biosolids are treated to Class B

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
			standards and land applied on pasture lands as fertilizer
Sewer force mains (linear feet)	11.25		
Gravity lines (linear feet)	74.4		
Effluent discharge pipe (linear feet)			
Effluent discharge location	Schooner Creek RM 1.1		
Storm stations	3		
Pump station overflow locations	Primary: Schooner Creek RM 1.1; Emergencies -- NW 40th and Jetty: Pacific Ocean NW 35th and Jetty: Coble Creek/Pacific Ocean NE Homes Road Park: Devils Lake NE 29th St.: unnamed Creek NW 12th and Harbor: Pacific Ocean SE third Street: Devils Lake SW Coast: unnamed Creek/Pacific Ocean SE 34th: Baldy Creek/Pacific Ocean SW 35th and Anchor: Pacific Ocean SW 37th and Anchor: Pacific Ocean SW 48th and Jetty: Schooner Creek 62nd and SW Galley: Siletz Bay NE 64th and Logan Road: Pacific Ocean NE 50th and Jetty: Pacific Ocean		

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
	NE 26th and Lake: Devils Lake Regatta Grounds Park: Devils Lake W Devils Lake Road and Highway 101: Devils Lake SW 48th and Beach: Pacific Ocean SE Spyglass Ridge: ground surface SE Anchor Court: ground surface SW Coast and Bard Road: ground surface Police Department: backs up in building West Lagoon Drive: Devils Lake NE 19th and WDLR: ground surface NE Johns Loop: Doubles Lake NE Yacht and WDLR: Devils Lake NE Port Lane: ground surface 57th Court: ground surface NW 15th St. Ramp: Pacific Ocean Reclaimed Water Outfalls (3; Level II, III, and IV reuse)		
Manholes	1898		
Lift stations	28		

Source: DEQ[2], 2003; DEQ[3], 2003

Stormwater Infrastructure

Stormwater Infrastructure	Description	Year(s) Built	Comments (if any)
Mains (linear feet)			
Storm water drain pipeline (linear feet/miles)			
Outfalls			
Culverts			
Manholes			
Catch basins/area drains			

Water Conservation Program

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit	Yes		16.1% non-revenue water; City beginning to mere large utility projects and water usage at construction sites
Fully Metered System	Yes		
Meter testing and maintenance	Yes	2 inch + meters are tested at least every three years in smaller meters are randomly tested	Conducting a feasibility study for radio read meters
Water rates based, at least in part, on the quantity of water used	Yes		Customers are charged an additional $3.44 for each additional 100 ft.^{3} beyond the first 400 ft.^{3} consumed. A peak season (July, August, September) rate has been added to further encourage conservation ($3.83 per additional 100 ft.^{3} instead of $3.44)
Leak detection and pipeline repair/replacement	Yes	Recently purchased leak detection	

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
		equipment for staff use; part-time employee dedicated to leak detection, can survey the entire service area 2 to 3 times per year	
Public education	Yes	Host a high school science class, outreach to elementary schools, presentations for civic clubs, conservation tips in water bills	
Technical and Financial Assistance programs	Yes	Indoor and outdoor water conservation kits, commercial indoor water audit program, park irrigation audit, unmetered use audits, residential audits program, hotel/motel irrigation audit program	
Supplier Financed Retrofit or Replacement of Inefficient Fixtures			
Water Reuse, Recycling, and Non-potable Water Opportunities	No	Currently not recycling water due to water quality concerns. Looking for opportunities.	

Source: City of Lincoln City, 2016

Finances

Type of Water Infrastructure	Financial Category	Funding FY 16-17	Expenditures FY 16-17	Number of Connections
Potable Water	Total Operating Capital			6200
Wastewater	Total Operating Capital			6200
Stormwater	Total Operating Capital			

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Lower Siletz Water System (Near Lincoln City)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions			
Water Treatment Plant, capacity (mgd)			Certified operator required, Distribution class: 1, Treatment class: None
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	158		
Connections (#)	155		
Interconnections			
Challenges			
Important notes	Receives water supply from Kernville-Gleneden Beach-Lincoln Beach Water District.		

Source: OHA, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Finances

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City of Newport

The City is located in the center coastline of Lincoln County at the mouth of the Yaquina River and has a population of 10,190, which swells with the influx of daily workforce and tourists. The City has fishing and tourism industries, a large brewery, as well as research facilities and numerous state and federal agency offices. The City's primary sources of water supply are the Siletz River and Big Creek. The City's primary discharge point for its treated wastewater is the ocean, approximately 1,244 feet offshore. The WWTP also produces Class A biosolids that can be sold or land applied without restriction. Stormwater collected within the City is conveyed through a mix of pipe and open channels that primarily discharge to the ocean or Yaquina Bay. In many locations, ravines were culverted and filled for development, resulting in storm sewer pipes under buildings and outside of any defined right-of-way.

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Big Creek: 10 cfs Siletz River: 6 cfs capacity	Big Creek: 1951, modified in 2012 Siletz River: 1994	Big Creek: Point of diversion and intake for water plant is located at an earthen dam on Big Creek (lower reservoir/Reservoir #1); source of live flow and stored water Siletz River: intake located just upstream and adjacent to the intake for Georgia Pacific Lumber, and the City of Toledo Water is pumped 5.5 miles into Blattner Creek and overland flows 2 miles into the Big Creek reservoir; Generally not used during winter months due to high turbidity in the river and availability in Big Creek; used in the summer months when flows are

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
			inadequate in Big Creek
Water Treatment Plant, capacity (mgd)	6 mgd maximum capacity, 10.9 MGD future capacity	2012	Distribution Class: 2, Treatment Class: 3, Certified Operator required
Storage reservoirs, total capacity (MG)	Raw water: Total storage -1,170 AF (lower reservoir-200 AF; upper reservoir-970 AF) Finished water: 8.2 MG total storage capacity in 7 tanks Main storage tanks adjacent to WTP: 2 MG, 2 MG City shops: 0.7 MG, 0.4 MG Smith: 0.25 MG Yaquina Heights: 1.6 MG South Beach: 1.3 MG NE 71st Street: 1.0 MG	Raw water: Earthen dam on Big Creek (lower reservoir/Reservoir #1)-1951; (upper reservoir, Reservoir #2)-1969 with expansion in 1976 Finished Water: Main storage tanks – 1972, 1978 City Shops: 1910, 1910 Smith: 1958 upgraded in the 1990s Yaquina Heights: 1993 South Beach: 1998 NE 71st Street: 2015	
Pipelines, total (feet/miles)	Distribution system Total: 475,900 feet/90.1 miles : Siletz River: 30,000 feet/5.5 miles from intake to Blattner Creek; 10,500 feet/ 2 miles open channel flow from Blattner Creek to upper Big Creek reservoir		Distribution system: mix of ductile iron, PVC, AC, polyethylene, and galvanized steel
Interconnections	A 12-inch water line connects SRWD to the City of Newport to provide both agencies water in an emergency.		

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
	Booster station at intertie allows Newport to feed all of SRWD, but only south of Yaquina Bay can be fed from SRWD.		

Source: Civil West 2008; City of Newport 2017; T. Gross, personal communications, 2017

Wastewater System Infrastructure

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
Wastewater treatment plant, capacity (mgd)	hydraulic capacity: 15 mgd, permitted capacity: 5 mgd (Average dry weather design flow: 3.5 mgd; average wet weather design flow: 4.35 mgd; winter daily mass load limit is 6.4 mgd)	2000	Activated Sludge with hypochlorite disinfection; Treatment System Class IV, Collection System Class III; City produces Class A biosolids from waste activated sludge and applies to City-owned land near the airport and sold without application restrictions (produces up to 122 dry metric tons of biosolids per year);
Wastewater treatment plant, location	5525 SE 50th Place Newport		
Sanitary Force Mains (linear feet)	12 miles		
Sanitary pipeline (linear feet/miles)	62.5 miles gravity pipelines	59% of sanitary sewer system constructed since 1950 3417 feet: 1920s 63,134 feet: 1950s 19,031 feet: 1960s 32,976 feet: 1970s 43,243 feet: 1980s 31,291 feet: 1990s	

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
		33,812 feet: 2000s 7099 feet: 2010s; 158,936 feet (40%) date unknown	
Effluent discharge pipe (linear feet)	24,600 feet from the wastewater treatment plant to the Nye Beach seawall		Treated effluent is discharged from the wastewater treatment facility through a 24,600 foot pipeline that returns the effluent through the old wastewater treatment plant at 420 Nye and then discharged to the Pacific Ocean.
Effluent discharge location	Treated wastewater: Pacific Ocean RM 188;	Outfall is located straight out from the south leg of Beach Drive in the Nye Beach District of Newport.	Outfall discharges to the Pacific Ocean 1,244 feet from the Nye Beach Seawall
Pump stations: current firm pumping capacity (gpm), # of pumps	9 major, 17 minor Major: Bay Front: 1200 GPM, 2 Big Creek: 2430 GPM, 3 HMSC: 1390 GPM, 2 Influent: 12,500 GPM, 6 Northside: 5900 GPM, 3 Northwest 48th Street: 500 GPM, 2 Nye Beach: 1400 GPM, 2 Schooner Creek: 660 GPM, 2 SE Running Springs Drive: 153 GPM, 2	, Big Creek upgraded in 2016, Bay Front: Constructed in 2001 Big Creek: upgraded 2016 HMSC: constructed 2001 Influent: Constructed 2001 Northside: used to be clarifier for old WWTP, converted to pump station in 2001 Northwest 48th Street: 1980, will be upgraded 2018 Nye Beach: unknown, pumps to be upgraded in 2017	Emergency Overflows-- Schooner Creek: Schooner Creek 56th St.: Pacific Ocean 48th St.: Pacific Ocean 42nd St.: Pacific Ocean Big Creek: Pacific Ocean Nye Beach: Pacific Ocean Bay Front: Yaquina Bay OSU Marine Science Center: Yaquina Bay Ferry Slip Road: Yaquina Bay

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
		Schooner Creek: unknown, will be upgraded in 2018 SE Running Springs Drive: unknown	NE 10th St.: Pacific Ocean SW 26th St.: Yaquina Bay SE third Street: Yaquina Bay Northside Pump Station: RM 188/Pacific Ocean Influent Pump Station: Unnamed ditch to Pacific Ocean Effluent Booster Pump Station: Yaquina Bay
Overflow Event History			
Manholes	1,400		

Source: DEQ[1], 2002; DEQ[2], 2002; Brown and Caldwell, 2016

Stormwater System Infrastructure

The City has approximately 43 storm drainage basins, separated into the "North" storm drain area north of Yaquina Bay and the "South Beach" storm drain area south of Yaquina Bay. Easterly basins contain natural drainage features conveying stormwater to nearby creeks, streams, rivers that flow to the ocean. Westerly portions of the basins along the coast are predominantly developed areas. The storage and drainage system includes a variety of pipes, culverts, open drainage ditches, and natural streams for conveyance of runoff. See **Appendix M** for a stormwater system schematic showing outfalls.

Stormwater Infrastructure	Description	Year(s) Built	Comments (if any)
Mains (linear feet)	12 miles		
Storm water drain pipeline (linear feet/miles)	32 miles		
Outfalls	45		
Culverts	29		
Manholes	595		
Catch basins/area drains	1197		

Source: Civil West 2016

Water Conservation Program

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit	Yes		16.3% (2004-2006 average, 19.88% in 2006)
Fully Metered System	Yes		
Meter testing and maintenance	Yes	Test five small meters per month, tests meters 3-inch or larger annually	
Water rates based, at least in part, on the quantity of water used	Yes	1000 gallons included with minimum monthly charge, additional fee per 1000 gallons in excess	
Leak detection and pipeline repair/replacement	Yes	Ongoing inspections of water mains, valves, connections, and meters for leaks; inspect water lines during roadway/utility repairs possible	
Public education	Yes	Billing messages, brochures	
Technical and Financial Assistance programs	Yes	Distribute water conservation kits, offer free leak detection tests to residential and institutional customers	
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	Yes	Provide assistance for retrofit and/or replacement of inefficient fixtures/appliances	
Water Reuse, Recycling, and Non-potable Water Opportunities	Yes	Perform feasibility study for reusing/recycling process water from	

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
		community treatment plants	

Source: Civil West, 2008

Finances

Type of Water Infrastructure	Financial Category	Funding FY 16-17	Expenditures FY 16-17	Proposed Expenditures FY 17-18	Number of Connections
Potable Water	Total		$ 3,276,268	$ 10,835,847	4850
	Operating		$ 2,464,565	$ 2,685,041	
	Capital		$ 811,703	$ 8,150,806	
Wastewater	Total		$ 4,598,284	$ 9,753,933	4850
	Operating		$ 2,777,808	$ 3,624,796	
	Capital		$ 1,820,476	$ 6,129,137	
Stormwater	Total	$449,817*	$ 465,514 - $465,514	$ 518,790 - $518.790	
	Operating				
	Capital				

*Note: City collects a Storm Water Utility Fee but the fee only covers operations. Storm water operations and capital are also funded through the general fund, Infrastructure Fee, and bonding.

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Otter Rock Water District (Near Newport)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Springs 1 (permanent), 2 (permanent), 3 (seasonal)		
Water Treatment Plant, capacity (mgd)	N/A		Distribution class: S, Treatment class: None
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	125		
Connections (#)	139		
Interconnections			
Challenges			
Important notes			

Source: OHA, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit			
Fully Metered System			
Meter testing and maintenance			
Water rates based, at least in part, on the quantity of water used			
Leak detection and pipeline repair/replacement			
Public education			
Other			

Finances

Type of Water Infrastructure	Financial Category	Funding FY 2016	Expenditures FY 2016	Number of Connections	Population
Potable Water	Total Operating Capital				

Fiscal Year Audit Report available at: https://secure.sos.state.or.us/muni/public.do

Panther Creek Water District (Near Otis)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Panther Creek and Well 3 (for emergency use when Panther Creek supply is insufficient, such as occasionally in summer)	Panther Creek: 1960s or earlier (more than 50 years ago) Well 3: approximately 2002 (15 years ago)	Water is pumped from Panther Creek just upstream from the Panther Creek Subdivisions and is blended with groundwater (when needed) from one well next to the WTP prior to treatment. When the Water District needs more than 100,000 gallons per day it needs to supplement its surface water supply with groundwater from the Well.
Water Treatment Plant, capacity (gpd)	110,000 gpd (120,000 gpd snacks for limited duration)		Slow sand filtration, hypo chlorination (post); certified operator required, Distribution class: 1, Treatment class: 1. Finished water is then pumped to the two reservoirs.
Storage reservoirs, total capacity (MG)	Total: 150,000 G (one 50,000 G plus one 100,000 G)	50,000 G: 1960s or earlier 100,000 G: late 1980s	
Pipelines, total (feet/miles)	15 miles		
Population	700		
Connections (#)	350		
Interconnections	No		

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Challenges	The Water District needs to upgrade its water system infrastructure so that it can increase production to serve the customers of other water providers in the vicinity. The Water District may need to serve 300-400 additional customers from other water districts dependent on wells (example: Guptil and Echo Mountain Park, which is right next door but too big to currently serve). The Water District is considering diverting water from the Salmon River and considering expanding the WTP and a reservoir.		
Important notes	The Water District is proud that it manages its water system very well despite its small size.		The Water District has 1.5 full-time employees.

Source: OHA, 2017; J. Hume, personal communications, September 6, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit	Yes	Compare finished water production to total consumption	Conducts monthly to keep an eye out for leaks
Fully Metered System	Yes	Customary meters, finished water meter, meter at diversion and wellhead	

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Meter testing and maintenance	Yes	Check for on meter readings monthly, and talk to property owners when high readings occur	
Water rates based, at least in part, on the quantity of water used	Yes	Get a fixed amount of money from property taxes plus $15 per month for administration (does not include a volume of water) plus $0.007/gallon.	
Leak detection and pipeline repair/replacement	Yes	Visual inspections for leaks on the surface; use monthly audits and meter reading reviews to detect leaks	
Public education	Yes	Include water conservation messages in water bills and on its webpage.	
Technical and Financial Assistance programs	Yes	Talk with customers when water use is high or leaks are suspected.	
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	Yes	Offers free low-flow showerheads	
Water Reuse, Recycling, and Non-potable Water Opportunities	No		
Other			

Source: J. Hume, personal communications, September 6, 2017

Finances
Expenditures: $100,000 per year total ($50,000 per year to run the WTP + $50,000 per year for payroll)

Fiscal Year Audit Report available at**:** https://secure.sos.state.or.us/muni/public.do

Type of Water Infrastructure	Financial Category	Funding FY 2016	Expenditures FY 2016	Number of Connections	Population
Potable Water	Total		$100,000	350	700
	Operating		$50,000		
	Capital		$50,000		

Riverside Mobile Park (Seal Rock, Between Newport and Waldport)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Well 1		
Water Treatment Plant, capacity (mgd)			Certified operator required, Distribution class: S, Treatment class: None
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	32		
Connections (#)	22		
Interconnections			
Challenges			
Important notes			

Source: OHA, 2017

Wastewater System Infrastructure: N/A.

Water Conservation Program

Finances

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Salmon River Mobile Village (Near Otis)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Well 1		
Water Treatment Plant, capacity (mgd)			Certified operator required, Distribution class: S, Treatment class: None
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	75		
Connections (#)	38		
Interconnections			
Challenges			
Important notes			

Source: OHA, 2017

Wastewater System Infrastructure: N/A.

Water Conservation Program

Finances

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Salmon River RV Park (Near Otis)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Well #1, Well#2 (LINC1985)		
Water Treatment Plant, capacity (mgd)			Certified operator required, Distribution class: S, Treatment class: None
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	69		
Connections (#)	45		
Interconnections			
Challenges			
Important notes			

Source: OHA, 2017

Wastewater System Infrastructure: N/A.

Water Conservation Program

Finances

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Sea Crest (Between Depoe Bay and Newport)

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Johnson Creek		
Water Treatment Plant, capacity (mgd)			Certified operator required, Distribution class: S, Treatment class: None
Storage reservoirs, total capacity (MG)			
Pipelines, total (feet/miles)			
Population	72		
Connections (#)	36		
Interconnections			
Challenges			
Important notes	Purchases its water supply from Johnson Creek Water Service, which uses Johnson Creek as its source.		

Source: OHA, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Finances

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Seal Rock Water District (Seal Rock)

Seal Rock Water District (District) serves a population of 5,175 within an area extending 11.5 miles from the north side of Alsea Bay at Waldport to Henderson Creek near the Newport Municipal Airport, and extending no more than 1.5 miles inland from the beach. The District's current source of water supply is the Siletz River, which is treated by the City of Toledo before the water is conveyed to the District. Recently, the District obtained a water use permit for the use of Beaver Creek and is planning to develop Beaver Creek as its primary source of water supply. SRWD has no wastewater or stormwater system. See **Appendix N** for schematics/maps of the District's potable water system.

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Siletz River (up to 2.6 cfs, Junior to instream water right) 40277 at the City of Toledo intake near RM 40. Certificate 21390 Henderson Creek Certificate 32199 Hill Creek Permit S-55012 Beaver Creek	1974 1956 1965 2015	City of Toledo uses Siletz water rights to provide water to the District. 1.0 CFS unused 0.4 CFS unused 2.0 CFS currently being developed
Water Treatment Plant, capacity (mgd)	Water treated by the City of Toledo	Proposed SRWD WTP 2020	2.5 MGD
Storage reservoirs, total capacity (MG)	Total: 2.5 MG Lost Creek: 1.5 MG Driftwood: 1.0 MG	Lost Creek: 2005 Driftwood: 1981	In 2007 the Driftwood reservoir underwent rehabilitation by removing all the existing interior coating & applying a urethane-based coating to the interior metal surface
Pump Stations, # and capacity	7-Pump Stations: 1.Toledo Pump 2. East Bayshore Pump	1974	700-gpm 100-gpm

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
	3. York Pump 4. Driftwood Pump 5. Cross Street Pump 6. Lost Creek Pump 7. SRWD/Newport Intertie 8. Beaver Creek Pump	2013 2015	300-gpm 300-gpm 100-gpm 100-gpm 500-gpm Decommissioned 2016.
Pipelines, total (feet/miles)	65-miles of piping (343,200 feet)		The District piping covers 6 pressure zones. Pipe size ranges from 2″ to 12″. Currently district staff are replacing 2″ waterlines as time allows.
Interconnections	The District obtains all water through a single pipeline conveying water from the City of Toledo; A 12-inch water line connects the District to the City of Newport to provide the City water in an emergency	In 2015 the District and the City of Newport completed the construction of a new emergency intertie, funded through a grant provided primarily by FEMA's Hazard Mitigation Grant Program.	The pipe entering and leaving the intertie is 12″. During an emergency, the District sends water to the City of Newport through the station by gravity the District and when needs water there are 2 pumps that provide the District with water from the City of Newport.

Source: Civil West, 2010; Civil West[1] 2014; A. Denlinger, personal communications, October, 16 2017

Wastewater System Infrastructure: N/A

Stormwater System Infrastructure: N/A

Water Conservation Program

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit	Yes	Annual audits, daily in-house audits using SCADA system	Unaccounted-for water: 23.27% (average 2007-2012), 15% July-September 2012. The District has completed replacing and upgrading waterlines in various locations throughout the District and lowered the unaccounted-for water loss to near 15%
Fully Metered System	Yes		The District is in the beginning phase of the Automated Metering Infrastructure (AMI) system project. When completed this will enable staff to monitor and detect water leaks much quicker.
Meter testing and maintenance	Yes	Replaced meters so that by the end of Fiscal year 2012/2016 all meters will be less than 10 years old; randomly inspect 5 m per month	All meters will be up to date as of early 2018
Water rates based, at least in part, on the quantity of water used	Yes	Increasing block rate for the volume of usage	
Leak detection and pipeline repair/replacement	Yes	Conducted a leak detection survey in 2012 and fix five major leaks; ongoing pipeline	Installation of AMI system is scheduled to be completed in early 2018. It anticipated that the

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
		replacement; meter readers monitor for leaks	system will allow the District to reduce non-revenue water to 10%
Public education	Yes	Water conservation information in flyers, brochures, and water bills, Dye strips available for toilet leak detection	District provides monthly information and updates on our website and through the utility billing process.
Technical and Financial Assistance programs	Yes	2014 - FEMA Hazard Mitigation Grant Program. 2016 - USDA-RD Emergency Community Water Assistance Grant (ECWAG) Program. 2014 - Business Oregon Infrastructure Finance Authority (IFA). 2014 - USDA-Rural Development phase-3 infrastructure system improvements.	Funds were used to construct the new Newport/SRWD Emergency Intertie $8000.000 (grant) Fund were used for emergency pipeline replacement in the Bayshore Community $150.000 (grant) Funds were used to complete a source water study at a cost of $120,000.00. $20,000.00 (Grant) $100,000.000 low interest (1%) loan. $3,451,000 million in G. O. Bonds and $2,549,045.00 in Grants to fund the installation of a fully automated metering system.

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	No		
Water Reuse, Recycling, and Non-potable Water Opportunities	No		

Source: Civil West[1], 2014

Finances

Type of Water Infrastructure	Financial Category	Funding FY 2016	Expenditures FY 2016	Number of Connections	Population
Potable Water	Total	$1,794,241	$1,410,300	As of 9/30/17 there are 2,531 Connections	5,000 static, close to 8000 during the summer months
	Operating	$1,385,916.00	$1.200,000.00		
	Capital	$9,353,970.00	$618,000.00		

Fiscal Year Audit Report available at: **https://secure.sos.state.or.us/muni/search.do**

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City of Siletz

The City is located along the Siletz River at approximately River Mile 40 and has a water service area population of 1,200. The City's source of potable water supply is the Siletz River. The City has a wastewater system, and with the exception of a local microbrewery, no significant commercial or industrial users discharge to the WWTP. The wastewater system occasionally experiences overflow events because of heavy rainfall during the winter. The City has limited information about the stormwater system because of poor historical records. See **Appendix O** for schematics/maps of the City's water systems.

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	From Siletz River	Early 1960s, Rebuilt in 1973, Upgrade in 1999	
Water Treatment Plant, capacity (mgd)	350 gpm 0.210 MGD/10hr-day	1973	New Plant 1999
Storage reservoirs, total capacity (MG)	1 MG		
Pipelines, total (feet/miles)	Approx. 7 mi. (not including CTSI system)		
Interconnections			

Source: D. Eshleman, personal communications, October 17, 2017

Wastewater System Infrastructure

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
Wastewater treatment plant, capacity (MGD)	Average dry weather design flow: 0.157 mgd	1994	Sequencing Batch Reactor-Activated Sludge Sewage Treatment Plant, UV disinfection Treatment System Class II, Collection System Class II
Wastewater treatment plant, location	1264 James Frank Road, Siletz		
Mains (linear feet)	3.2 mi		
Effluent discharge pipe (linear feet)	185 ft		
Effluent discharge location	Siletz River, River Mile 36.9		
Pump station overflow locations	None		2 Basins at WWTP

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
Overflow Event History	Due to high levels of inflow and infiltration within the collection system, sanitary sewage overflows can occur during heavy rainfall in the winter (Nov-Feb)		Dec 2001/Jan 2002 Jan 2009/Jan 20011 Jan 2012/Dec 2014 Feb 2015/Dec 2015 Nov 2016/Feb 2017 Mar 2017
Manholes	75		
Lift stations	1 at Willow Court	1978	Rehab. 2005

Source: DEQ[1] 2004; DEQ[2] 2004; D. Eshleman, personal communication, October 17, 2017

Stormwater System Infrastructure

Stormwater Infrastructure	Description	Year(s) Built	Comments (if any)
Mains (linear feet)			
Storm water drain pipeline (linear feet/miles)			
Outfalls			
Culverts			
Manholes			
Catch basins/area drains			

Water Conservation Program

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit	YES		
Fully Metered System	YES		
Meter testing and maintenance	YES		
Water rates based, at least in part, on the quantity of water used	YES		
Leak detection and pipeline repair/replacement	YES		
Public education	NO		
Technical and Financial Assistance programs	NO		
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	NO		
Water Reuse, Recycling, and Non-potable Water Opportunities	NO		

Source: D. Eshleman, personal communication, October 17, 2017

Finances

The City's fiscal administration currently has a "closed book" policy, such that the Public Works Department does not have easy access to information about funding and expenditures. The Public Works Department submits budget requests, but is not informed about the extent to which budget is set aside to meet those requests. The Public Works Department currently must submit individual funding requests for projects or materials, and fiscal administrators inform the Public Works Department whether funds are available to approve the request.

Type of Water Infrastructure	Financial Category	Funding FY 16-17	Expenditures FY 16-17	Number of Connections
Potable Water	Total Operating Capital			480
Wastewater	Total Operating Capital			
Stormwater	Total Operating Capital			

Southwest Lincoln County Public Utility District (Near Waldport)

Southwest Lincoln County Public Utility District (District) serves water to a population of 3,000 within a ½-mile- to 1-mile-wide by 8-mile-long strip of land between the City of Waldport on the north and the City of Yachats on the south along Highway 101. The topography within the District is flat to gently sloping, except at some eastern limits where foothills begin and most water users reside below an elevation of 100 feet. More than 95 percent of the water connections serve residential customers. The District's primary water sources are Big Creek, Vingie Creek, Starr Creek, and Dicks Fork. The District can supply water to the City of Waldport and the City of Yachats through interconnections. The District does not have a wastewater or stormwater system.

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Dicks Fork, Big Creek, Vingie Creek, and Starr Creek		Dicks Fork: supplies 10%; Big Creek, Vingie Creek, and Starr Creek: supply 90%
Water Treatment Plant, capacity (mgd)	Blodgett Water Treatment Facility (Big Creek, Starr, and Vingie Creeks): rated at 350 gpm, periodically at 450 gpm; Dicks Fork Treatment Facility (Dicks Fork Creek): 200 gpm		Blodgett: rapid sand filtration, hypo chlorination (post); Dicks Fork: rapid sand filtration, hypo chlorination (post) Certified operator required, Distribution class: 2, Treatment class: 2, filtration endorsement required
Storage reservoirs, total capacity (MG)	Raw water: Starr Creek: 120,000 G Big Creek: 60,000 G Dicks Fork: 120,000 Treated Water: Crabapple: 50,000 G East line: 500,000 G Blodgett: 1 MG Dicks Fork I: 200,000 G Seabrook: 100,000 G Dicks Fork II: 500,000 G (planned)		

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
	Wakonda Beach: 0.5 MG (planned)		
Pipelines, total (feet/miles)	105,500 feet		
Population	2250 permanent, up to 6000 in summer		
Connections (#)	1250		
Interconnections	Water can be sent to or from the City of Waldport or the City of Yachats		
Challenges			
Important notes			

Source: Southwest Lincoln County Water District, 2014; OHA, 2017

Wastewater System Infrastructure: N/A. On septic.

Water Conservation Program

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit	Yes		2012-2013 raw water loss was 1% in treated water loss was 3%; Monthly, quarterly, annually
Fully Metered System	Yes		
Meter testing and maintenance	Yes		Water meters for the largest customers are flagged for testing or replacement by 2019; no small meter testing until at least 2024; test raw water meters every five years or as needed; meters greater than 1.5 inches tested every 10 years or 10,000,000 $ft.^3$
Water rates based, at least in part, on the quantity of water used	Yes		Inclining block rate structure beginning for usage over 101 $ft.^3$
Leak detection and pipeline repair/replacement	Yes		Ongoing monitoring for leaks; free leak checks offered to customers when

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
			requested and check for leaks when reading meters
Public education	No		Educate customers when requested.
Technical and Financial Assistance programs	No		
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	No		
Water Reuse, Recycling, and Non-potable Water Opportunities	Yes		Customers are encouraged to capture rainwater for irrigation.
Other	Yes		Conservation Incentive Program, Reduced Operational Water encourages low-water use landscaping usage a treatment plants

Source: OHA, 2017; Southwest Lincoln County Water District, 2014

Finances

Type of Water Infrastructure	Financial Category	Funding FY 2016	Expenditures FY 2016	Number of Connections	Population
Potable Water	Total Operating Capital			1,258	3,000

Fiscal Year Audit Report available at: https://secure.sos.state.or.us/muni/public.do

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City of Toledo

The City is located on the Yaquina River 7 miles inland from the ocean. The City has an active railway, pulp mill, harbor with repair port for oceangoing vessels, and art galleries and studios. The City's water service area consists of the area within the city limits, 71 residential connections and 6 commercial connections outside of the city limits, and a few connections outside of the UGB. The water service area population was estimated to be 3,514 in 2016. The City also treats water for Seal Rock Water District, which has its own water rights on the Siletz River. The City's potable water sources are the Siletz River and the Mill Creek Watershed. Portions of the diversion and conveyance infrastructure related to the Siletz River are relatively new, while a significant portion of the diversion and conveyance infrastructure related to the Mill Creek Watershed is in need of repair and replacement. The City's WWTP discharges into the Yaquina River at River Mile 13.7. The WWTP is not operating as designed (has diminished capacity in the winter) and the outfall pipe to the Yaquina River does not have sufficient capacity. The City's wastewater system may have excessive inflow and infiltration. The City has a stormwater system, but information about the system is lacking. See **Appendix P** for schematics/maps of the City's water systems.

Potable Water System Infrastructure

Potable Water Infrastructure	Description	Year(s) Built
Diversions	Mill Creek Watershed intake at Mill Creek Reservoir (natural flow and stored water) • use in winter and spring due to algae problems in the reservoir • 3.4 miles to the Mill Creek Raw Water Pump Station and then boosted 1.9 miles to the City's WTP Siletz River at RM 40 (at the City of Siletz) • intake capacity: 4.69 cfs • use and summer and fall due to high turbidity in the river in other seasons • 6 miles from the City's WTP	Mill Creek Dam and Reservoir: 1965 to 1967 Siletz River intake and pump station: rebuilt in 2015
Water Treatment Plant, capacity (mgd)	Design capacity: 3.0 mgd /4.64 cfs Current Capacity: 1.89 cfs-2.89 cfs	1976, upgraded in 1999; clear well: 1938
Storage reservoirs, total capacity (MG)	3.35 MG (in three storage reservoirs: 0.45 MG, 1.0 MG, and 1.9 MG)	1968, 1970s, 2014
Pump Stations, # and capacity	Raw Water	Mill Creek: 1968 Siletz: 2016

Potable Water Infrastructure	Description	Year(s) Built
	Mill Creek raw water pump station: two pumps, 790-860 gpm total and 426 gpm with a single pump running; Siletz River: three, at least 1200 gpm per pump Finished Water Skyline Drive Booster: Wagon Road Booster:	Skyline Drive Booster: Wagon Road Booster:
Pipelines, total (feet/miles)	186,885 feet / 35.4 miles Mill Creek raw water transmission piping: 10,130 feet (dam to pump station) Siletz River Raw water transmission pipe: 33,975	Siletz River Raw water transmission pipe: 2,800 feet replaced in 2015 and remainder installed in the late 1970s Mill Creek pump station transmission piping: replacement recommended Dam to Pump Station: 1950 Pump Station to WTP: 1968 and 1975

Source: GSI, 2017; Civil West[2], 2017

Wastewater System Infrastructure

Wastewater Infrastructure	Description	Year(s) Built
Wastewater treatment plant	Designed to accept short duration peak flow of 6.5 mgd Headworks size to accommodate peak flow, remainder of plant designed for a max flow of 4.3 mgd • not operating as designed • winter months: capacity reduced to 2.8 mgd (maximum monthly average flow was 0.272 mgd and average dry weather flow was 0.12 mgd as of 2009; Maximum daily flow is 0.479 mgd in December 2009)	1954, last upgraded in 2000; new headworks in 2011
Mains (linear feet)	Gravity sewer main: 115,638 feet Pressure force main: 6,000 feet	Gravity mains: materials and conditions very widely with some original clay pipes installed in 1926 in other sections replaced with PVC in the past few years
Effluent discharge pipe in parentheses linear feet)	1,500 feet Discharge point: Yaquina River Does not have sufficient capacity	
Effluent discharge location	Yaquina River, River Mile 13.7	
Manholes	655	
Lift stations	5	1954, last upgraded in 2000 1954, last upgraded in 2000 1975, upgraded in 2000 1955, last upgraded in 2000 Rebuilt in 2000

Source: Civil West[2], 2014

The City may have excessive infiltration and inflow, as indicated by a marked increase in WWTP inflows during the winter, particularly during prolonged storm events (2011 Inflow and Infiltration Study).

Stormwater System Infrastructure

Stormwater Infrastructure	Description	Year(s) Built	Comments (if any)
Mains (linear feet)			
Storm water drain pipeline (linear feet/miles)			
Outfalls			
Culverts			
Manholes			
Catch basins/area drains			

Water Conservation Program

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments
Annual water audit	Yes	Annual water audit	Non-revenue water was 21.9% in 2015. Benchmark goal: meter or estimate currently unmetered authorized uses.
Metering	Yes	Automated meter reading (AMR) system installed on small meters	
Water rates and billing	Yes	Rate based on the quantity of water metered	
Leak detection and pipeline repair/replacement	Yes	AMR system and visual inspection	
Public education	Yes	Water bill and newsletter messages	
Technical and financial assistance	No		Not currently, but included as benchmark
Supplier financed retrofit/replacement of fixtures	No		Not currently, but included as a benchmark
Water reuse, recycling, and non-potable water	No		Not currently, but included as a benchmark

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments
Other	Yes	American Public Works Association member	

Source: GSI, 2017

Finances

Type of Water Infrastructure	Financial Category	Funding FY 16-17	Expenditures FY 16-17	Number of Connections	Total Estimated Current funding needs
Potable Water	Total Operating Capital			1369	$11,794,000, as of 2017
Wastewater	Total Operating Capital				$6,627,030, as of 2011
Stormwater	Total Operating Capital				

The major potable water system improvement needed by the City is rebuilding the Mill Creek pump station and transmission piping. The City also needs to storage tanks refurbished. Wastewater system improvements needed include: WWTP upgrades, lift station upgrades, lift station force main replacements, pipeline repairs, and manhole rehabilitations.

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City of Waldport

The City is a coastal community located on a relatively flat area on the south side of Alsea Bay near the mouth of the Alsea River. The City serves a population of 2,080 within its water service area. The primary water sources are North and South Weist Creeks and Eckman Creek. Treated effluent from the City's WWTP is discharged into Lint Slough (Alsea subbasin) at River Mile 0.6, where the Alsea Highway crosses Lint Slough. The City's wastewater collection system is old and has inflow and infiltration problems. Since 1997, the City's Urban Renewal Agency has been implementing an extensive project to address deficiencies in the sanitary and stormwater systems, including repairing leaks in the system, replacing old sewer lines, improving stormwater conveyance system, and replacing pump stations. The City has a stormwater system, but information about the system is lacking. See **Appendix Q** for schematics/maps of the City's water systems.

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	North and South Weist Creeks (impoundments created by 10 for high concrete dams) and Eckman Creek; Southworth Creek (not an active water source)		Eckman Creek used during late spring and summer months when flows from the two Weist Creek impoundments are insufficient to meet the raw water requirements
Water Treatment Plant, capacity (mgd)	0.5 mgd (175 gpm x 2)	1983, to package treatment systems with the capacity of 175 GPM each	Installing improved filters to increase treatment rate to 280 GPM each
Storage reservoirs, total capacity (MG)	2.325 MG total; 2 MG, 300,000 G, 25,000 G	1983, 1964, 2002	
Pump Stations, # and capacity			
Pipelines, total (feet/miles)	125,689 feet (23.8 miles)		Older galvanized iron, steel, and asbestos cement piping sections frequently are replaced due to poor condition

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
			(leakage, corrosion, loss of capacity)
Interconnections	Mutual Aid Agreement with Southwest Lincoln County Water District (serves an unincorporated area south of the City between Waldport and the City of Yachats) to provide and receive water in emergencies or drought assuming surplus water is available; however, excess water is not anticipated during drought because both systems rely on coastal streams		

Source: The Dyer Partnership, Inc., 2013

Wastewater System Infrastructure

The City has an old collection system, which has resulted in significant I&I problems. The City has been working to reduce its inflow and infiltration into their treatment system, including the City's Urban Renewal Agency beginning an extensive project in 1997 to address the sanitary and storm water systems. The City performed extensive tests of its collection system and has been repairing leaks in the system, replacing old sewer lines, disconnecting illegal connections, improving stormwater conveyance system, and replacing pump stations (Golf Course, and Ocean Hills).

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
Wastewater treatment plant, capacity (mgd)	Peak capacity: 2.2 mgd; Design flows based on a design year 2013 and a population of 3294: Average dry weather: 0.36 mgd Max Month Dry Weather: 0.47 mgd Max Month Wet Weather: 0.70 mgd Peak Daily: 1.20 mgd Peak Weekly: 0.83 mgd Peak Instantaneous: 2.00 mgd	1993	Activated Sludge-sequence Batch Reactor, UV disinfection system (2.0 mgd maximum capacity) Treatment System Class: II, Collection System Class: II
Wastewater treatment plant location	City of Waldport 390 Lint Slough Rd, Waldport		
Mains (linear feet)			
Effluent discharge pipe (linear feet)			
Effluent discharge location	Lint Slough (Alsea subbasin), River Mile 0.6, where the Alsea Highway crosses Lint Slough		
Pump station overflow locations			
Compliance history	Violations occurred in 1993, 1994 (3), 1995 (2), 1996, 2002		
Manholes			
Lift stations			

Source: DEQ[1], 2003

Stormwater System Infrastructure

Stormwater Infrastructure	Description	Year(s) Built	Comments (if any)
Mains (linear feet)			
Storm water drain pipeline (linear feet/miles)			
Outfalls			
Culverts			
Manholes			
Catch basins/area drains			

Water Conservation Program

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit	Yes	Annual and monthly audits	5.8 % non-revenue water average from July 2008-June 2011
Fully Metered System	Yes		
Meter testing and maintenance	Yes	Billing program flags abnormal readings that could indicate a meter malfunction; source water production meters calibrated annually; all customer meters replaced with new meters in the past few years)	Inaccurate meters thought to account for 1-3% of non-revenue water
Water rates based, at least in part, on the quantity of water used	Yes		Charge per 100 CF
Leak detection and pipeline repair/replacement	Yes	Uses leak detection equipment, regularly checks the system for leaks; ongoing	A Citizens Patrol group looks for unusual activity such as new puddles of water indicating a leaky line, and have noted illegal activities

Category of Conservation Measures	A Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
		replacement of pipelines, particularly AC piping; if build usage versus production volume is greater than 6%, public works actively looks for leaks; leaks are generally apparent at the surface due to a high water table	(unauthorized/unmetered filling of tanker trucks from fire hydrants)
Public education	Yes		Supports water conservation education and local schools
Technical and Financial Assistance programs	No		
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	No		
Water Reuse, Recycling, and Non-potable Water Opportunities	No		Treated wastewater is planned to be used at the local golf course when the golf course can afford system upgrades

Source: The Dyer Partnership, Inc., 2013

Finances

Type of Water Infrastructure	Financial Category	Funding FY 16-17	Expenditures FY 16-17	Number of Connections	Population
Potable Water	Total Operating Capital			1,318	2,080
Wastewater	Total Operating Capital				
Stormwater	Total Operating Capital				

City of Yachats

The City of Yachats, located along the mouth of the Yachats River and a relatively rugged portion of coastline, is primarily a resort and retirement community. The City's water service area population of 600 can nearly double during the summer tourist season when the City's resorts, rentals, and second homes become fully occupied; it can peak at 2,500. The City's primary sources of water are Reedy Creek and Salmon Creek, tributaries to the Yachats River. The City upgraded its WWTP and pump stations in 2009 to reduce overflow events. Wastewater effluent is discharged into the ocean, approximately 300 feet offshore. The City's stormwater system is currently under review and a search of a revenue source is underway. See **Appendix** R for schematics/maps of the City's water systems.

Potable Water Infrastructure

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Diversions	Reedy Creek: diversion 2 miles east of town, estimated capacity is 2 cfs; Salmon Creek: diversion 100 yards north of the WTP, intake estimated capacity is 1.0 cfs	Diversion and intake on Reedy Creek reconstructed in 1998,;	Salmon Creek is a backup to Reedy Creek (City has water rights on the Yachats River and Cape Creek, but do not divert); Reedy and Salmon Creeks do not have sufficient flow in the late summer to supply the City's raw water needs;
Water Treatment Plant, capacity (mgd)	0.5 mgd	1992	
Storage reservoirs, total capacity (MG)	Raw water: 0.5 MG Treated water: 1.696 MG total from 6 reservoirs, Primary tank: 1.0 MG, Round tank: 200,000 G Upper tank: 10,000 G Blackstone tank: 10,000 G Blackstone tank: 126,000 G	Raw water: 2000 Primary Tank: 1992 Round Tank: 1945 Upper tank: 1964 2 Blackstone tanks: 2015	Currently constructing a tank in south Yachats. 250,000 G
Pump Stations, # and capacity	Windsong PS: 150gpm Blackstone 1 PS: 100gpm Blackstone 2 PS 50 gpm Horizon PS: 50 Radar PS: 100 gpm	Windsong PS: 2015 Blackstone 1 PS: 2015 Blackstone 2 PS: 2015 Horizon PS: 1964 Radar PS: 1945	

Potable Water Infrastructure	Description	Year(s) Built	Comments (if any)
Pipelines, total (feet/miles)	Treated water transmission pipeline (WTP to system): 4700 feet Distribution system: 62,000 feet (12 miles)	Transmission pipeline: 1992	AC piping frequently replaced due to poor condition
Interconnections	Mutual Aid Agreement with Southwest Lincoln County Water District, which provides water to unincorporated areas north of the City between Yachats and the City of Waldport.		

Source: The Dyer Partnership, Inc. 2001

Wastewater System Infrastructure

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
Wastewater treatment plant(mgd)	Average dry weather design flow: 0.33 mgd; actual average dry weather design flow from May-August 2009 was 0.12 mgd; (maximum monthly average flow was 0.272 mgd as of 2009 and maximum daily flow was 0.479 mgd in December 2009)	New WWTP completed in February 2009	Activated Sludge-Sequencing Batch Reactor Treatment Plant, UV disinfection system Treatment System Class II, Collection System Class II
Wastewater treatment plant, location	500 W. 7th St. Yachats	Built 2008	
Mains (linear feet)	12 miles of gravity collection piping		
Effluent discharge pipe (linear feet)	500 feet of 10 inch pipe		
Effluent discharge location	Pacific Ocean, 300 feet from Ocean View Drive bluff; 10 inch diameter pipe		Full pipe typically exposed only during minus tide conditions
Pump stations	5	Main, Park, Riverside and Pontiac replaced in February 2009;	

Wastewater Infrastructure	Description	Year(s) Built	Comments (if any)
Overflow Event History	4 since the last permit renewal (2004, 2006, and 2007 occurred before the new WWTP and pump station upgrades; 2009 due to loss of electrical power to one of the pump stations; 2008: raw sewage overflow to the Yachats River)		
Manholes	550		
Lift stations	5 lift stations		

Source: DEQ[1], 2009; DEQ, 2010

Stormwater System Infrastructure

Stormwater Infrastructure	Description	Year(s) Built	Comments (if any)
Mains (linear feet)			
Storm water drain pipeline (linear feet/miles)			unknown
Outfalls			
Culverts			
Manholes			
Catch basins/area drains			

Water Conservation Program

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
Annual water audit	Yes	Performs monthly and annual water audits	40% non-revenue water (average 1997-2000)
Fully Metered System	Yes		
Meter testing and maintenance	Yes	The City is the process of replacing all meters.	
Water rates based, at least in part, on the quantity of water used	Yes	Base rate includes 200 cf and a	

Category of Conservation Measures	Current Water Conservation Measure (Yes/No)	Measure Examples	Comments (if any)
		consumption rate for each 100 cubic feet there after	
Leak detection and pipeline repair/replacement	Yes	Periodic leak detection surveys, ongoing pipe repair and replacements	
Public education	Yes	Conservation messages in water bills, brochures, website	
Technical and Financial Assistance programs	No		
Supplier Financed Retrofit or Replacement of Inefficient Fixtures	Yes	Free showerheads and faucet aerators, toilet rebates	
Non-potable Water Opportunities	Yes	WWTP	

Source: The Dyer Partnership, Inc. 2001

Finances

Type of Water Infrastructure	Financial Category	Funding FY 16-17	Expenditures FY 16-17	Number of Connections	Population
Potable Water	Total Operating Capital	$715,669		853	1,000
Wastewater	Total Operating Capital	$713,153			
Stormwater	Total Operating Capital	$0			

2.3.3.3. Other Built Systems

Devils Lake Water Improvement District (District)

The District is working to address water quality problems in Devils Lake caused by septic systems, such as installing sewer systems that connect to the City of Lincoln City's wastewater system. For more information: **http://dlwid.org/projects/**

Georgia Pacific (Industry)

Georgia Pacific owns a water storage facility located on the West Fork Olalla Creek called Ollala Reservoir. The reservoir stores water from the Siletz River for use at the Georgia-Pacific plant in the City of Toledo. At River Mile 4.3, the West Fork Olalla Creek enters Olalla Creek. Georgia Pacific also maintains a tide-gate at River Mile 0.8 on Olalla Creek that prevents upstream flow of saline water from the Yaquina River (Bio-Surveys, LLC, 2003).

Hydropower Projects

Contact Name	Status	Expiration Date (Oregon)	Stream	Tributary	cfs
Oregon Dept Fish & Wildlife Attn: Christopher Lorion	Certificate 81670	12/31/2025	Mill Creek Reservoir	Yaquina River	0.06
Digger Mountain Forestry, LLC	Certificate 83638	12/31/2027	an Unnamed Creek, tributary to the Alsea River	Alsea River	0.11
Hans D. and J. Karin Radtke	Certificate 76816	12/31/2021	an Unnamed Stream, tributary to Ten Mile Creek	Ten Mile Creek	1

Source: OWRD, 2017

Certificate 81670 authorizes the right to use the waters of Mill Creek Reservoir, constructed under Reservoir Permit R-5132, for hydroelectric production of 0.34 theoretical horsepower of energy to be stored in batteries to operate a fish trap to catch juvenile salmon migrating downstream.

Certificate 83638 authorizes the right to use waters of Unnamed Creek, for hydroelectric production of 1.52 theoretical horsepower of energy for household use.

Certificate 76816 authorizes the right to use waters of an Unnamed Stream for development of 9.5 theoretical horsepower for domestic use.

2.3.4. Data Gaps

- Many water, wastewater, and stormwater systems do not have complete information on inventory and condition.
- Lack of information on water contamination from sanitary sewer overflows and stormwater.
- Funding
    1. Revenue source
    2. Annual operation and maintenance expenditures
    3. Capital improvement plan
    4. Estimate of unfunded needs to replace aging infrastructure
    5. Funding for growth

2.3.5. Sources

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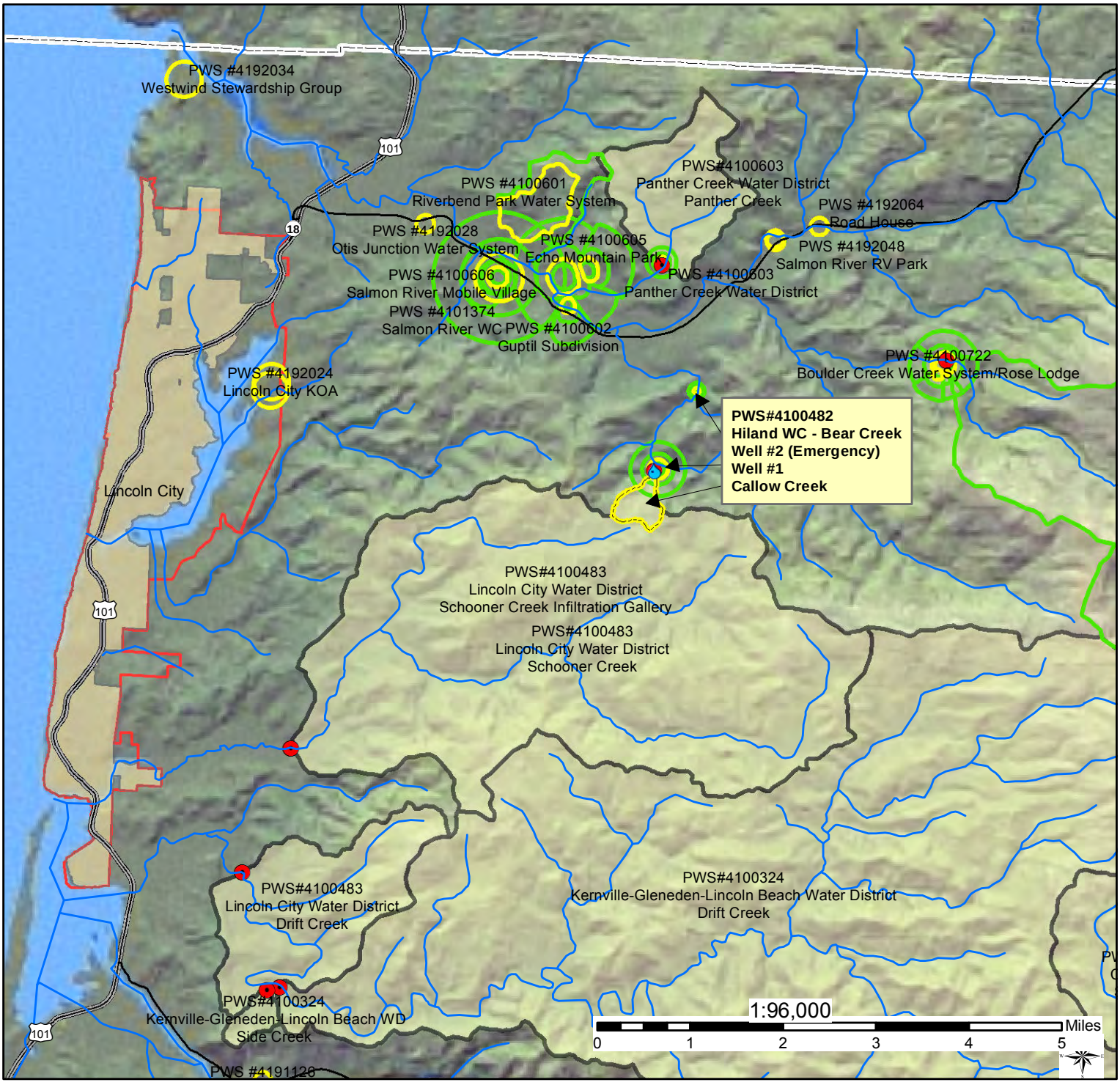
Appendix A

Source Water Maps:

Potable Water Systems with Certified Water Treatment Plant Operators

Figure 1. Hiland Water Corp.- Bear Creek (PWS 00482) Drinking Water Source Area and Adjacent Source Areas



Legend

- rivers
- Hiland Water Co.-Bear Creek surface water intake
- Surface Water Intake
- Hiland Water Co - BearCreek Drinking Water Source Area
- Surface Water DWSAs
- Groundwater 2-yr TOT (Zone 1 for Springs)
- Groundwater Drinking Water Source Area
- City limits (ODOT, 2013)
- Urban Growth Boundary (2010)
- County Boundary

Highways

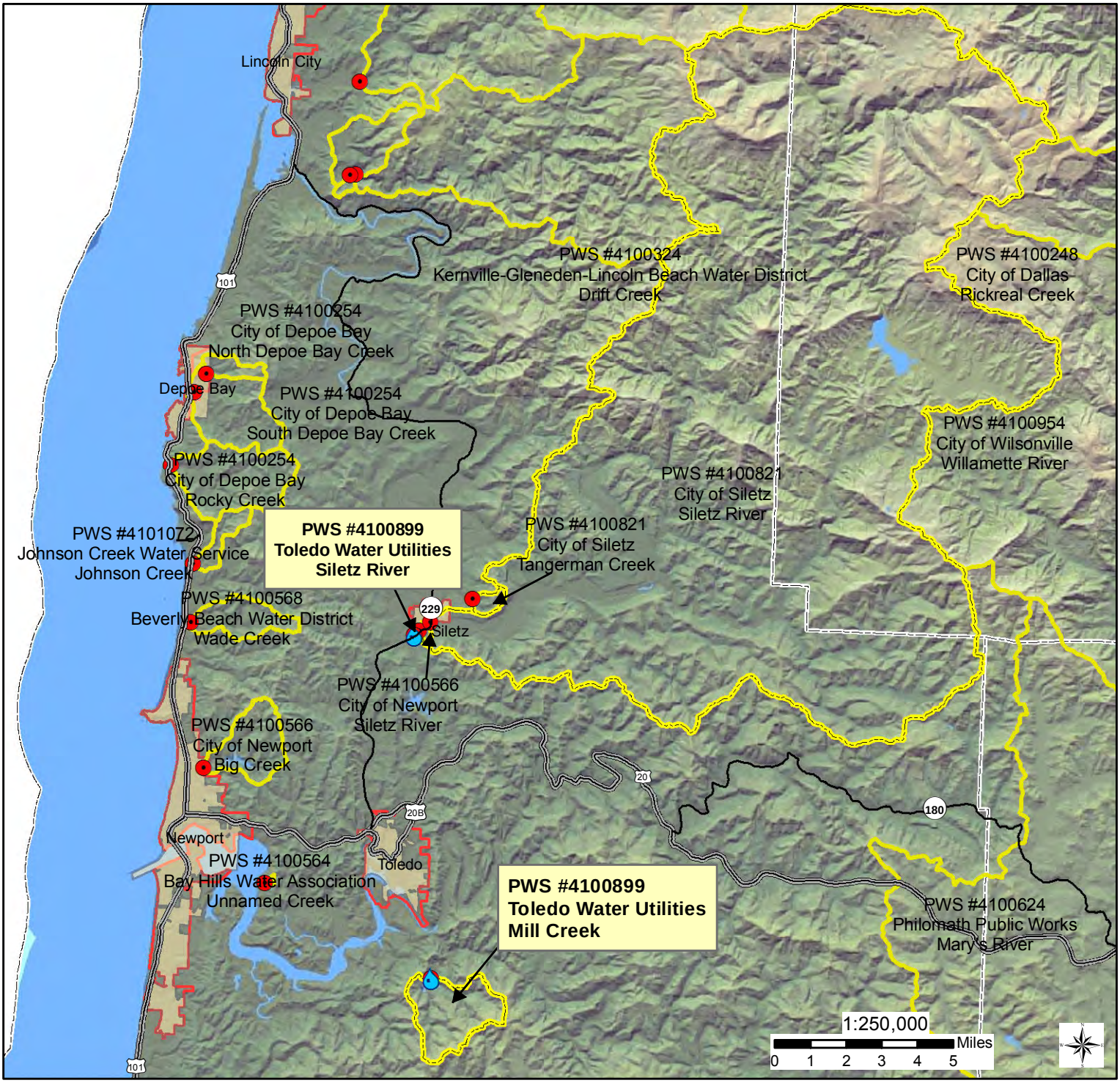
- Interstate
- U.S. Routes
- Oregon Routes

This data analysis was conducted for strategic planning purposes in drinking water protection. If other uses are considered for the data, please contact DEQ's Drinking Water Protection Program for details on how this query was performed. It is important to understand the limitations and qualifications of queries to ensure appropriate interpretation of this data. No warranty expressed or implied is made regarding the accuracy or utility. This disclaimer applies both to individual use of the data and aggregate use with other data.

Oregon Dept of Environmental Quality/Environmental Solutions Division/Water Quality Program
Drinking Water Protection Program/GIS
Projection: Oregon Lambert (Lambert Conformal Conic)
GCS_North_American_1983, Datum: D_North_American_1983
File:\\deqhq1\dwp\SWA Reports & Plan\Update SWA SW 2016\PWSReports\4100483_LincolnCityWater District\USWA_Fig1_SW_LincolnCityWaterDistrict_VicinityMap.mxd
Prepared by: 19AUG2016 (sda), Printed: 17NOV2016 (

Note on Base Layer: The hillshade color effect shown here is the result of additional processing of digital elevation models (DEM - 30 meter grid) data from 1:24000 topographic maps. A "hillshade" was produced first and then color adjusted. The original DEM files were developed by the OR Dept. of Forestry. Additional processing of the hillshade data with Red, Green, Blue (RGB) color scheme resulted in the "orshade.sid" dataset displayed here. The data set is provided for use by the Oregon Geospatial Data Center.

Figure 1. Toledo Water Utilities (PWS 00899) Drinking Water Source Area and Adjacent Source Areas



Legend

- Toledo Water Utilities surface water intake
- Surface Water Intake
- Toledo Water Utilities Drinking Water Source Areas
- Surface Water DWSAs
- City limits (ODOT, 2013)
- Urban Growth Boundary (2010)
- County Boundary

Highways

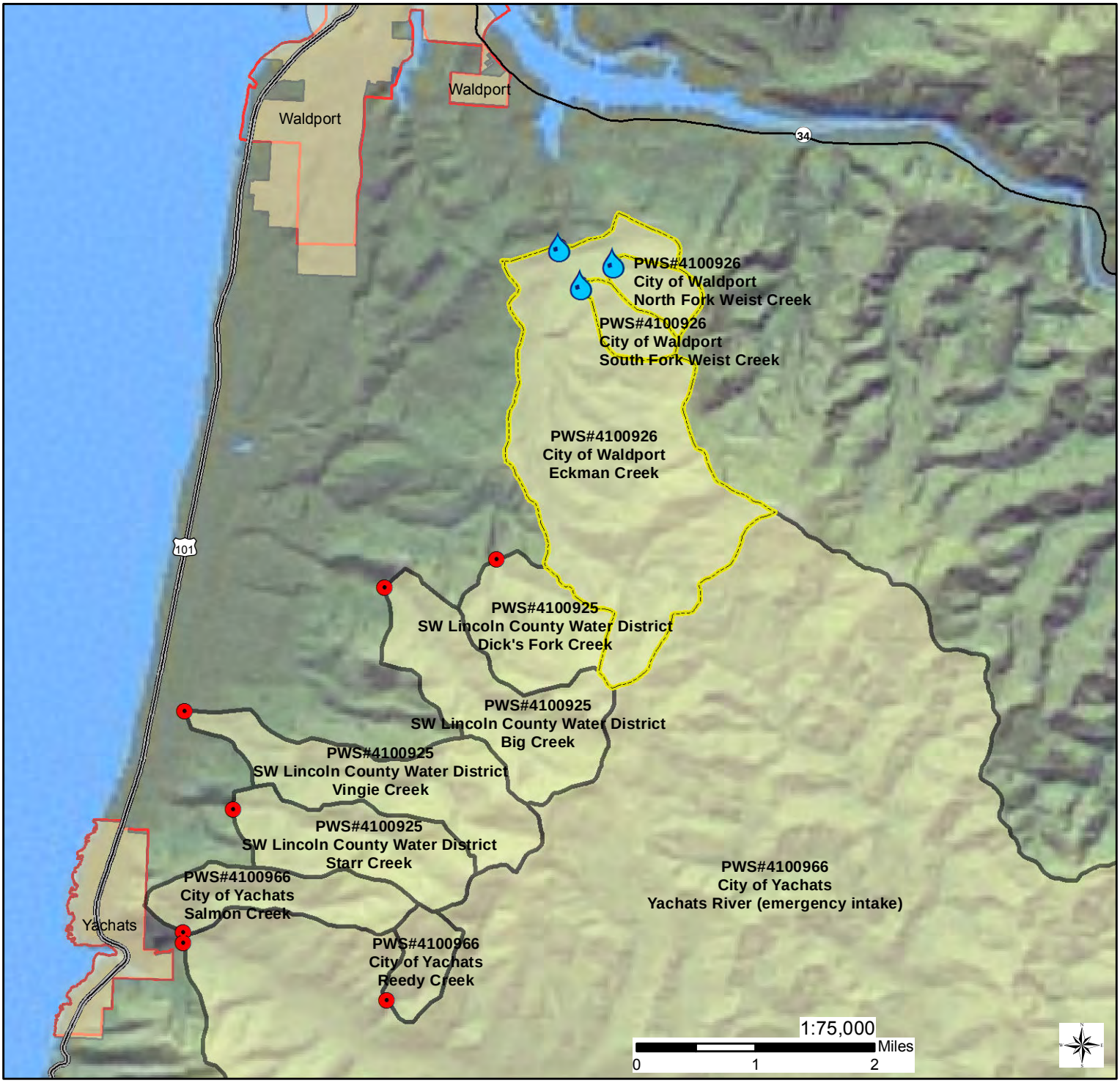
- Interstate
- U.S. Routes
- Oregon Routes

This data analysis was conducted for strategic planning purposes in drinking water protection. If other uses are considered for the data, please contact DEQ's Drinking Water Protection Program for details on how this query was performed. It is important to understand the limitations and qualifications of queries to ensure appropriate interpretation of this data. No warranty expressed or implied is made regarding the accuracy or utility. This disclaimer applies both to individual use of the data and aggregate use with other data.

Oregon Dept of Environmental Quality/Environmental Solutions Division/Water Quality Program
Drinking Water Protection Program/GIS
Projection: Oregon Lambert (Lambert Conformal Conic)
GCS_North_American_1983, Datum: D_North_American_1983
File:\\deqhq1\dwp\SWA Reports & Plan\Update SWA SW 2016\PWSReports\4100899_Toledo\USWA_Fig1_SW_ToledoWaterUtilities_VicinityMap.mxd
Prepared by:sda (22SEP2016), Printed: 22SEP201616 (sda)

Note on Base Layer: The hillshade color effect shown here is the result of additional processing of digital elevation models (DEM - 30 meter grid) data from 1:24000 topographic maps. A "hillshade" was produced first and then color adjusted. The original DEM files were developed by the OR Dept. of Forestry. Additional processing of the hillshade data with Red, Green, Blue (RGB) color scheme resulted in the "orshade.sid" dataset displayed here. The data set is provided for use by the Oregon Geospatial Data Center.

Figure 1. City of Waldport (PWS 00926) Drinking Water Source Area and Adjacent Source Areas



Legend

City of Waldport surface water intake

City of Waldport Drinking Water Source Areas

Surface Water Intake

Surface Water DWSAs

City limits (ODOT, 2013)

Urban Growth Boundary (2010)

County Boundary

Highways

Interstate

U.S. Routes

Oregon Routes

This data analysis was conducted for strategic planning purposes in drinking water protection. If other uses are considered for the data, please contact DEQ's Drinking Water Protection Program for details on how this query was performed. It is important to understand the limitations and qualifications of queries to ensure appropriate interpretation of this data. No warranty expressed or implied is made regarding the accuracy or utility. This disclaimer applies both to individual use of the data and aggregate use with other data.

Oregon Dept of Environmental Quality/Environmental Solutions Division/Water Quality Program
Drinking Water Protection Program/GIS
Projection: Oregon Lambert (Lambert Conformal Conic)
GCS_North_American_1983, Datum: D_North_American_1983
File:\\deqhq1\dwp\SWA Reports & Plan\Update SWA SW 2016\PWSReports\4100926_Waldport\USWA_Fig1_SW_City of Waldport_VicinityMap.mxd
Prepared by: S. Aalbers (06JUL2016), Printed: 06JUL2016 (sda)

Note on Base Layer: The hillshade color effect shown here is the result of additional processing of digital elevation models (DEM - 30 meter grid) data from 1:24000 topographic maps. A "hillshade" was produced first and then color adjusted. The original DEM files were developed by the OR Dept. of Forestry. Additional processing of the hillshade data with Red, Green, Blue (RGB) color scheme resulted in the "orshade.sid" dataset displayed here. The data set is provided for use by the Oregon Geospatial Data Center.

Appendix B

Classification of Wastewater Systems by DEQ

Oregon Administrative Rules (OARs) filed through August 15, 2017

DEPARTMENT OF ENVIRONMENTAL QUALITY

DIVISION 49

REGULATIONS PERTAINING TO CERTIFICATION OF WASTEWATER SYSTEM OPERATOR PERSONNEL

340-049-0020 Classification of Wastewater Systems

(1) All wastewater systems will be classified by the Department as wastewater treatment systems and/or wastewater collection systems, as appropriate, in accordance with the following classification system:

(a) Small Wastewater Systems — 30 total points or less; less than 500 design population or less than 150 connections.

(b) Wastewater Treatment Systems

(A) Class I — 30 total points or less;

(B) Class II — 31-55 total points;

(C) Class III — 56-75 total points;

(D) Class IV — 76 or more points.

(c) Wastewater Collection Systems:

(A) Class I — 1,500 or less design population;

(B) Class II — 1,501 to 15,000 design population;

(C) Class III — 15,001 to 50,000 design population;

(D) Class IV — 50,001 or more design population.

(2) Wastewater treatment system classifications will be derived from the total points assigned based on criteria shown in OAR 340-049-0025.

340-049-0025

Criteria for Classifying Wastewater Treatment Systems

(1) Design Population or Population Equivalent Points:

(a) Less than 750 — 0.5 points;

(b) 751 to 2000 — 1 point;

(c) 2001 to 5000 — 1.5 points;

(d) 5001 to 10,000 — 2 points;

(e) Greater than 10,000 — 3 points plus 1 point per 10,000.

(2) ADWF Points:

(a) Less than 0.075 MGD — 0.5 point;

(b) Greater than 0.075 to 0.1 MGD — 1 point;

(c) Greater than 0.1 to 0.5 MGD — 1.5 points;

(d) Greater than 0.5 to 1.0 MGD — 2 points;

(e) Greater than 1.0 MGD — 3 points plus 1 point per 1 MGD.

(3) Unit Process Points:

(a) Preliminary Treatment and Plant Hydraulics:

(A) Comminution — 1 point;

(B) Grit Removal, gravity — 1 point;

(C) Grit Removal, mechanical — 2 points;

(D) Screen(s), in-situ or mechanical — 1 point;

(E) Pump/Lift Station(s) — 2 points;

(F) Flow Equalization — 1 point.

(b) Primary Treatment:

(A) Community Septic Tank(s) — 2 points;

(B) Clarifier(s) — 5 points;

(C) Flotation Clarifier(s) — 7 points;

(D) Chemical Addition System — 2 points;

(E) Imhoff Tank — 3 points.

(c) Secondary, Advanced, and Tertiary Treatment:

(A) Low Rate Trickling Filter(s) — 7 points;

(B) High Rate Trickling Filter(s) — 10 points;

(C) Trickling Filter — Solids Contact System — 12 points;

(D) Activated Sludge — 15 points;

(E) Pure Oxygen Activated Sludge — 20 points;

(F) Activated Bio Filter Tower less than 0.1 MGD — 6 points;

(G) Activated Bio Filter Tower greater than 0.1 MGD — 12 points;

(H) Rotating Biological Contactors 1 to 4 shafts — 7 points;

(I) Rotating Biological Contactors, 5 or more shafts — 12 points;

(J) Stabilization Lagoons, 1 to 3 cells without aeration — 5 points;

(K) Stabilization Lagoons, 2 or more cells with primary aeration — 7 points;

(L) Stabilization Lagoons, 2 or more with full aeration — 9 points;

(M) Recirculating Gravel Filter — 7 points;

(N) Chemical Precipitation Unit(s) — 3 points;

(O) Gravity Filtration Unit(s) — 2 points;

(P) Pressure Filtration Unit(s) — 4 points;

(Q) Nitrogen Removal, Biological or Chemical/Biological System — 4 points;

(R) Nitrogen Removal, Designed Extended Aeration Only — 2 points;

(S) Phosphorus Removal Units — 4 points;

(T) Effluent Microscreen(s) — 2 points;

(U) Chemical Flocculation Units — 3 points;

(V) Chemical Addition System — 2 points;

(W) Ultrafiltration Membrane(s) — 15 points.

(d) Solids Handling:

(A) Anaerobic Primary Sludge Digester(s) without Mixing and Heating — 5 points;

(B) Anaerobic Primary Sludge Digester(s) with Mixing and Heating — 7 points;

(C) Anaerobic Primary and Secondary Sludge Digesters — 10 points;

(D) Sludge Digester Gas reuse — 3 points;

(E) Aerobic Sludge Digester(s) — 8 points;

(F) Sludge Storage Lagoon(s) — 2 points;

(G) Sludge Lagoon(s) with aeration — 3 points;

(H) Sludge Drying Bed(s) — 1 point;

(I) Sludge Air or Gravity Thickening — 3 points;

(J) Sludge Composting, In Vessel — 12 points;

(K) Sludge Belt(s) or Vacuum Press/Dewatering — 5 points;

(L) Sludge Centrifuge(s) — 5 points;

(M) Sludge Incineration — 12 points;

(N) Sludge Chemical Addition Unit(s) — 2 points;

(O) Non-Beneficial Sludge Disposal — 1 point;

(P) Beneficial Sludge Utilization — 3 points;

(Q) Solids Reduction Processing — 4 points.

(e) Disinfection:

(A) Liquid Chlorine Disinfection — 2 points;

(B) Gas Chlorine Disinfection — 5 points;

(C) On-Site Chlorine Generation of Disinfectants — 5 points;

(D) Dechlorination System — 4 points;

(E) Other disinfection systems including ultraviolet and ozonation — 5 points.

(4) Effluent Permit Requirements Points:

(a) Minimum of secondary effluent limitations for BOD and/or Total Suspended solids — 2 points;

(b) Minimum of 20 mg/L BOD and/or Total Suspended Solids — 3 points;

(c) Minimum of 10 mg/L BOD and/or Total Suspended Solids — 4 points;

(d) Minimum of 5 mg/L BOD and/or Total Suspended Solids — 5 points;

(e) Effluent limitations for effluent oxygen — 1 point.

(5) Variation in Raw Waste Points. Points in this category will be awarded only when conditions are extreme to the extent that operation and handling procedure changes are needed to adequately treat the waste due to variation of raw waste:

(a) Recurring deviations or excessive variations of 100% to 200% in strength or flow — 2 points;

(b) Recurring deviations or excessive variations of more than 200% in strength or flow, or conveyance and treatment of industrial wastes covered by a pretreatment program — 4 points.

(c) Septage or truck hauled waste — 2 points.

(6) Sampling and Laboratory Testing Points:

(a) Sample for BOD, Total Suspended Solids performed by outside laboratory — 2 points;

(b) BOD or Total Suspended Solids analysis performed at treatment plant — 4 points;

(c) Bacteriological analysis performed by outside laboratory — 1 point;

(d) Bacteriological analysis performed at treatment plant — 2 points;

(e) Nutrient, Heavy Metals, or Organics analysis by outside laboratory — 3 points;

(f) Nutrient, Heavy Metals or Organics analysis performed at treatment plant — 5 points.

Stat. Auth.: ORS 448.410, 468.020 & 468B.030
Stats. Implemented: ORS 448.405 - 448.430 & 448.992
Hist.: DEQ 23-1988, f. & cert. ef. 9-15-88; DEQ 15-2002, f. & cert. ef. 10-16-02; DEQ 2-2013, f. 1-28-13, cert. ef. 3-1-13

Appendix C

DEQ's Sanitary Sewer Overflow Form

Oregon Department of Environmental Quality

SSO Reporting Form

This information must be submitted within 5 days of becoming aware of the overflow.
Please complete online and print for signature. Be sure to fill out all fields.

SSO

FACILITY/CONTACT INFORMATION		
Name of Permittee:		
Contact Name:		
Phone:	Email:	County:
DEQ Permit # (see permit face page):		DEQ File #:
OERS Incident #:		Date Reported to OERS:
Date Reported To DEQ:		Today's Date:
Date SSO Started (if known):		Time Started (if known):
Date SSO Stopped (if known):		Time Stopped (if known):
SSO Location:		
SSO Nearest Address:		
City:		Zip Code:
SSO Latitude (if known):		Longitude (if known):
Estimate of Quantity Overflowed:		(Gallons) Link to estimation method
Did the SSO discharge to surface water?		
Name of waterbody:		

PUBLIC NOTIFICATION
Notified downstream drinking water sources (List Below)?
Name of drinking water facility:
Signs Posted?
Media contacted?
Who?
List any other steps taken to notify the public or state/federal agencies:

CAUSES
Cause or suspected cause of the overflow: *If needed, attach additional sheets*
Rainfall in the 24 hours prior to SSO (for storm-related overflows): (inches)
Source of rainfall data: *If needed, attach additional sheets*

1-in-5 year 24 hour rainfall for the sewerage system area (if known): (in/24hr)

EMERGENCY RESPONSE AND MIGRATION	
List actions taken to stop and mitigate the impact of the SSO.	
For overland flow:	Taped off affected area?
	Cleaned up affected area?
For SSO to surface water:	Bacteria samples taken to confirm impact?
	Follow up bacteria samples taken to confirm end of impact?
Describe monitoring and results:	
For SSOs that impact buildings:	Pumped out flooded buildings?
	Disinfected?
Other measures taken (describe):	
Steps taken or planned to reduce, eliminate, and prevent the reoccurrence of the overflow and schedule for those steps:	

COMMENTS

I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

Authorized Signature

Date

Name (print)

Phone Number

*You may attach additional information to this report before sending to DEQ as needed to explain the circumstances of the overflow. This information may include but is not limited to: maintenance records and bacteria monitoring results.

Upon completion, print out this form and send to the appropriate DEQ Address:		
Portland-Permit Coordinator 700 NE Multnomah St., Suite 600 Portland, OR 97232	**Salem-Permit Coordinator** 4026 Fairview Industrial Dr. SE Salem, OR 97302	**Pendleton-Permit Coordinator** 800 SE Emigrant, #330 Pendleton, OR 97801

FOR DEQ PERSONNEL ONLY

☐ Pre-Enforcement Notice

☐ Warning Letter

No enforcement action was warranted because:

☐ The SSO was caused by unpreventable vandalism or similar force majeure; or

☐ The SSO is allowed as an exception to the permit as maintenance; or

☐ The cause of the current SSO was beyond reasonable control AND we do not expect the premittee to prevent similar SSOs in the future; or

☐ The SSO was 400 gallons or less, spilled to the ground and not reaching surface water; permittee properly reported, cleaned up, and took appropriate public notice measures; and the SSO was not part of a chronic problem.

COMMENTS

Appendix D

NPDES Permits

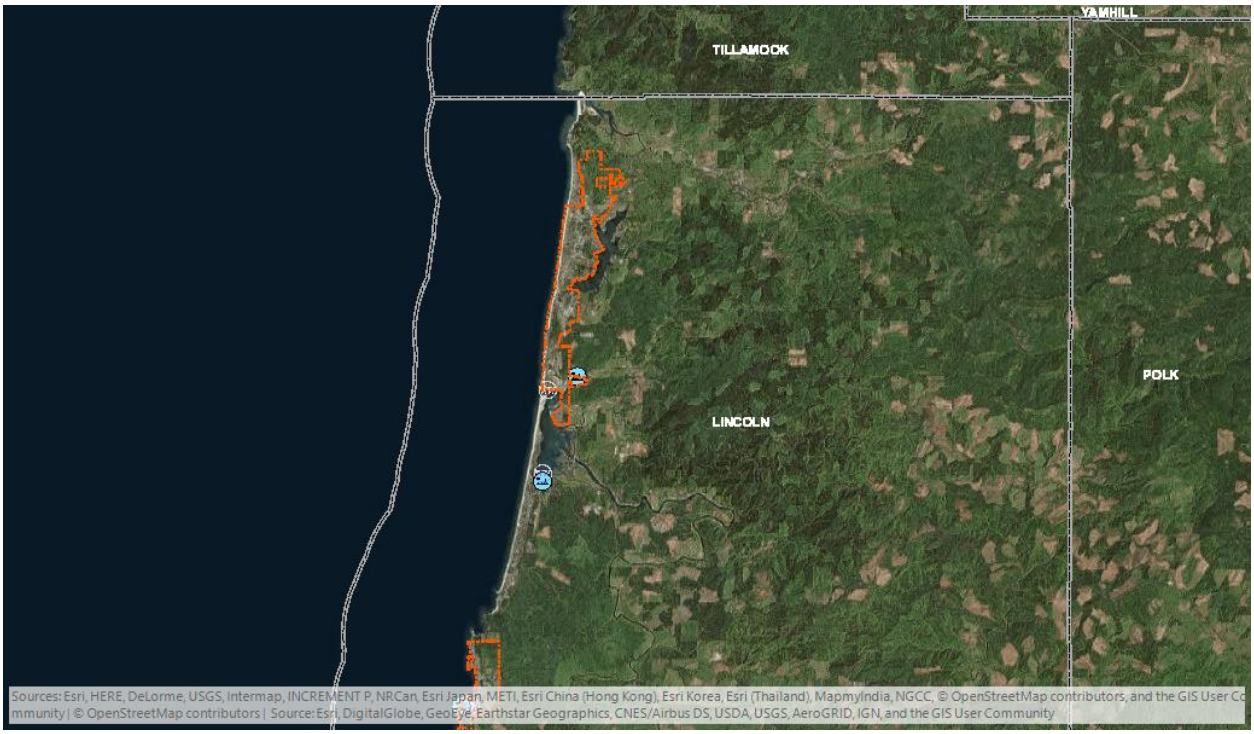
Effluent Discharge Locations

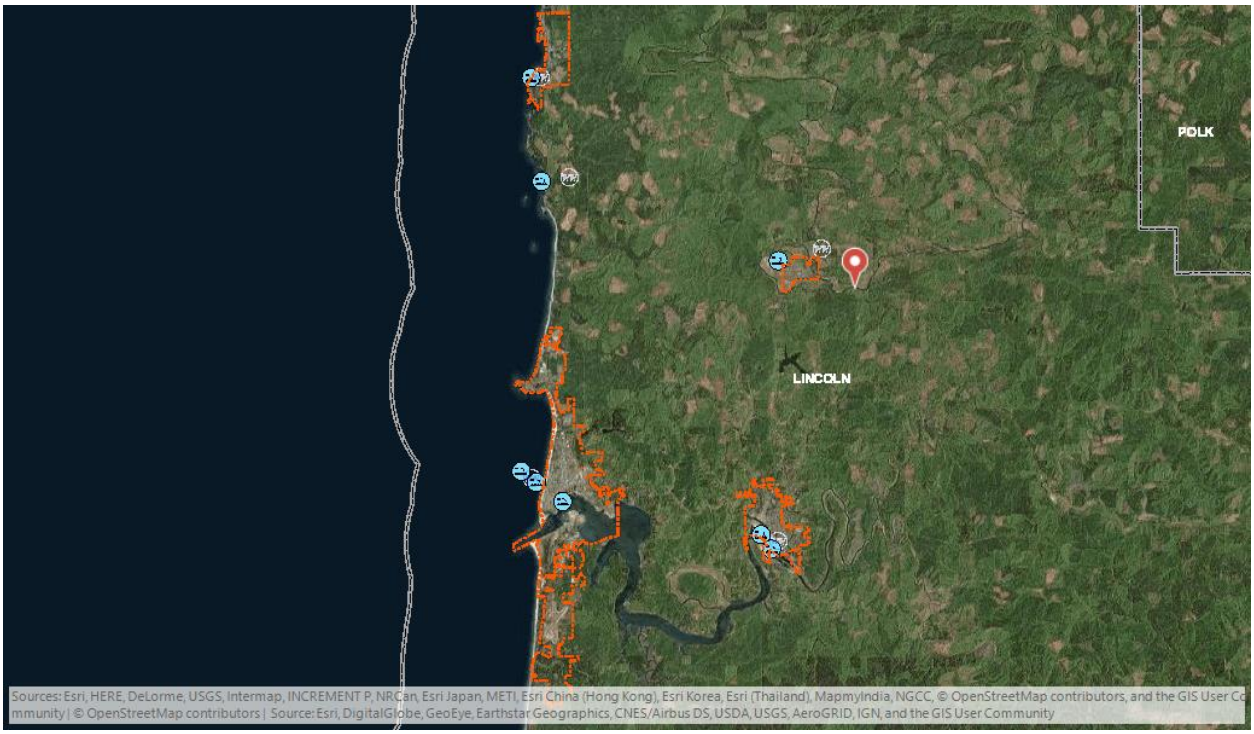
White dot = Water Quality domestic wastewater treatment sites (DEQ - SIS as of 1/25/2016)

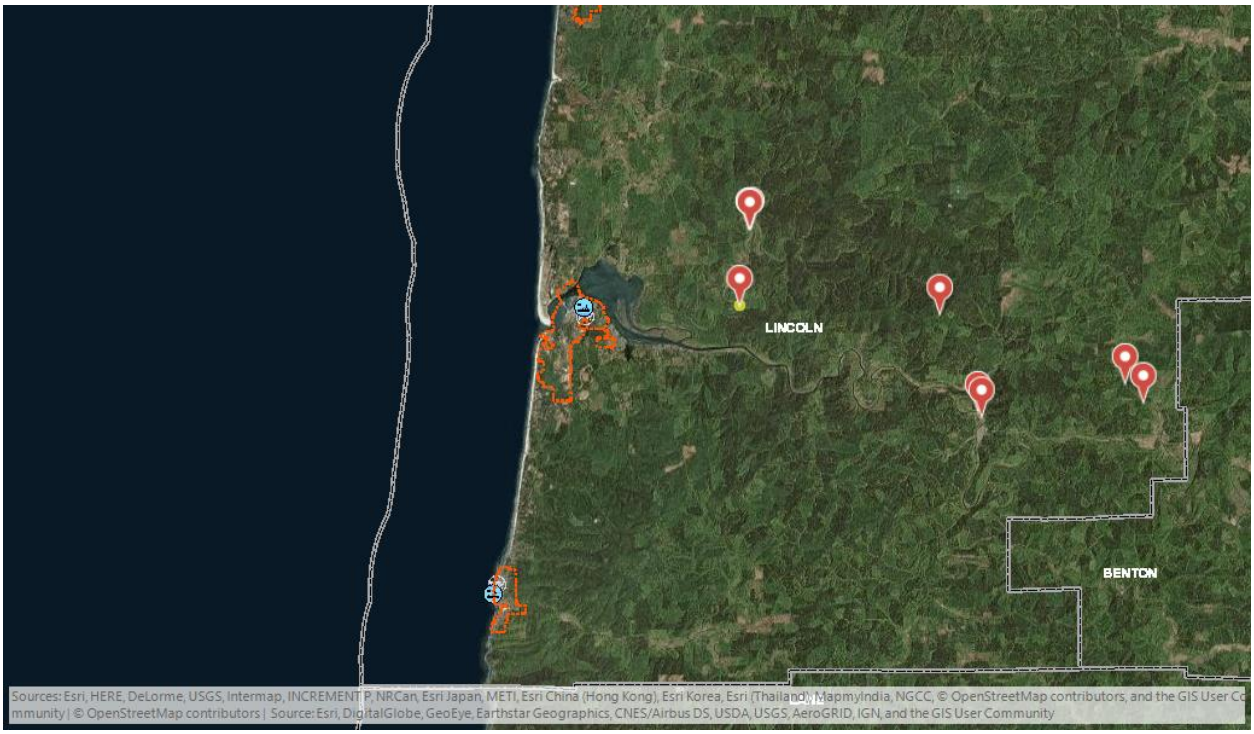
Blue dot = Water Quality effluent outfalls (DEQ -WQ as of 2009)

Source: DEQ's Drinking Water Protection Interactive Map Viewer

http://www.oregon.gov/deq/wq/programs/Pages/DWP-Maps.aspx




POLK
LINCOLN
Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community | © OpenStreetMap contributors | Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community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BENTON
Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community | © OpenStreetMap contributors | Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendix E

Classifications of Recycled Water and Types of Beneficial Uses of Recycled Water

2.3 Classes of Recycled Water

The rules identify four Classes of disinfected recycled water, and a nondisinfected recycled water. Although these Classes of water are similar to the Levels defined in previous rules, the correlation is inexact. Any new or renewed permit, including the associated RWUP, should refer to the Classes of Water described in Table 3.

Table 3. Recycled water Classes identified in rule, based upon level of treatment.

	Class A	Class B	Class C	Class D	Nondisinfected
Former Level	IV	III	II	Enhanced I	I
Oxidized					
Disinfected					
Filtered					
Turbidity (NTU)					
24-hr mean	2				
5% of time during a 24-hr period	5				
Maximum at any time	10				
Monitoring Frequency	hourly				
Total coliform (organisms/100 mL)					
7-day median	2.2	2.2	23		
Maximum in any sample	23	23			
Maximum in 2-consecutive			240		
Monitoring Frequency	daily	3/wk	1/wk		
E. coli					
30-day log mean				126	
Maximum in any sample				406	
Monitoring Frequency				1/wk	
Beneficial Purposes	More				Less
Conditions on use	Less Restrictive				More Restrictive

Although the rules allow the use of nondisinfected recycled water, nondisinfected water should be assumed to contain significant levels of pathogenic organisms and to carry the highest public health risk. Consequently, DEQ should encourage facilities currently permitted to use nondisinfected water to treat their effluent to Class D or better for reuse applications.

2.4 Public Health and Environmental Concerns

DEQ encourages the use of recycled water for beneficial purposes provided the recycled water use is protective of the environment and public health [OAR 340-055-0005]. The primary concerns with recycled water use include the transmission of waterborne pathogens and adverse impacts to the environment due to harmful organic and inorganic contaminants. The following discussion should provide some guidance for evaluating potential public health and environmental impacts with recycled water use.

Appendix F

Data Sources

Descriptions of water systems pulled heavily, and at times directly, from OWRD and DEQ documents and websites. The Oregon Health Authority was a source of details of potable water systems. DEQ produced NPDES permits was a source of information about wastewater systems. Water Management and Conservation Plans (WMCP) were a source of information about water conservation. Water system operators and their plans (WMCPs, Water System Master Plans, Wastewater Facility Plans, Storm water Plans, etc) were also a major source of information. To collect information about water systems, most water providers with certified water treatment plant operators were contacted for documents and were asked to review and to add more information to the tables included in this report.

Appendix G

Terminology

- **Surface water:** The part of precipitation that lands on the ground and remains on the ground surface, such as in the form of creeks, lakes, and wetlands.
- **Groundwater:** The part of precipitation that lands on the ground surface, infiltrates into the subsurface, and continues down into the soil until it reaches rock material that is saturated (zone of saturation).
- **Aquifer**: The zone of saturation below the water table, which is the upper surface of the zone of saturation
- **Point of diversion**: the location where water is diverted from a surface water source
- **Point of appropriation**: the location where water is pumped from a groundwater source
- **Water treatment plant**: Removes contaminants from raw water to produce water that is pure enough for human consumption without any short term or long term risk of any adverse health effect. Substances that are removed during the process of drinking water treatment include suspended solids, bacteria, algae, viruses, fungi, and minerals such as iron and manganese. The processes involved in removing the contaminants includes: physical processes such as settling and filtration, chemical processes such as disinfection and coagulation and biological processes such as slow sand filtration, and final disinfection and chemical adjustment to reduce scaling or corrosion within the delivery system. (Wikipedia)
- **Raw water**: Water that has not been treated and has not had any minerals, ions, particles, or living organisms removed; includes rainwater, groundwater, and water from streams and lakes
- **Finished water**: Water that has passed through all the processes of a water treatment plant and is ready to distribute to customers for consumption
- **Wastewater or sewage**: water-carried human or animal waste from residences, buildings, industrial establishments or other places, together with such groundwater infiltration and surface water as may be present. The admixture of domestic and industrial waste or other by-products, such as sludge, is also considered wastewater or sewage. (OAR Division 49)
- **Wastewater Treatment System or Sewage Treatment System**: any structure, equipment or process for treating and disposing of, or recycling or reusing wastewater and sludge (including industrial waste) that is discharged to the wastewater system. (OAR Division 49)
- **Wastewater Collection System or Sewage Collection System**: trunks, arterials, pumps, pump/lift stations, piping and other appurtenances necessary to collect and carry away wastewater or other liquid waste treatable in a community or private wastewater treatment facility. (OAR Division 49)
- **Wastewater System**: "Sewage Treatment Works" defined in ORS 448.405 as any structure, equipment or process required to collect, carry away and treat domestic waste and dispose of sewage as defined in ORS 454.010. Typically, components of a

wastewater system include a wastewater collection system and a wastewater treatment system. (OAR Division 49)

- **Recycled water or reclaimed water**: Treated municipal wastewater or "reclaimed water" that may be reused for irrigation or other beneficial uses as an exempt use without a water use permit issued by OWRD, under certain conditions. The reclaimed water must first be treated and discharged under either a national pollutant discharge elimination system (NPDES) or water pollution control facilities (WPCF) permit issued by DEQ. The reclaimed water may be retained in a pond or lagoon without a reservoir permit prior to reuse. But depending on the size of the retention structure, OWRD approval of the engineering plans may be required. In addition, the person intending to use the reclaimed water as an exempt use must first complete and file a *Municipal Reclaimed Water Registration* form with OWRD. If the municipality has discharged the reclaimed water into a stream for five or more years, and the discharge represented more than 50 percent of the total average annual flow of the stream, OWRD must notify water right holders who may be affected by the reduced discharge. If a water right is affected, the water right holder may have a preference to use the reclaimed water.
- **Wet weather capacity**: capacity of a wastewater treatment plant during wet weather events (e.g. rain and snow melt), which are peak flow events due to the addition of inflow/infiltration to wastewater from City customers entering the wastewater treatment plant
- **Dry weather capacity**: capacity of a wastewater treatment plant on days without wet weather events, so primarily wastewater from City customers
- **National Pollutant Discharge Elimination System (NPDES) Permit**: Waste discharge permit issued in accordance with requirements and procedures of the National Pollutant Discharge Elimination System authorized by Section 402 of the Federal Clean Water Act and OAR 340, division 4. The Clean Water Act prohibits anybody from discharging "pollutants" through a "point source" into a "water of the United States" unless they have an NPDES permit. The permit contains limits on what you can discharge, monitoring and reporting requirements, and other provisions to ensure that the discharge does not hurt water quality or people's health. In essence, the permit translates general requirements of the Clean Water Act into specific provisions tailored to the operations of each person discharging pollutants. (Source: https://www.epa.gov/npdes/npdes-permit-basics)
- **Inflow and infiltration (I&I)**: This term is used to describe sources of storm water (rain and groundwater) that enter into the wastewater (i.e. sewer) system. Virtually every sewer system has some I&I. Historically, small amounts of I&I are expected and tolerated. However, infiltration and inflow may be considered excessive when it is the cause of overflows or bypasses, or the cost to transport and treat exceeds the cost to eliminate it. (For more information about I&I: https://www3.epa.gov/region1/sso/pdfs/Guide4EstimatingInfiltrationInflow.pdf)
    - Inflow: surface water that enters the collection system from yard, roof and footing drains, from cross connections with storm drains, downspouts, and through holes and manhole covers.

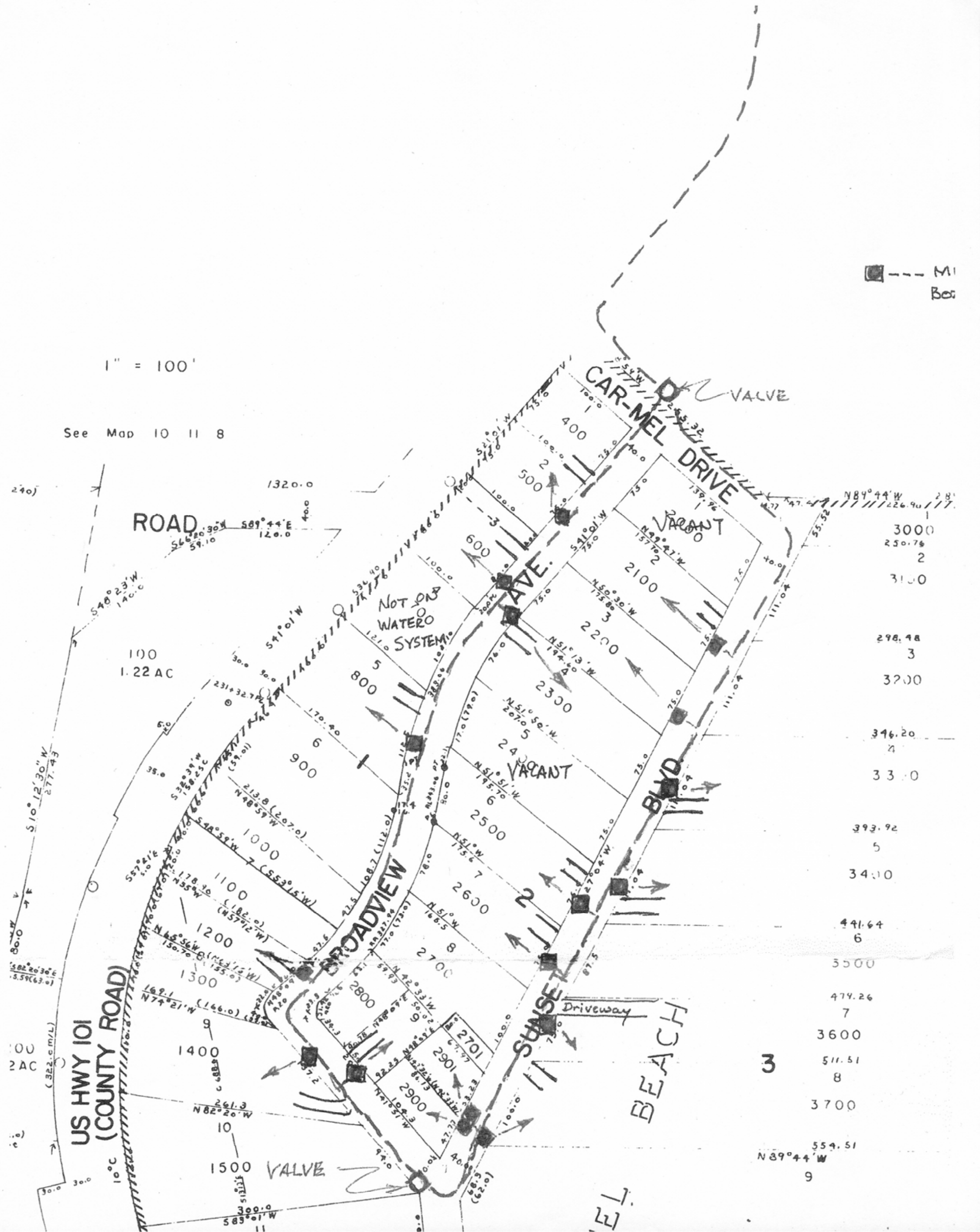
    - Infiltration is groundwater that enters sewer pipes (interceptors, collectors, manholes, or site sewers) through holes, brakes, joint failures, connection failures, and other openings.
- **Lift station**: Also called a pump station, used for pumping wastewater or sewage from a lower elevation to a higher elevation
- **Water main**: An underground pipe that conveys water to customers
- **Sewer force main**: Moves wastewater under pressure by using pumps or compressors located in lift stations; it necessary when gravity flow is not sufficient to move water runoff and sewage through gravity line
- **Activated sludge**: Aerated sewage containing aerobic microorganisms that help break it down
- **Slow sand filtration**: A water purification system that removes turbidity and pathogenic organisms through various biological, physical, and chemical processes in a single treatment step
- **SCADA**: Supervisory Control and Data Acquisition (SCADA) is a system of software and hardware that enables water managers to monitor and adjust water conveyance and treatment in water systems
    - Examples of capabilities: monitoring of water meter readings, flow through the system, water levels in reservoirs, and treatment processes; adjustment of valves
- **Non-revenue water**: Water that has been distributed for consumption and lost before it reaches customers; (i.e. the amount of distributed water that is not reflected in customer billings
- **Pump station**: Facility where pumps are installed and operated to pump water directly into a water system or to increase pressure when gravity flow is insufficient to move water in the distribution system
- **Average day demand (ADD)**: Equals the total annual system input (demand) divided by the number of days in a year, typically 365 days.
- **Maximum day demand (MDD)**: Equals the highest system demand that occurs on any single day during a calendar year.
- **Peaking factor ratio**: Ratio of one demand value to another. The most common and important peaking factor is the ratio of the MDD to the ADD. This ratio is often used for: estimating peak demands when only ADDs are known or measured, hydraulic modeling of the system, and demand forecasting.
- **Backwashing**: Pumping water backwards through filters to clean and enable reuse of the filters
- **System bulge**: Provides a short-term location for excess water as it moves between the point of diversion/point of appropriation and the place of use
- **Overflow Event (Sewer System Overflow)**: untreated sewage is discharged from a sanitary sewer into the environment prior to reaching sewage treatment facilities. When caused by rainfall it is also known as wet weather overflow. (Wikipedia)

- **Water Management and Conservation Plan (WMCP)**: A plan designed to help water suppliers examine their water rights, current and future demands, water source reliability and adequacy, and water conservation program. WMCP's are typically required by the Oregon Water Resources Department as a condition of an extension of time of water use permits (an extension of time is needed when an amount of water authorized under the permit has not been put to full beneficial use at the date initially specified for complete beneficial use of the permitted water) and required for access to water under the permit that was not used as of the date initially specified for complete beneficial use.

Appendix H

Carmel Beach Water District

Map/Schematic



1" = 100'
See Map 10 11 8
CAR-MEL DRIVE
VALVE
SUNSET BLVD
BROADVIEW AVE.
BEACH
ROAD
US HWY 101 (COUNTY ROAD)
Not on Water System
VACANT
Driveway
100
1.22 AC
400
500
600
800
900
1000
1100
1200
1300
1400
1500
2100
2200
2300
2400
2500
2600
2700
2701
2800
2900
2901
3000
3100
3200
3300
3400
3500
3600
3700
N89°44'W

Appendix I

City of Depoe Bay

Map/Schematic

Exhibit 2-1. Water Delivery Area Map, Part 1.

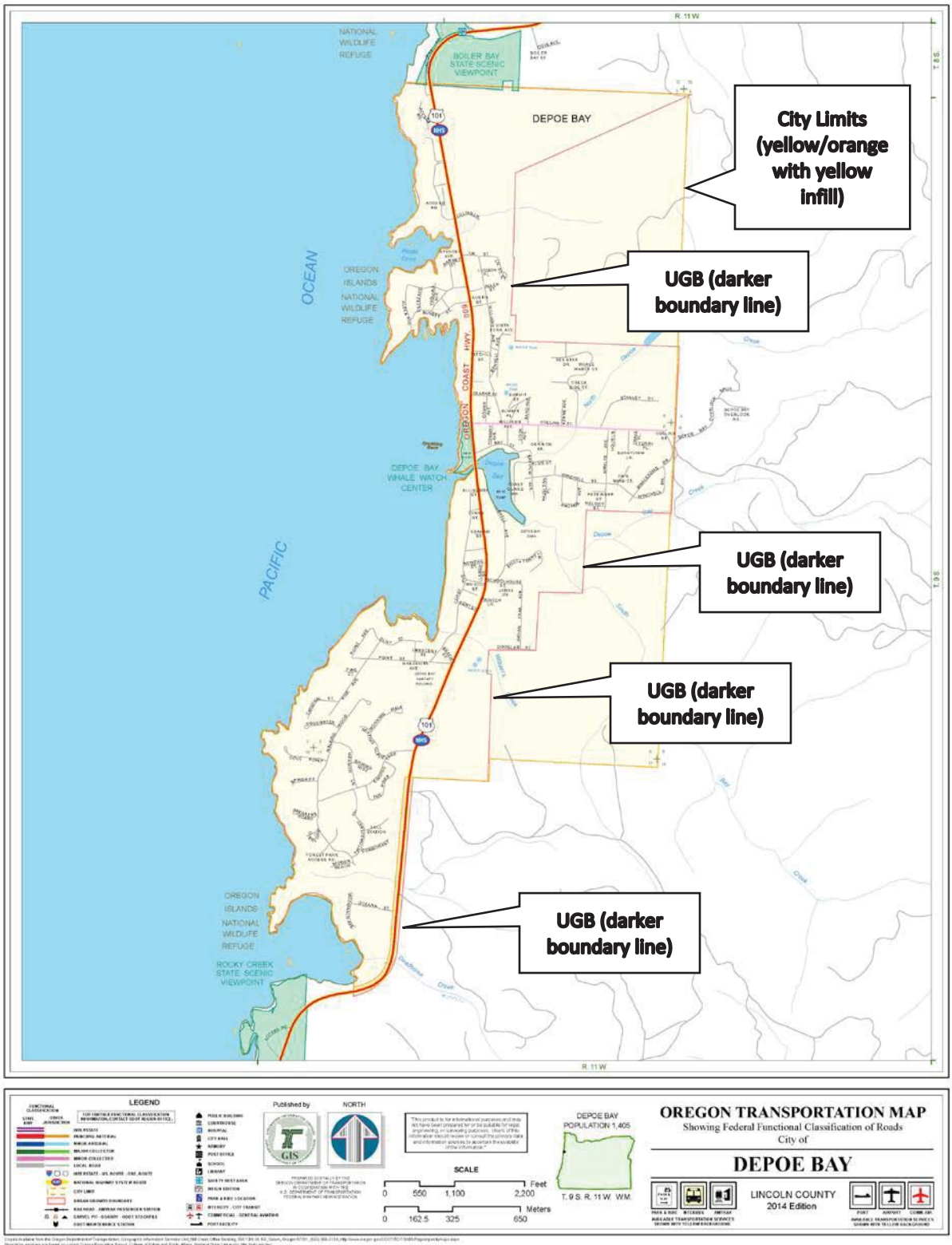
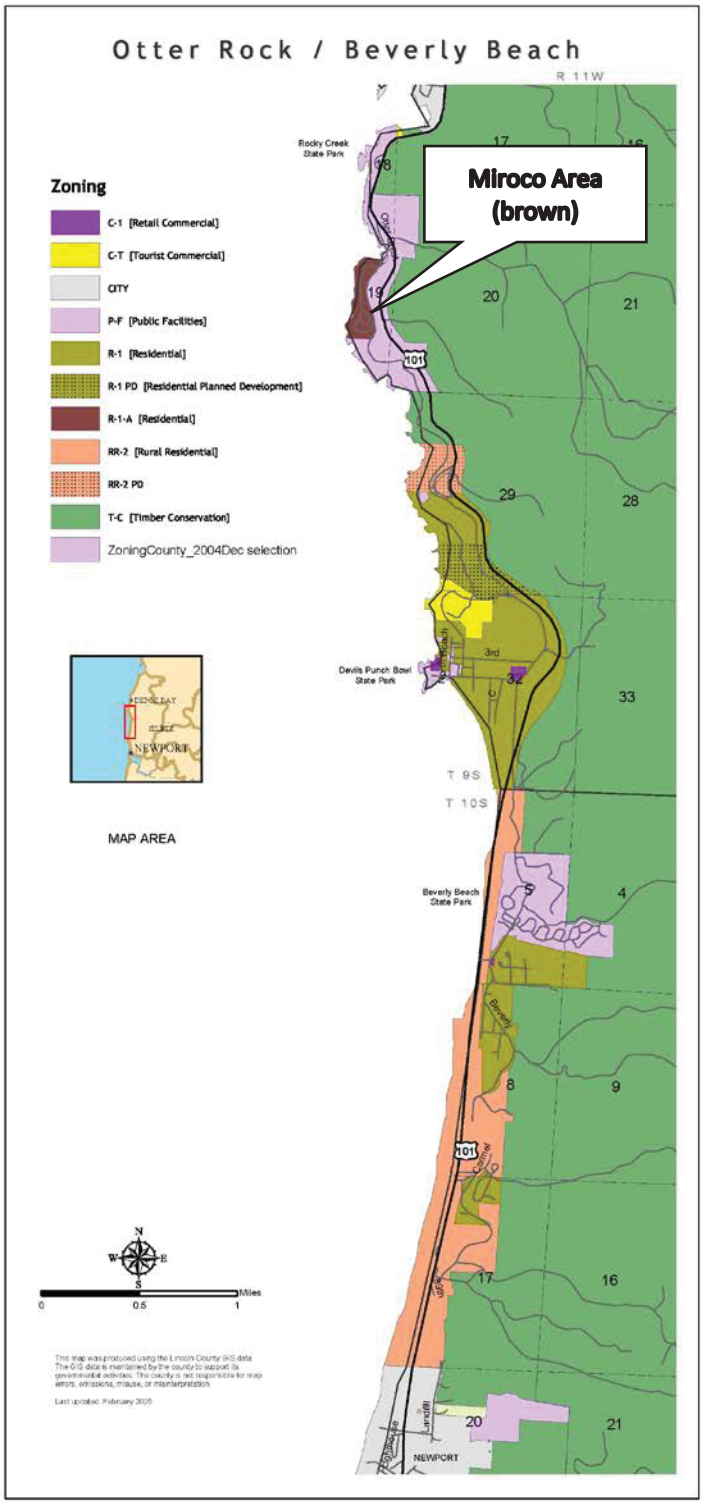
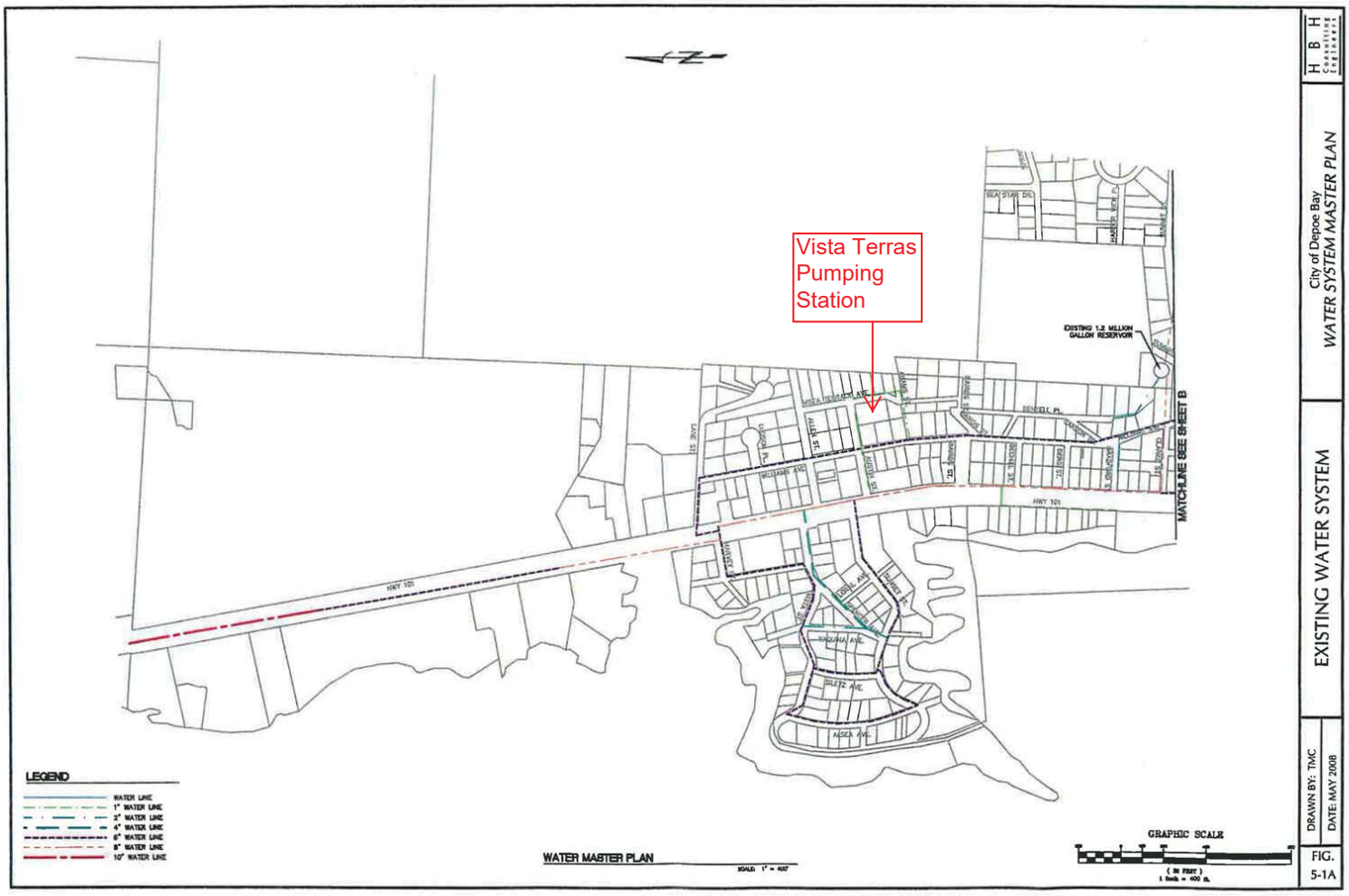
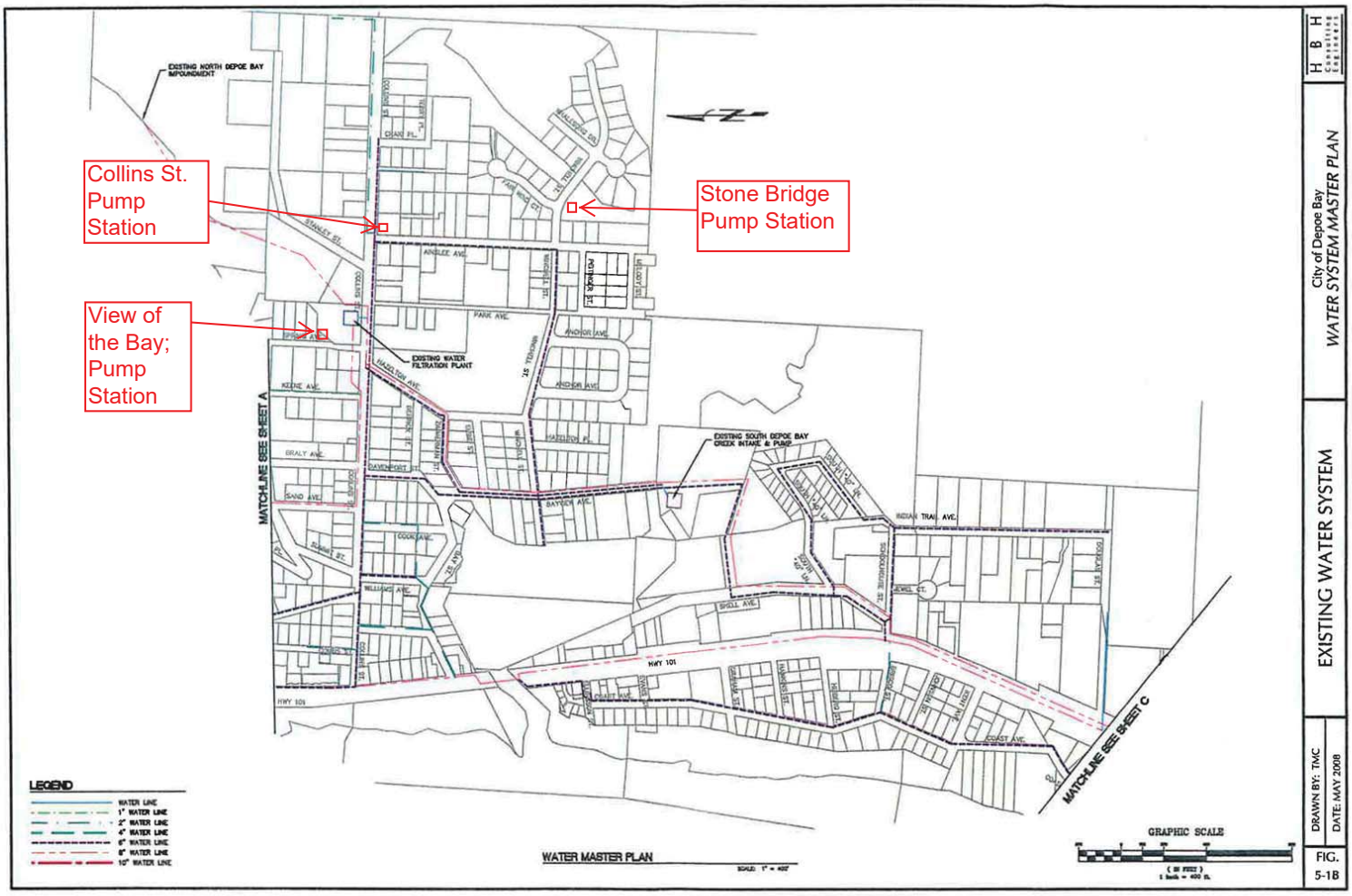
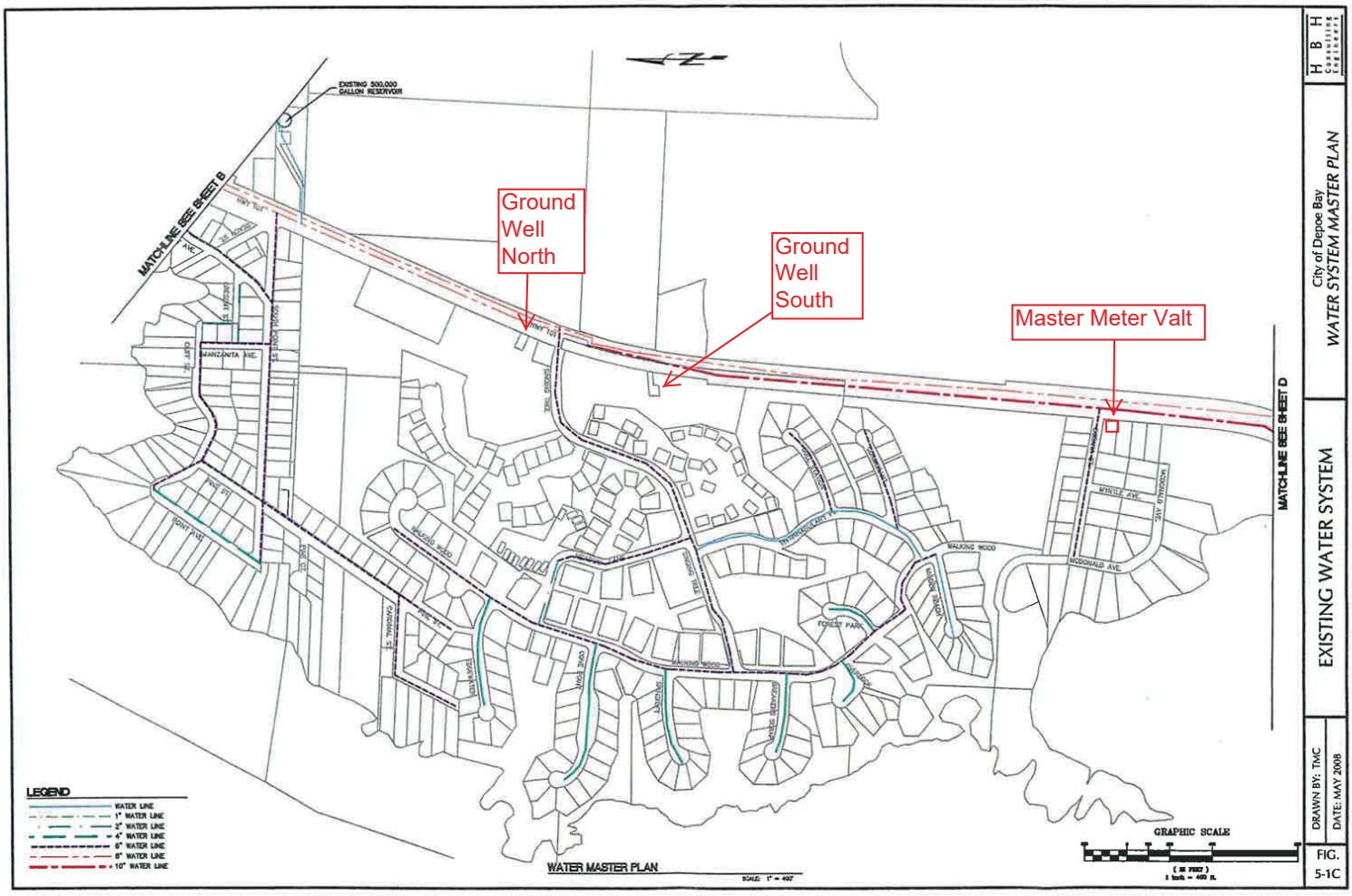


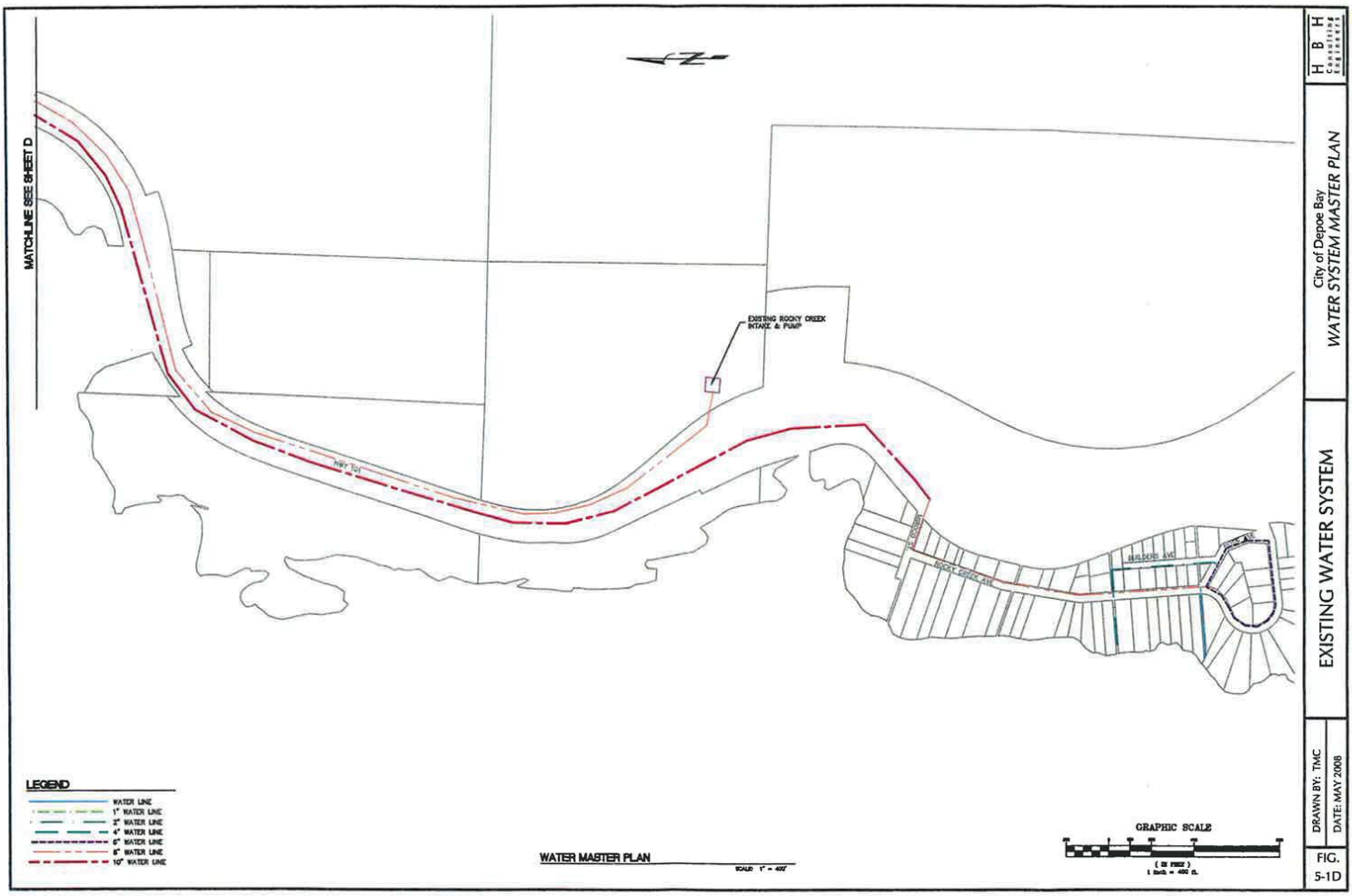
Exhibit 2-1. Water Delivery Area Map, Part 2.




Vista Terras
Pumping
Station
EXISTING 1.2 MILLION
GALLON RESERVOIR
MATCHLINE SEE SHEET B
HWY 101
HWY 101
LEGEND
WATER LINE
1" WATER LINE
2" WATER LINE
4" WATER LINE
6" WATER LINE
8" WATER LINE
10" WATER LINE
WATER MASTER PLAN
GRAPHIC SCALE
H B H
Consulting Engineers
City of Depoe Bay
WATER SYSTEM MASTER PLAN
EXISTING WATER SYSTEM
DRAWN BY: TMC
DATE: MAY 2008
FIG.
5-1A


Collins St. Pump Station
Stone Bridge Pump Station
View of the Bay; Pump Station
EXISTING NORTH DEPOE BAY IMPOUNDMENT
EXISTING WATER FILTRATION PLANT
EXISTING SOUTH DEPOE BAY CREEK INTAKE & PUMP
MATCHLINE SEE SHEET A
MATCHLINE SEE SHEET C
HWY 101
BAYVIEW AVE.
PARK AVE.
ANCHOR AVE.
INDIAN TRAIL AVE.
COAST AVE.
LEGEND
WATER LINE
1" WATER LINE
2" WATER LINE
4" WATER LINE
6" WATER LINE
8" WATER LINE
10" WATER LINE
WATER MASTER PLAN
GRAPHIC SCALE
H B H Consulting Engineers
City of Depoe Bay
WATER SYSTEM MASTER PLAN
EXISTING WATER SYSTEM
DRAWN BY: TMC
DATE: MAY 2008
FIG. 5-1B


Ground Well North
Ground Well South
Master Meter Valt
EXISTING 500,000 GALLON RESERVOIR
MATCHLINE SEE SHEET B
MATCHLINE SEE SHEET D
LEGEND
WATER LINE
1" WATER LINE
2" WATER LINE
4" WATER LINE
6" WATER LINE
8" WATER LINE
10" WATER LINE
WATER MASTER PLAN
GRAPHIC SCALE
H B H Consulting Engineers
City of Depoe Bay
WATER SYSTEM MASTER PLAN
EXISTING WATER SYSTEM
DRAWN BY: TMC
DATE: MAY 2008
FIG. 5-1C



H B H Consulting Engineers

City of Depoe Bay
WATER SYSTEM MASTER PLAN

EXISTING WATER SYSTEM

DRAWN BY: TMC

DATE: MAY 2008

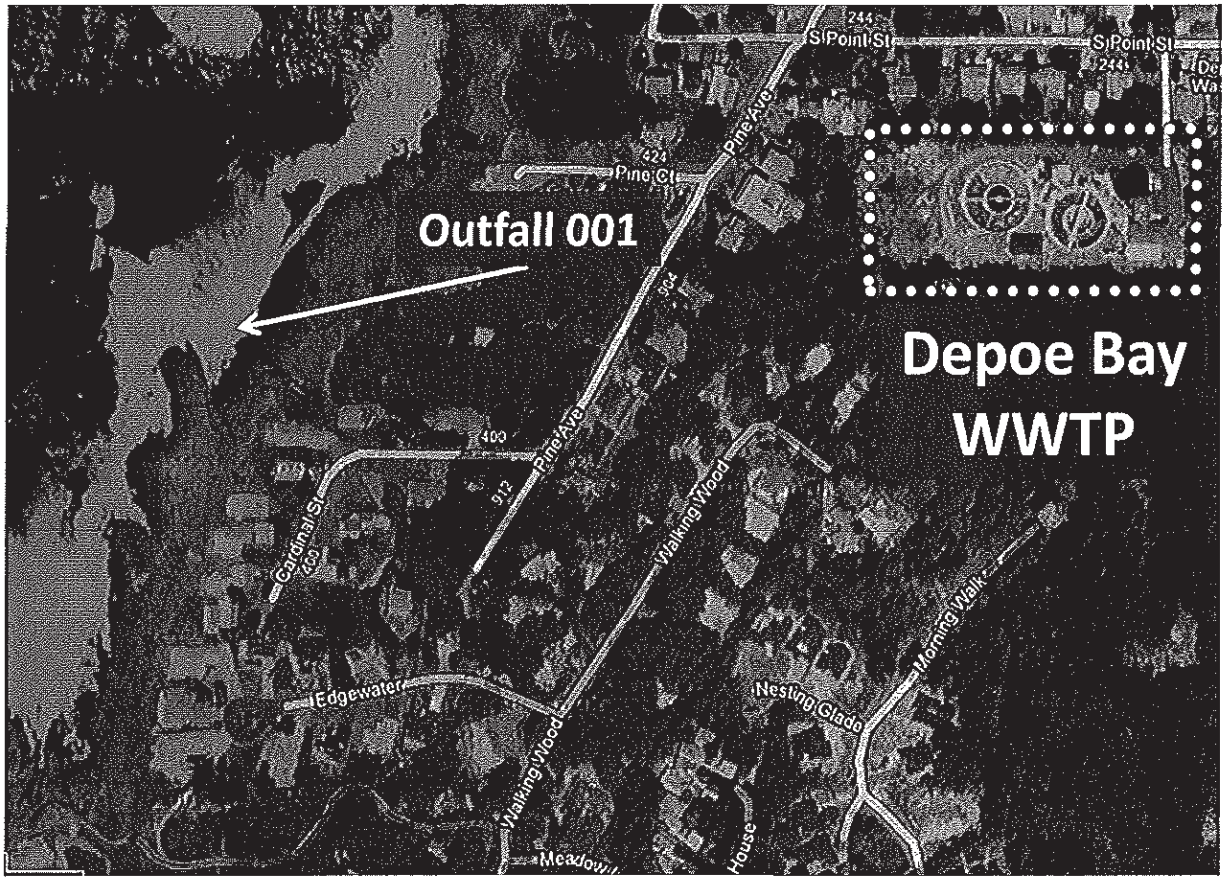
FIG. 5-1D

evaluation report describes the basis and methodology used to develop the permit and proposes effluent limitations and special conditions necessary to carry out state and federal law.

Facility: Description

The WWTP, located at 212 South Point St. in the City of Depoe Bay **(See Figure 1)**, was originally constructed in 1975 and upgraded in 2000 with the addition of a second aeration basin. The WWTP uses the conventional activated sludge process to treat sewage. The current plant comprises a headworks having rag and grit removal, influent composite sampling, and an in-line magnetic flow meter from the main pump station. The secondary treatment unit comprises two annular aeration basins, two secondary clarifiers, and sludge storage for lime stabilization to meet state biosolids rules (OAR 340-050). The city disinfects its treated wastewater using UV light prior to discharge.

FIGURE 1: Aerial Photo of Depoe Bay Wastewater Treatment Plant & Outfall 001



The collection system is a conventional gravity flow system having 4 lift stations (Vista, Harbor, Little Whale Cove, Edgewater) in addition to the influent pump station. The Gleneden Sanitary District has several small lift stations and one large one at Fogarty Creek State Park. The Fogarty Creek lift station pumps sewage to the northern section of the Depoe Bay collection system and was significantly upgraded in the last two years. The first significant rain event since the upgrade occurred on January 15, 2011. The system had no Sanitary Sewer Overflows during this event, despite the fact that the rainfall (6 inches in 24 hours) exceeded the 5 year, 24 hour rainfall (5 inches in 24 hours). However, the flow from the upgraded Fogarty Creek pump station was 1.6

Appendix J

Kernville-Gleneden Beach-Lincoln Beach Water District

Map/Schematic

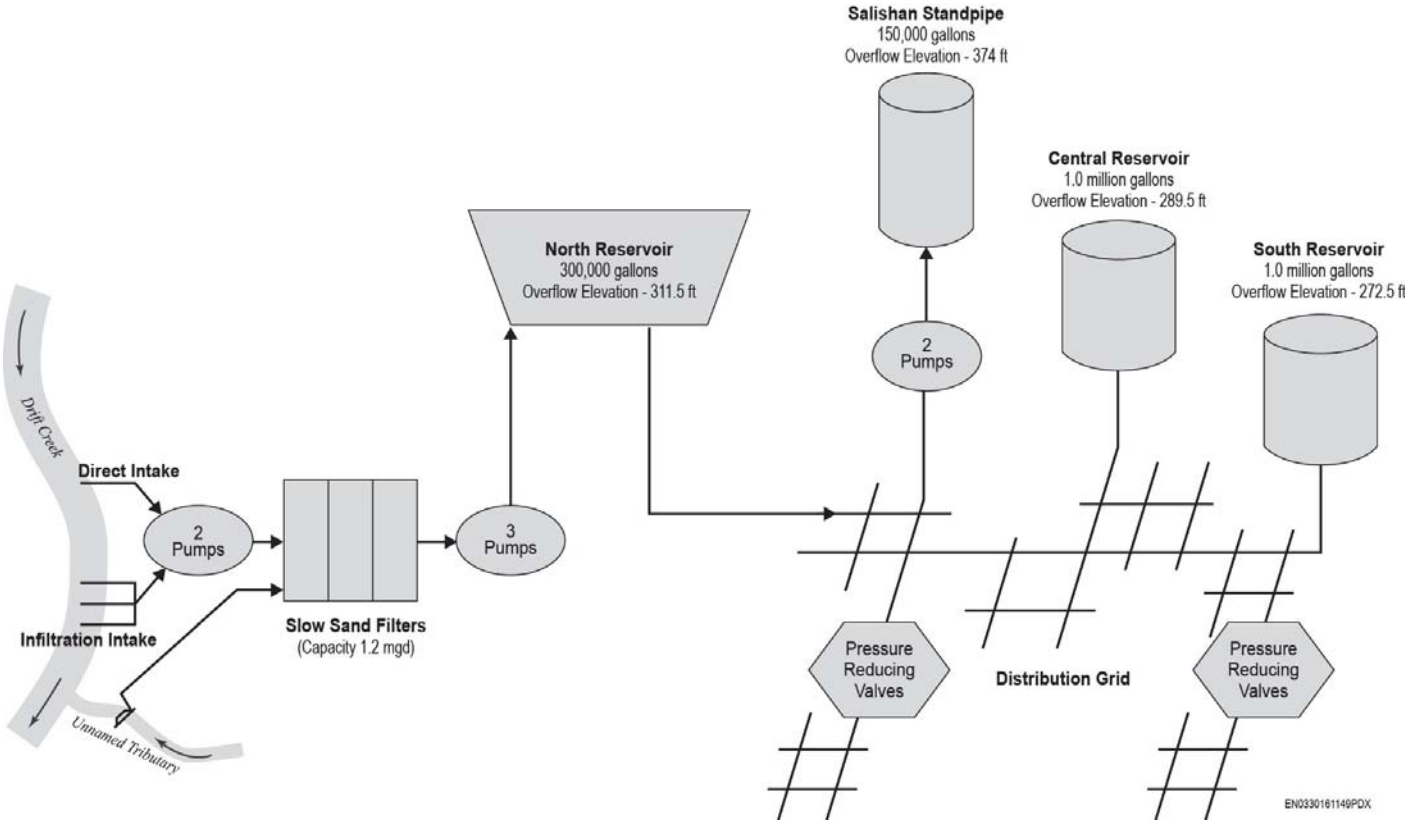


Figure 2-1. Kernville-Gleneden Beach-Lincoln Beach Water District System Schematic

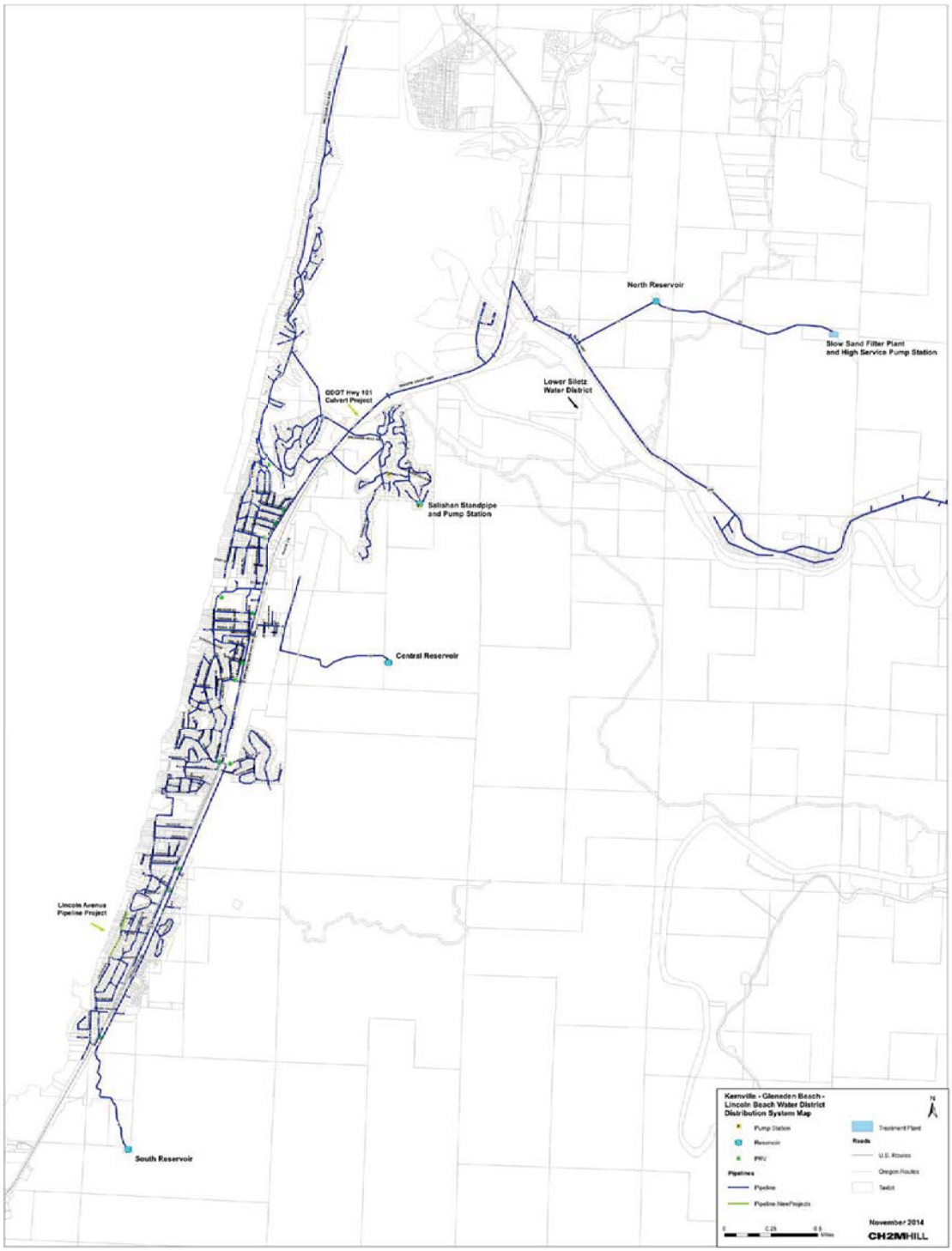
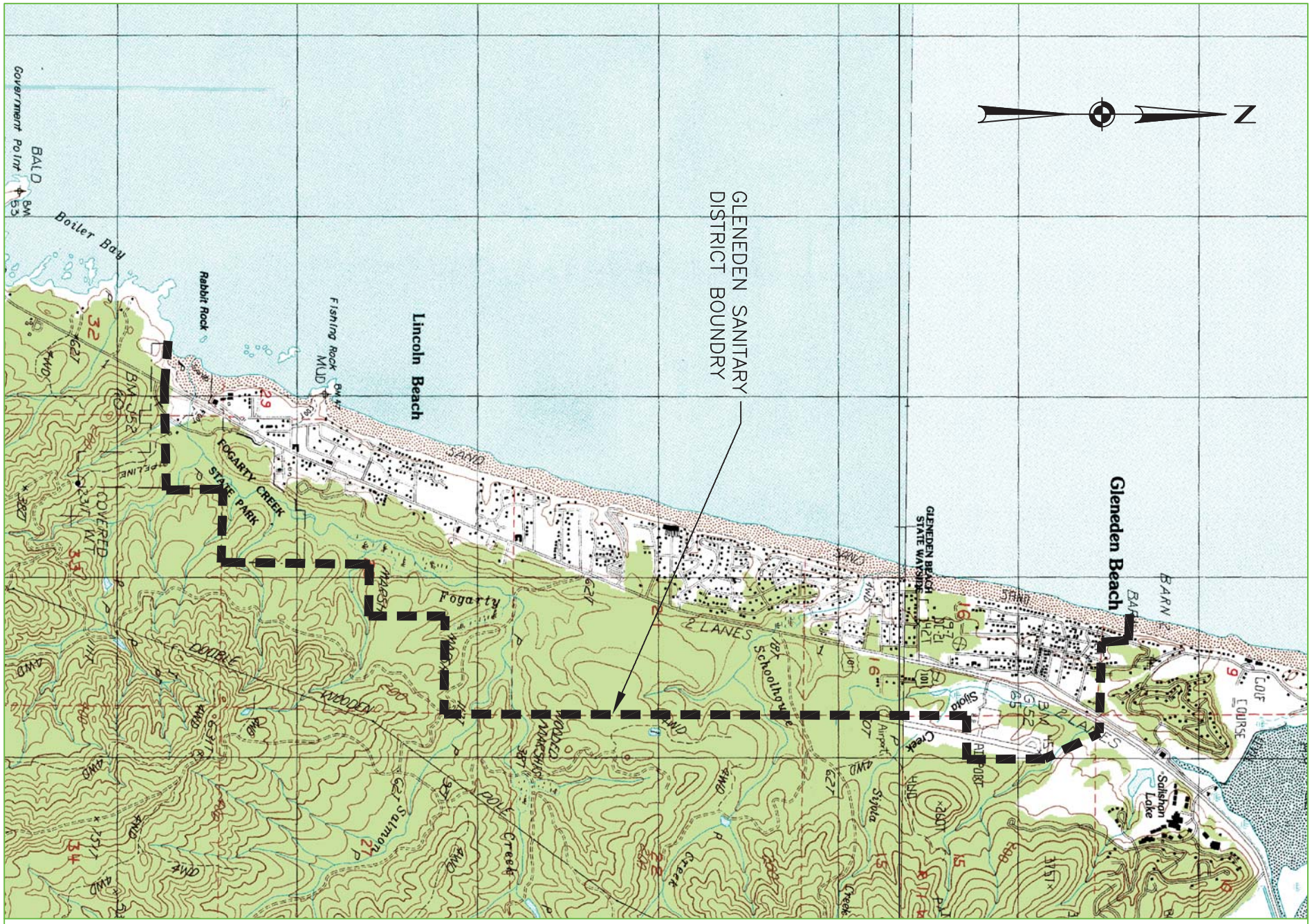


Figure 3-1. Kernville-Gleneden Beach-Lincoln Beach Water District Service Area

Appendix K

Gleneden Sanitary District

Map/Schematic

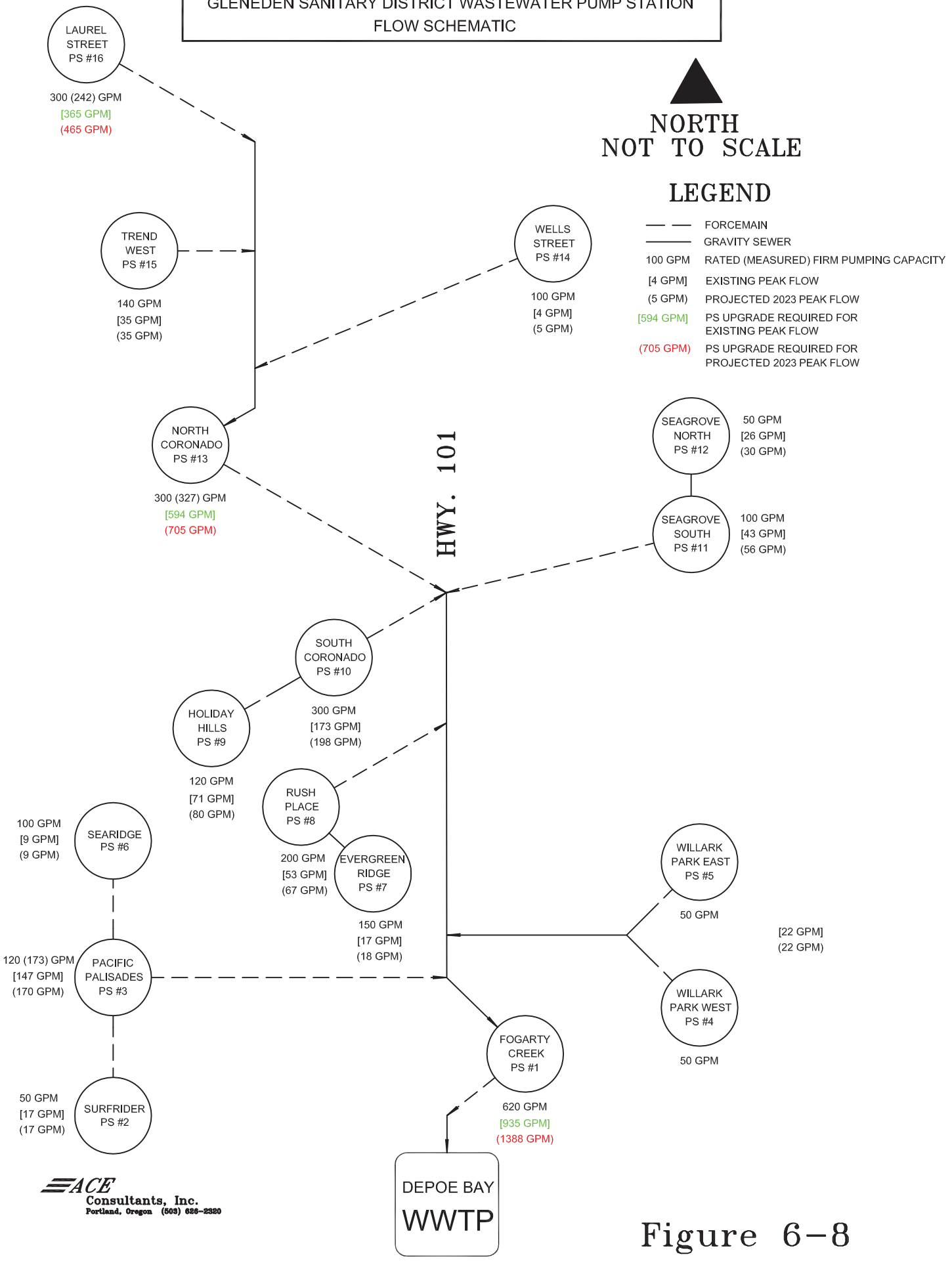


ACE Consultants, Inc.

GLENEDEN SANITARY DISTRICT BOUNDRY

FIGURE 3-1

GLENEDEN SANITARY DISTRICT WASTEWATER PUMP STATION FLOW SCHEMATIC



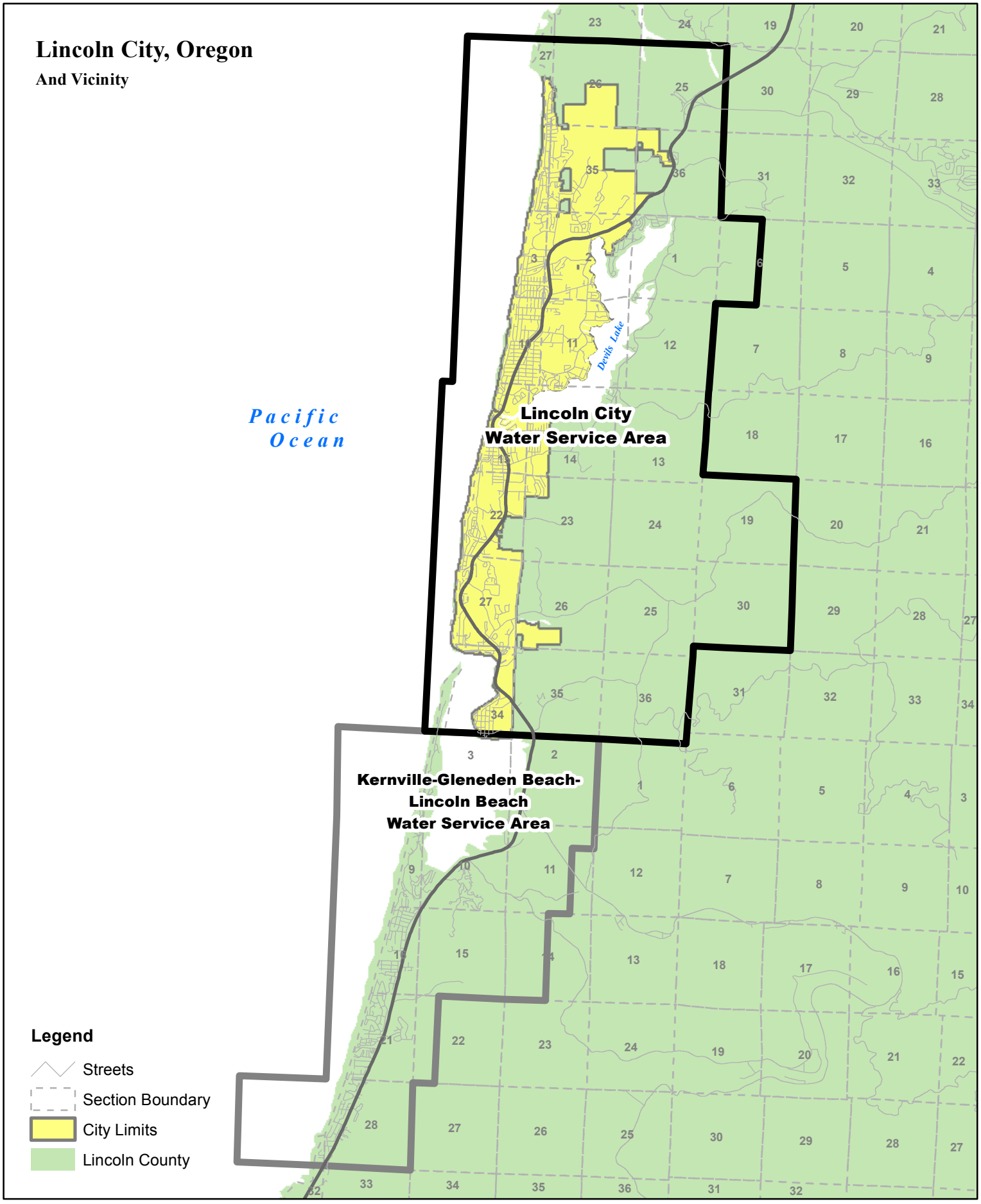
ACE Consultants, Inc.
Portland, Oregon (503) 626-2320

Figure 6-8

Appendix L

City of Lincoln City

Maps/Schematics



City of Lincoln City

Figure 1

Water Service Areas for the Lincoln City Vicinity

July 1, 2013

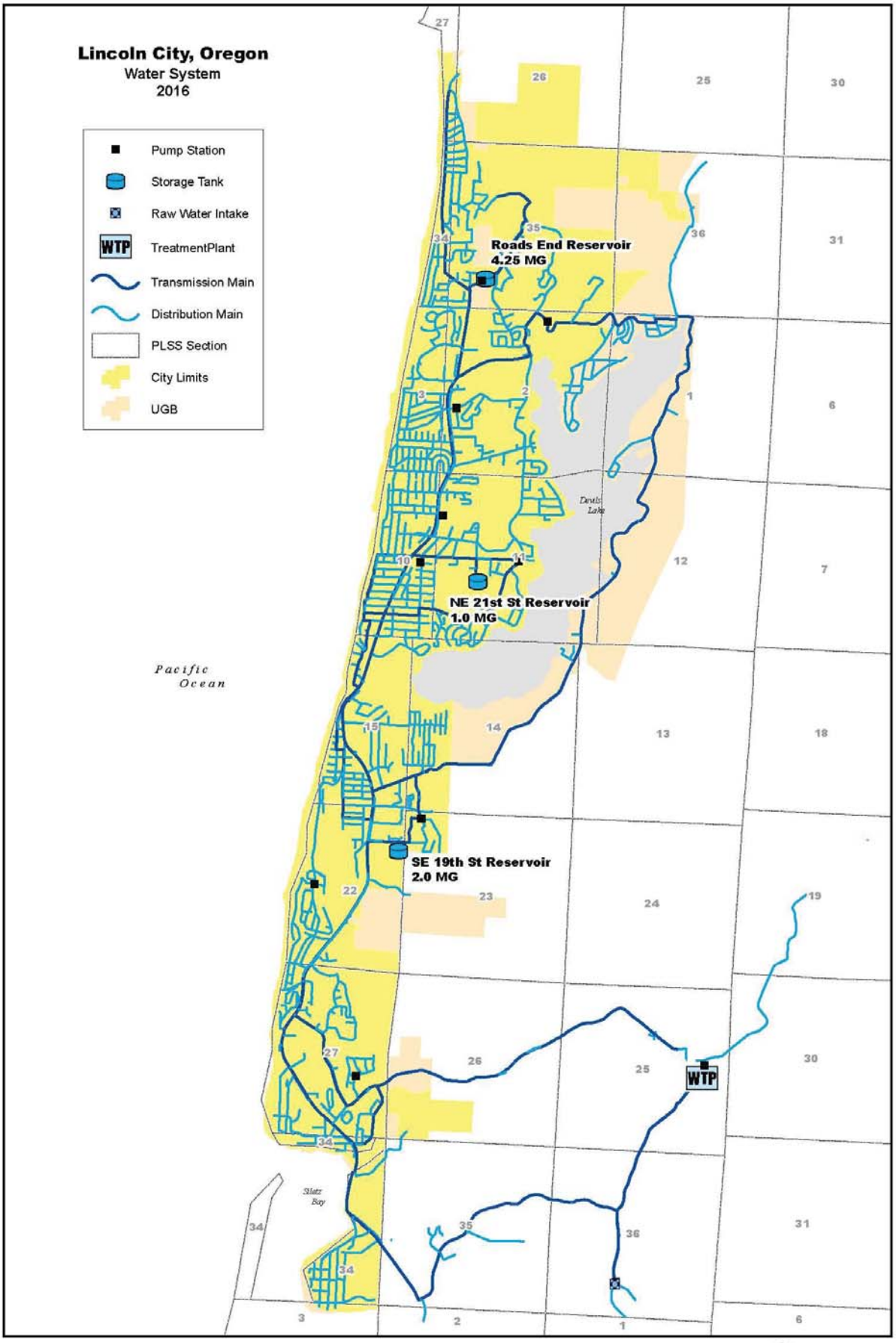


Figure 2

Schematic of Water Utilities for Lincoln City

Appendix M

City of Newport

Maps/Schematics

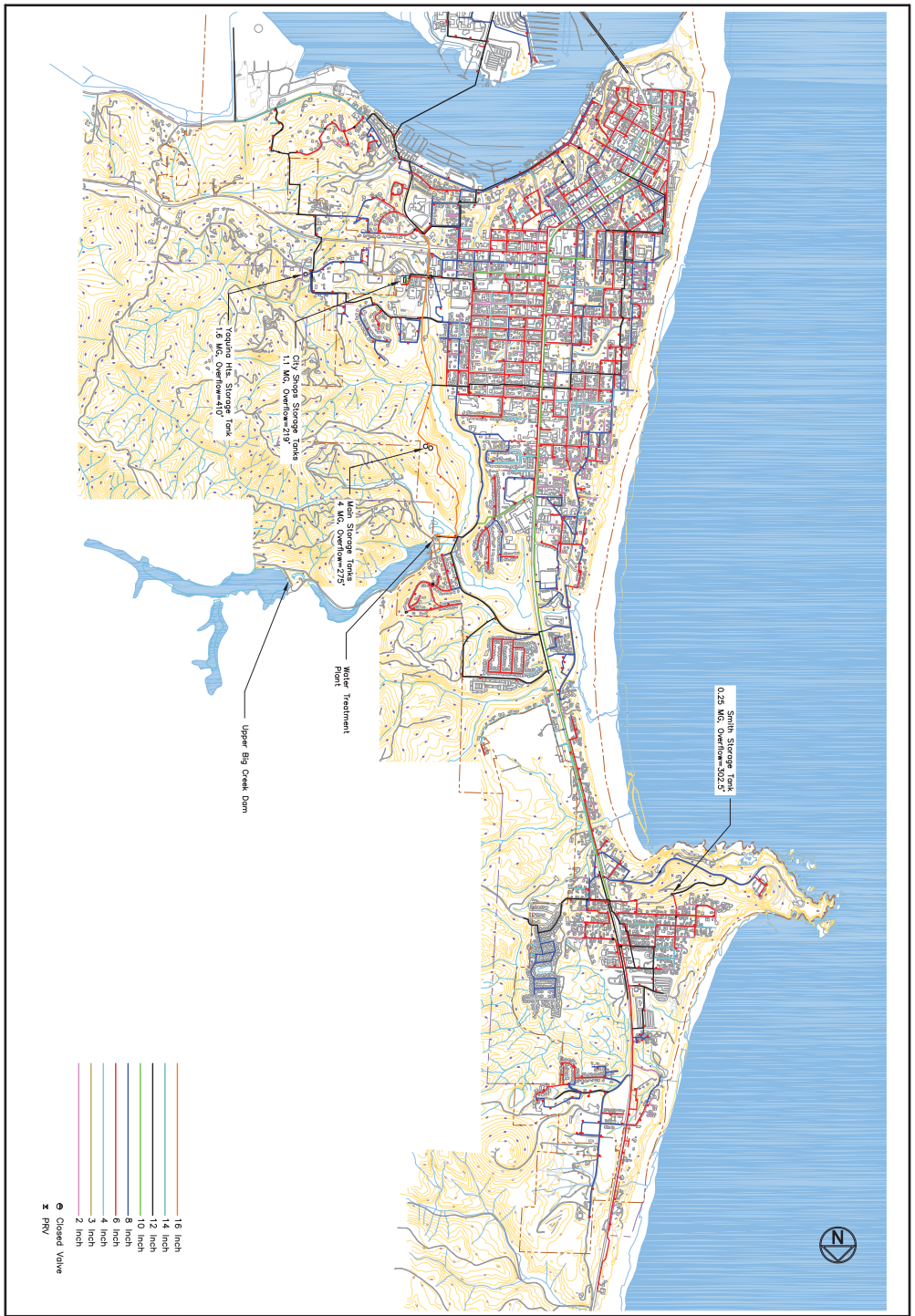


FIG. 5.5-1

0 1"

1" = 2000'

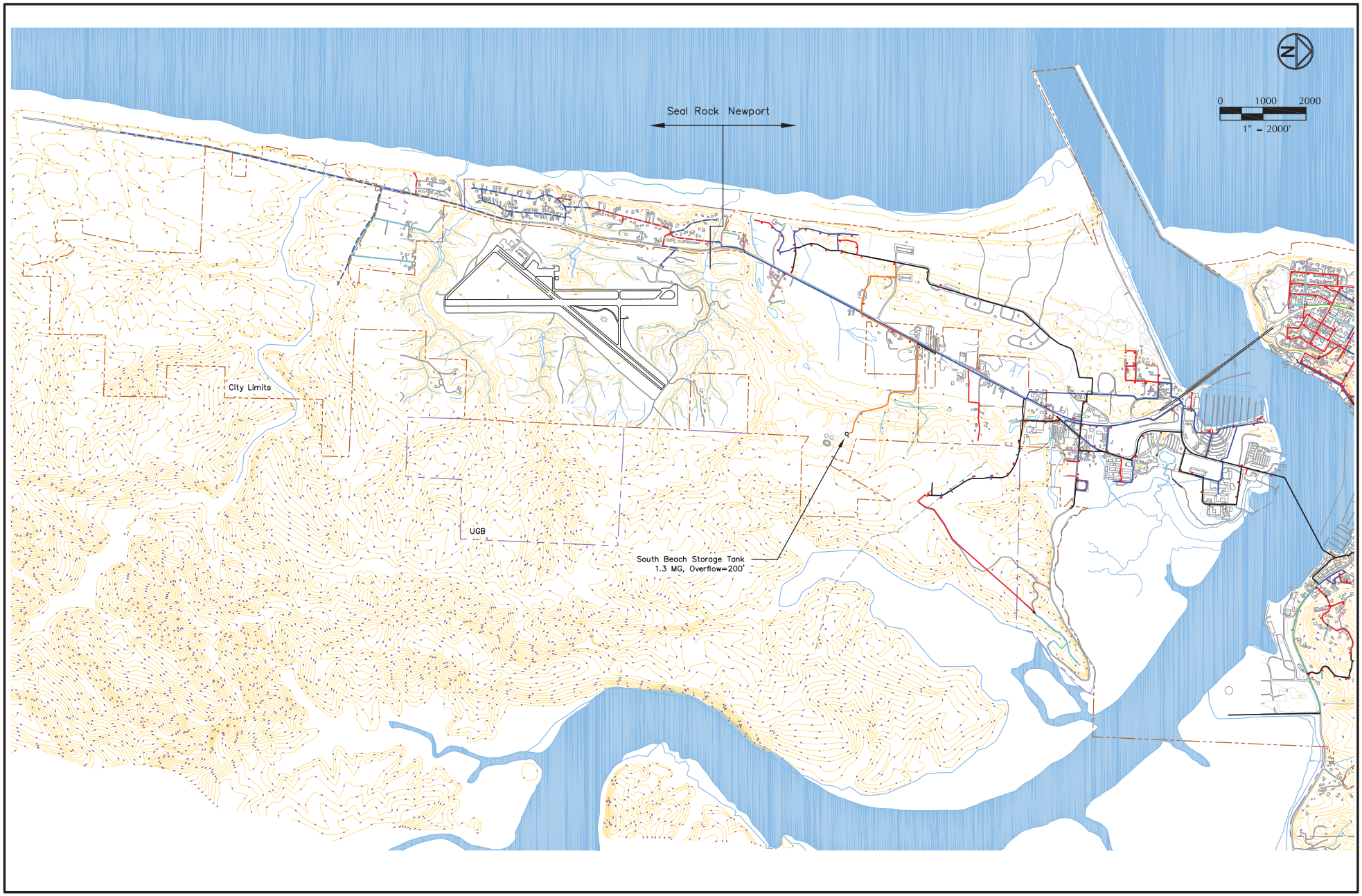
DRAWN BY: REB

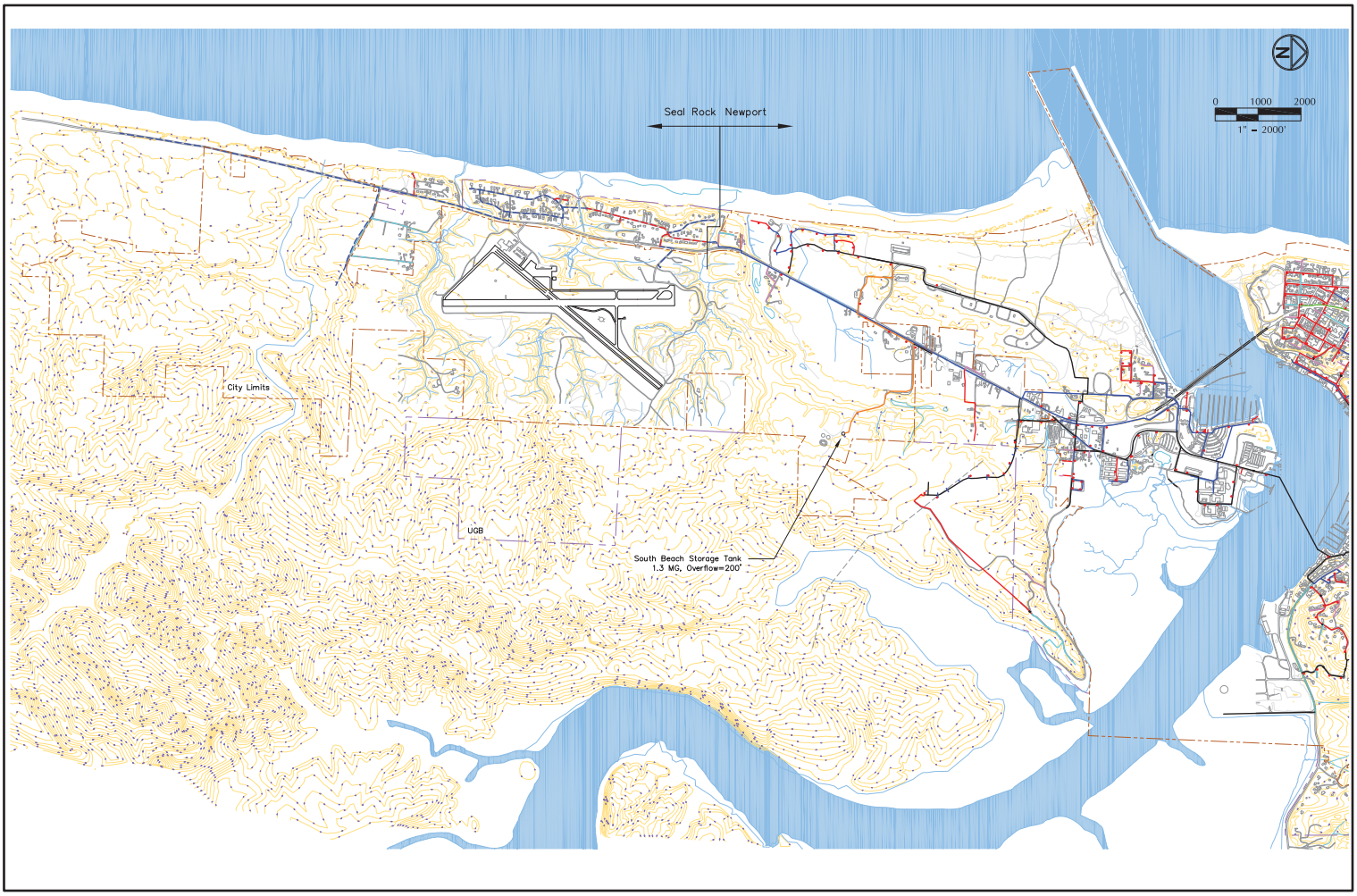
DATE: OCT. 9, 2008

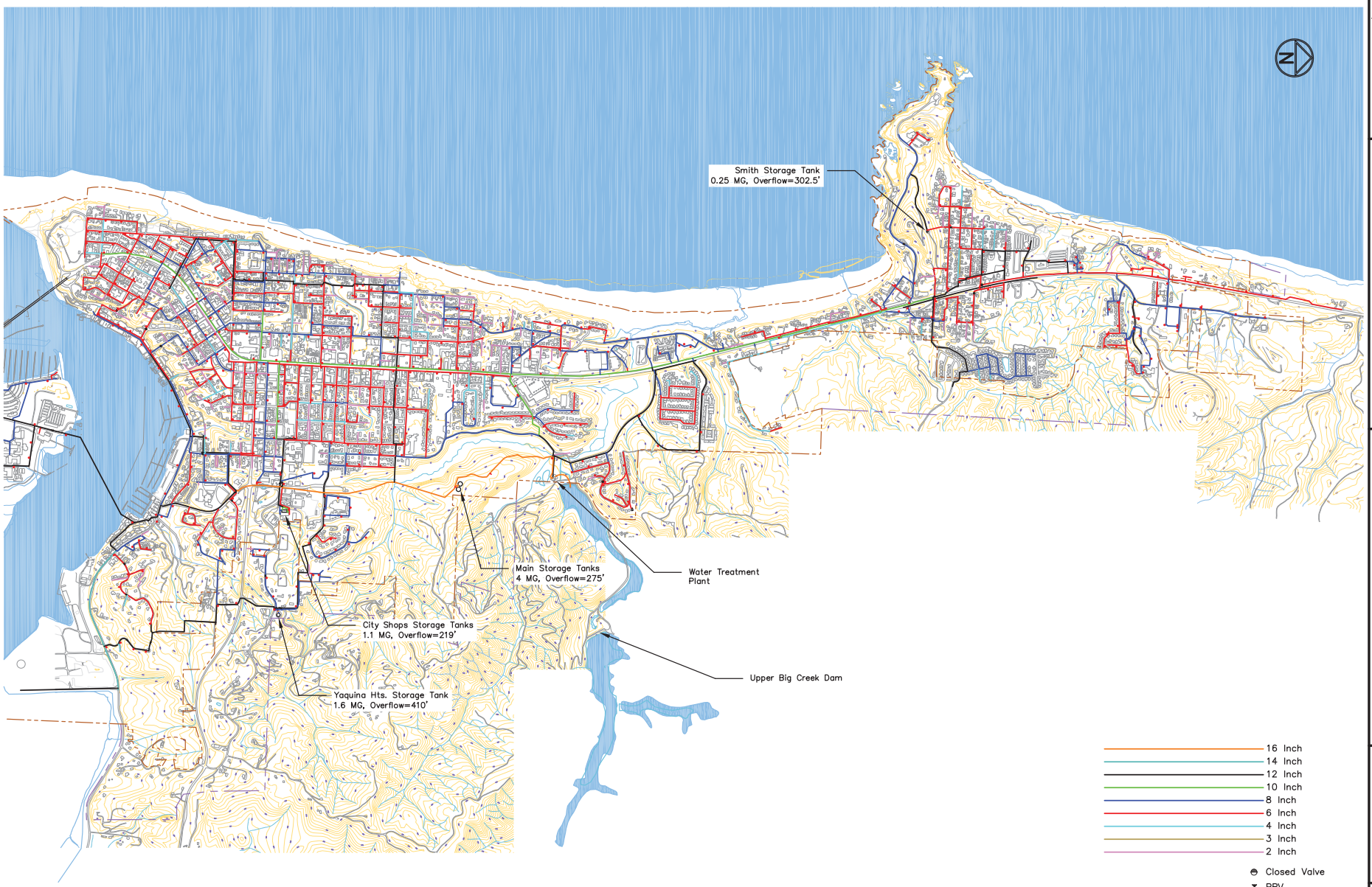
CITY MAP
EXISTING WATER SYSTEM

CITY OF NEWPORT
LINCOLN COUNTY, OREGON

CIVIL WEST
Engineering Services, Inc.


Seal Rock Newport
0 1000 2000
1" = 2000'
City Limits
UGB
South Beach Storage Tank
1.3 MG, Overflow=200'


Seal Rock Newport
0 1000 2000
1" = 2000'
City Limits
UGB
South Beach Storage Tank
1.3 MG, Overflow=200'



CIVIL WEST Engineering Services, Inc.

CITY OF NEWPORT
LINCOLN COUNTY, OREGON

CITY MAP
EXISTING WATER SYSTEM

DRAWN BY: REB
DATE: OCT. 9, 2008

FIG.
5.5-1

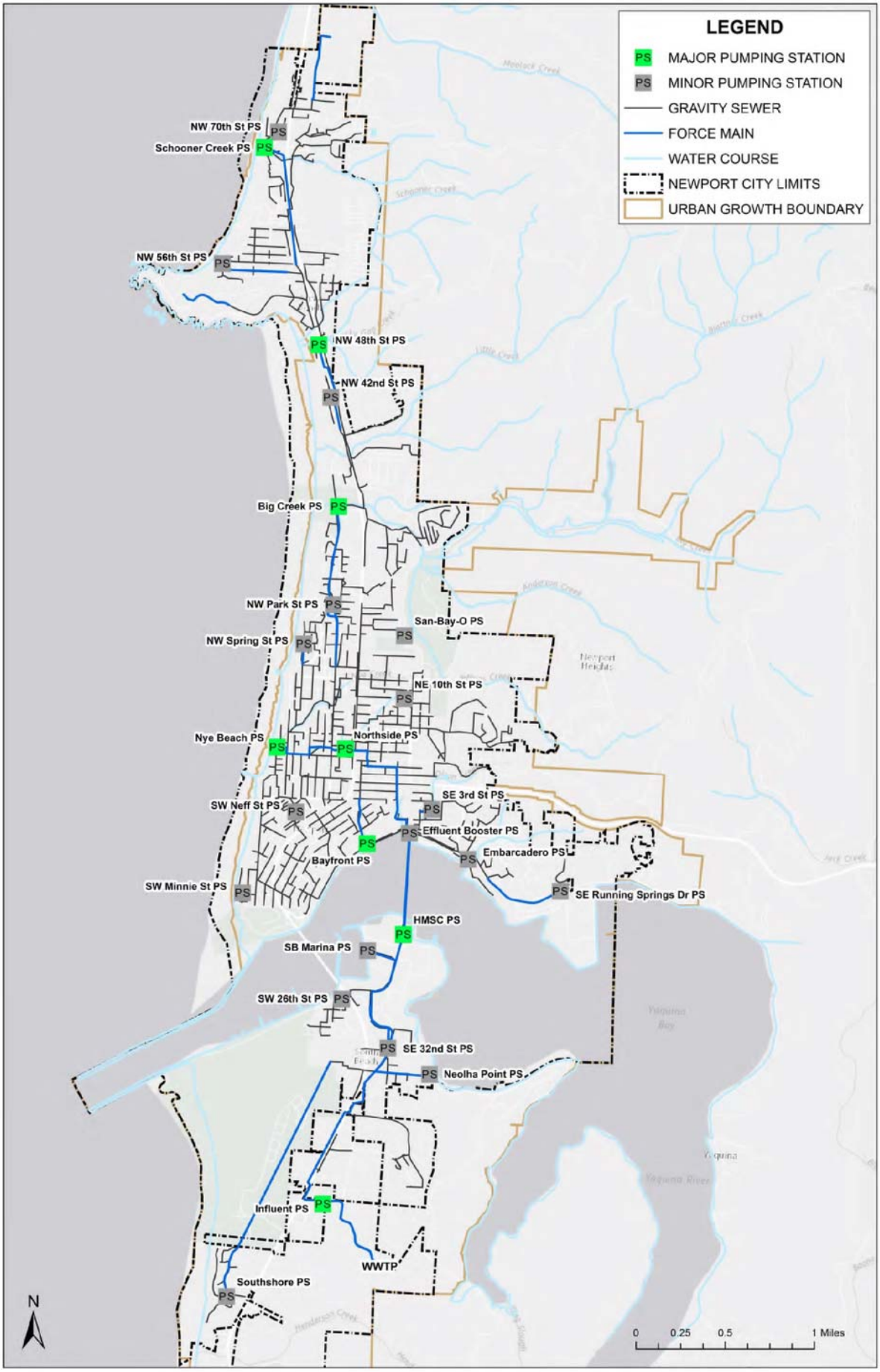
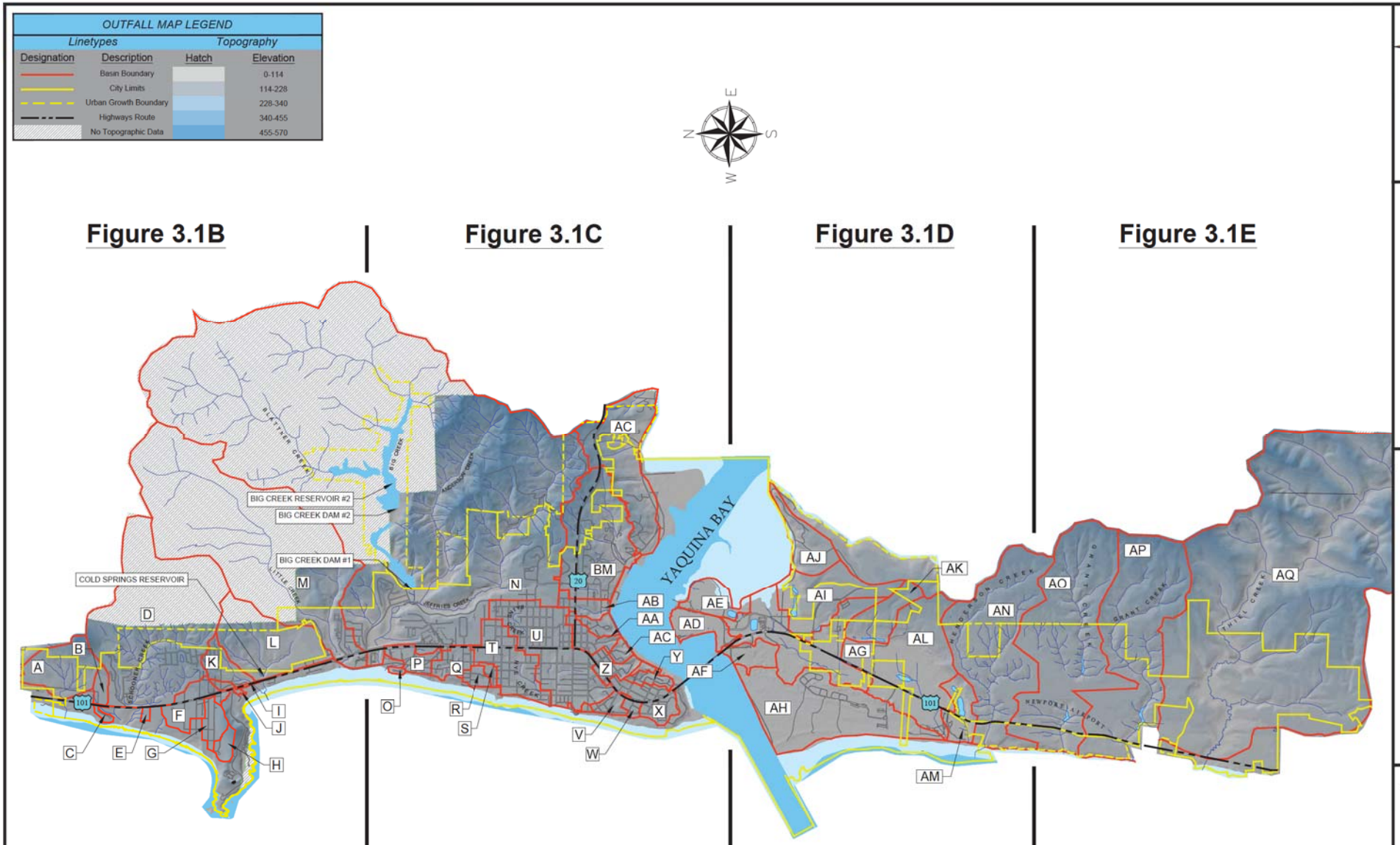


Figure 2-2. Collection system map



Civil West Engineering Services, Inc.

THE CITY OF NEWPORT
LINCOLN COUNTY, OREGON

STORM WATER MASTER PLAN

Basin index Map

1" = 3800'

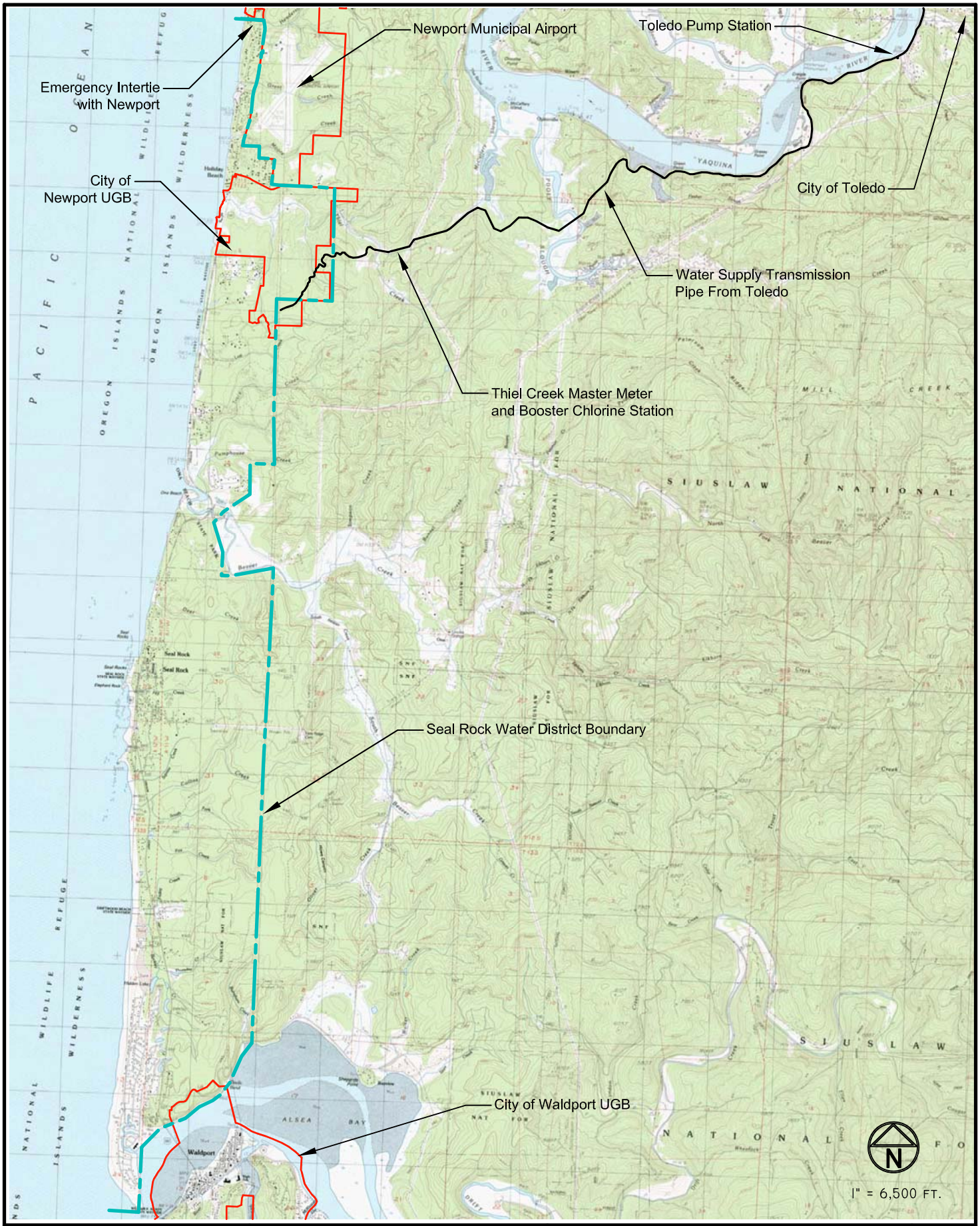
DRAWN BY: JRP
DATE: APRIL 2014

FIGURE
3.1A

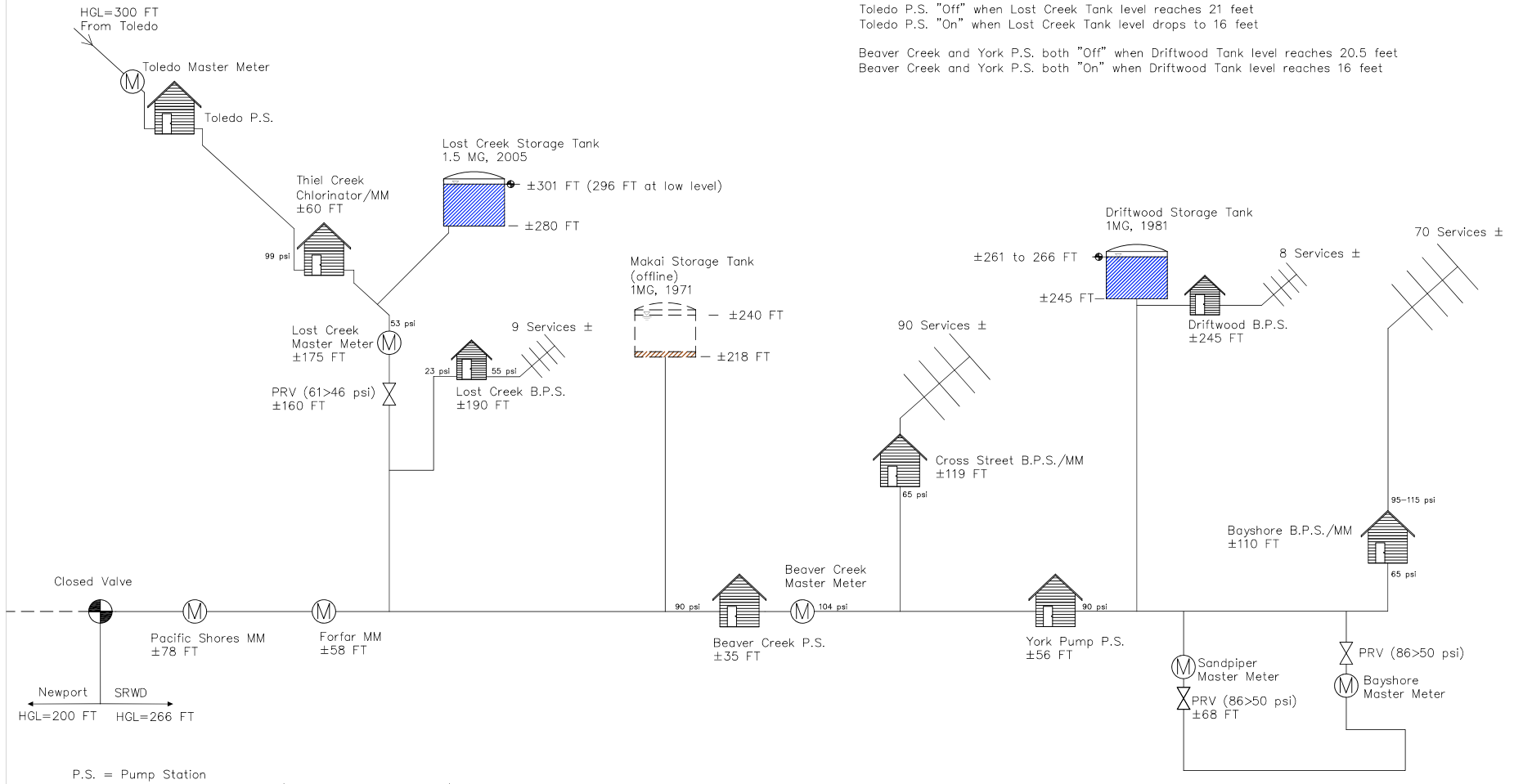
Appendix N

Seal Rock Water District

Map/Schematic



Civil West Engineering Services, Inc.	DWG BY: REB DATE: MARCH 12, 2010 0 1"	PLANNING AREA MAP	FIGURE
	WATER SYSTEM MASTER PLAN	SEAL ROCK WATER DISTRICT LINCOLN COUNTY, OREGON	2.1.1-1



P.S. = Pump Station
B.P.S. = Booster Pump Station (with hydropneumatic tank)
MM = Master Meter
Vertical Datum = NAVD 88
HGL = Static Hydraulic Grade Line

Civil West Engineering Services, Inc.

SEAL ROCK WATER DISTRICT
LINCOLN COUNTY, OREGON

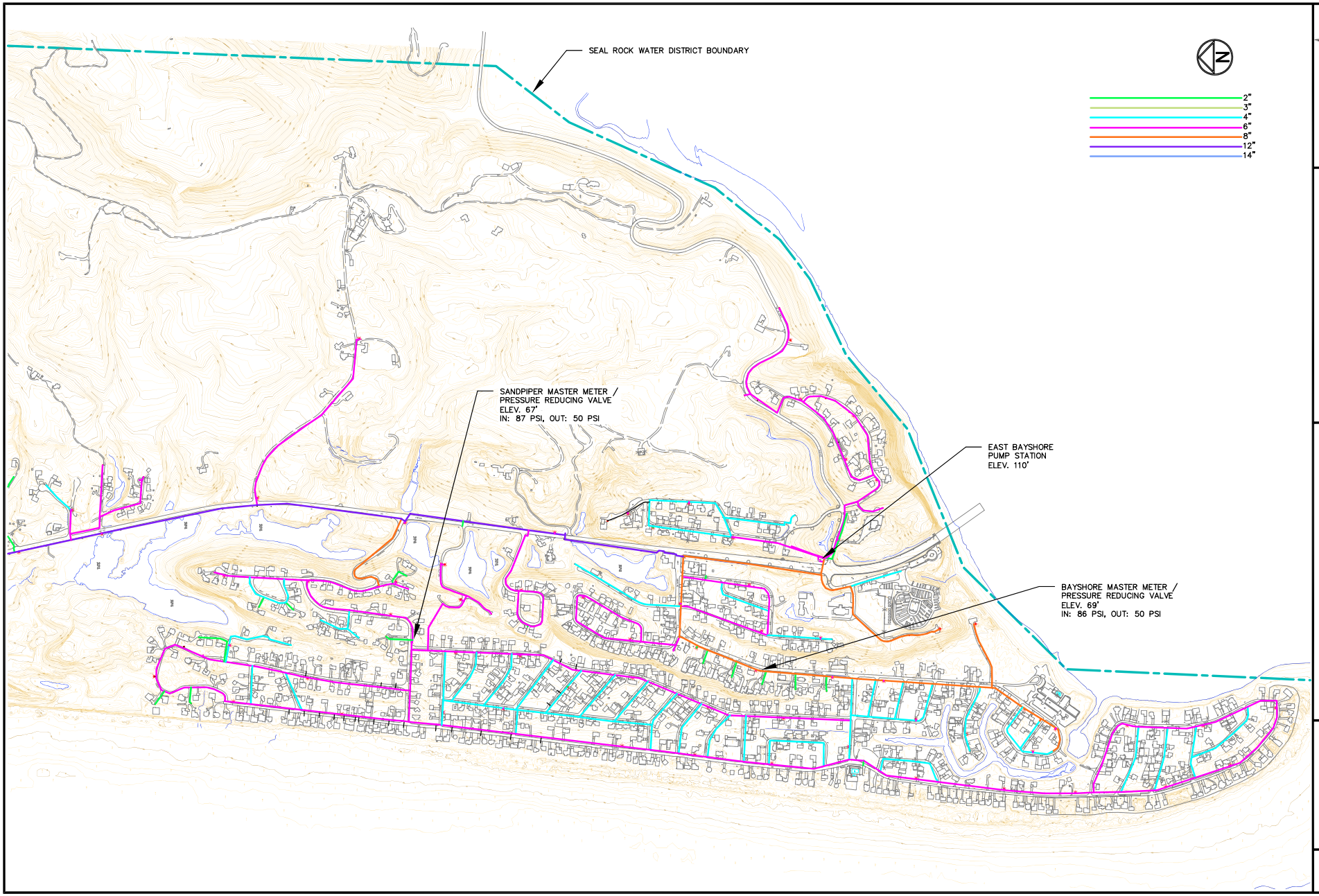
Water System Schematic

WATER SYSTEM MASTER PLAN

0 1"
NTS

DRAWN BY: JBH
DATE: JUNE 18, 2010

FIGURE
6.4-1



Civil West Engineering Services, Inc.

SEAL ROCK WATER DISTRICT
LINCOLN COUNTY, OREGON

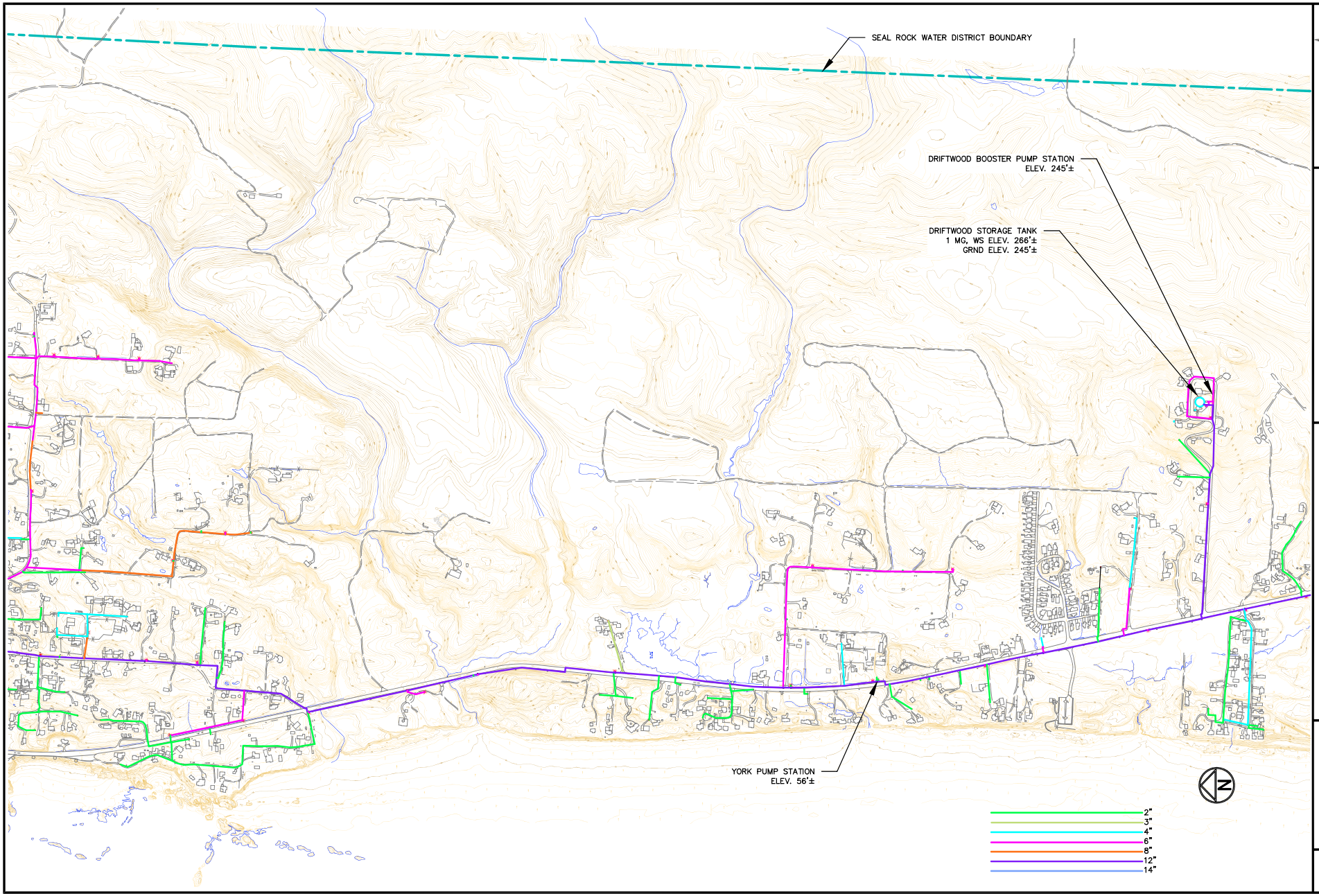
Existing Water System

WATER SYSTEM MASTER PLAN

0 1" = 800' 1"

DRAWN BY: CDA
DATE: JULY 27, 2010

FIGURE
6.5-1



Civil West Engineering Services, Inc.

SEAL ROCK WATER DISTRICT
LINCOLN COUNTY, OREGON

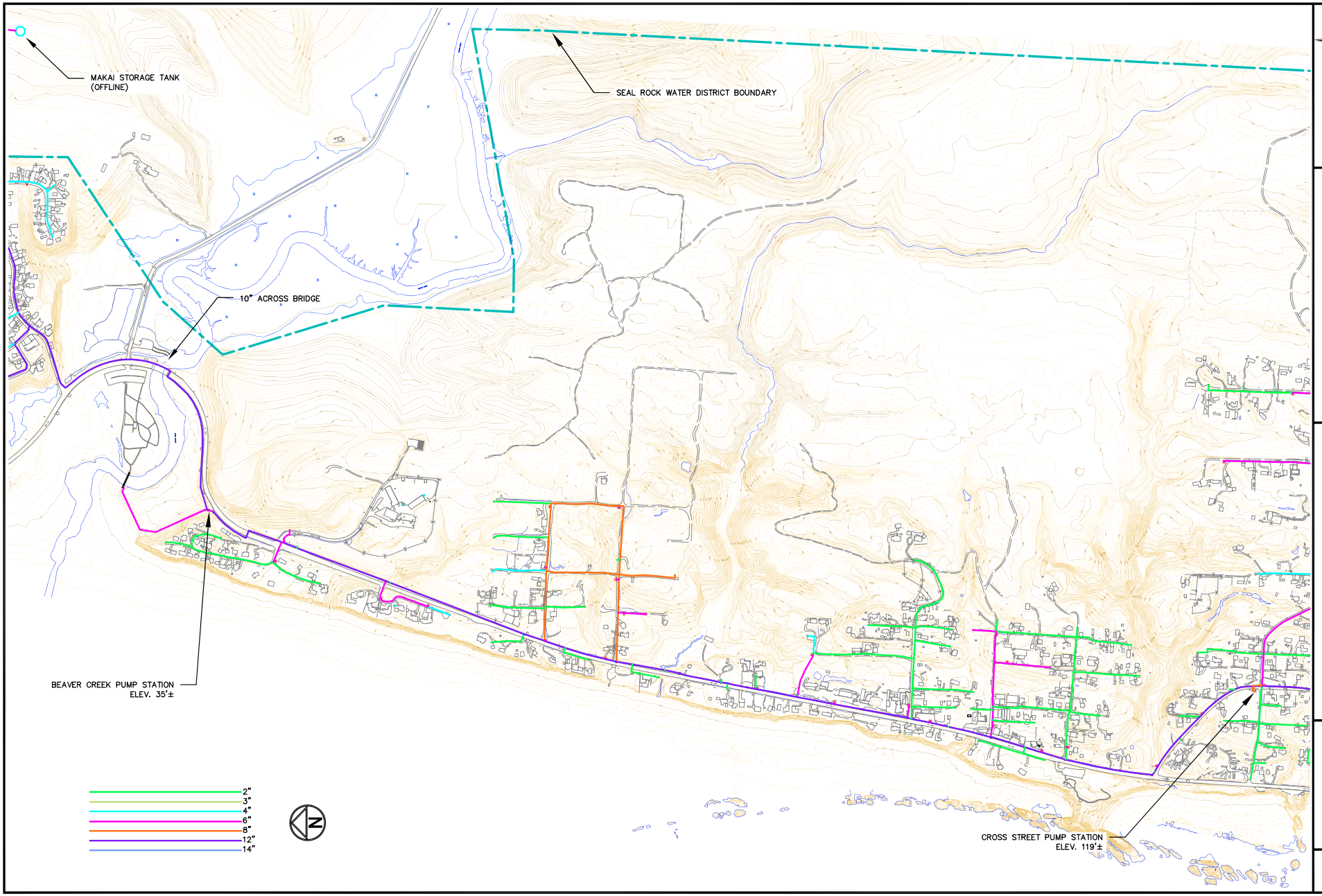
Existing Water System

WATER SYSTEM MASTER PLAN

0 1" = 800' 1"

DRAWN BY: CDA
DATE: JULY 27, 2010

FIGURE
6.5-2



Civil West Engineering Services, Inc.

SEAL ROCK WATER DISTRICT
LINCOLN COUNTY, OREGON

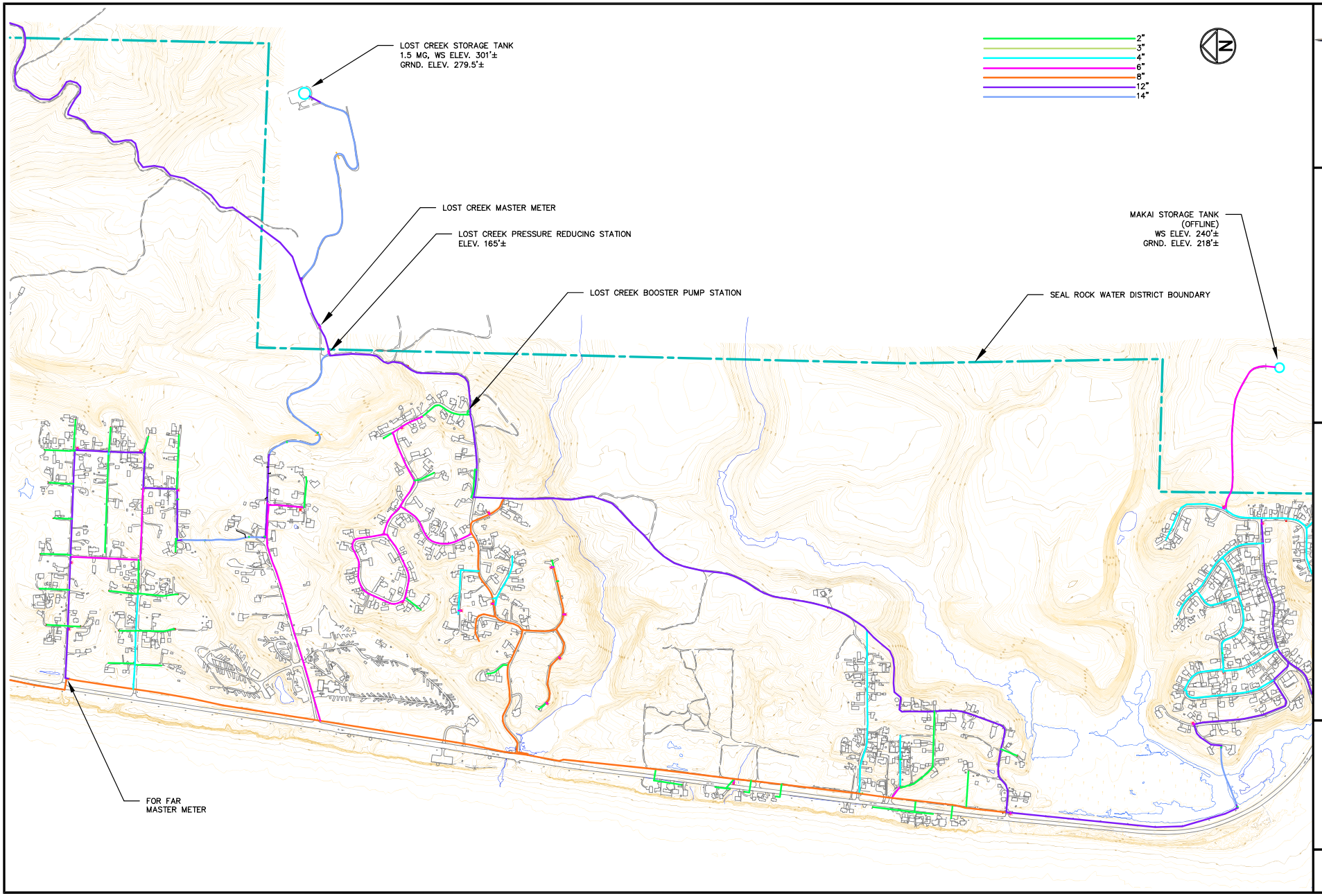
Existing Water System

WATER SYSTEM MASTER PLAN

0 1" = 800'

DRAWN BY: CDA
DATE: JULY 27, 2010

FIGURE
6.5-3



Civil West Engineering Services, Inc.

SEAL ROCK WATER DISTRICT
LINCOLN COUNTY, OREGON

Existing Water System

WATER SYSTEM MASTER PLAN

0 1" = 800'

DRAWN BY: CDA
DATE: JULY 27, 2010

FIGURE
6.5-4

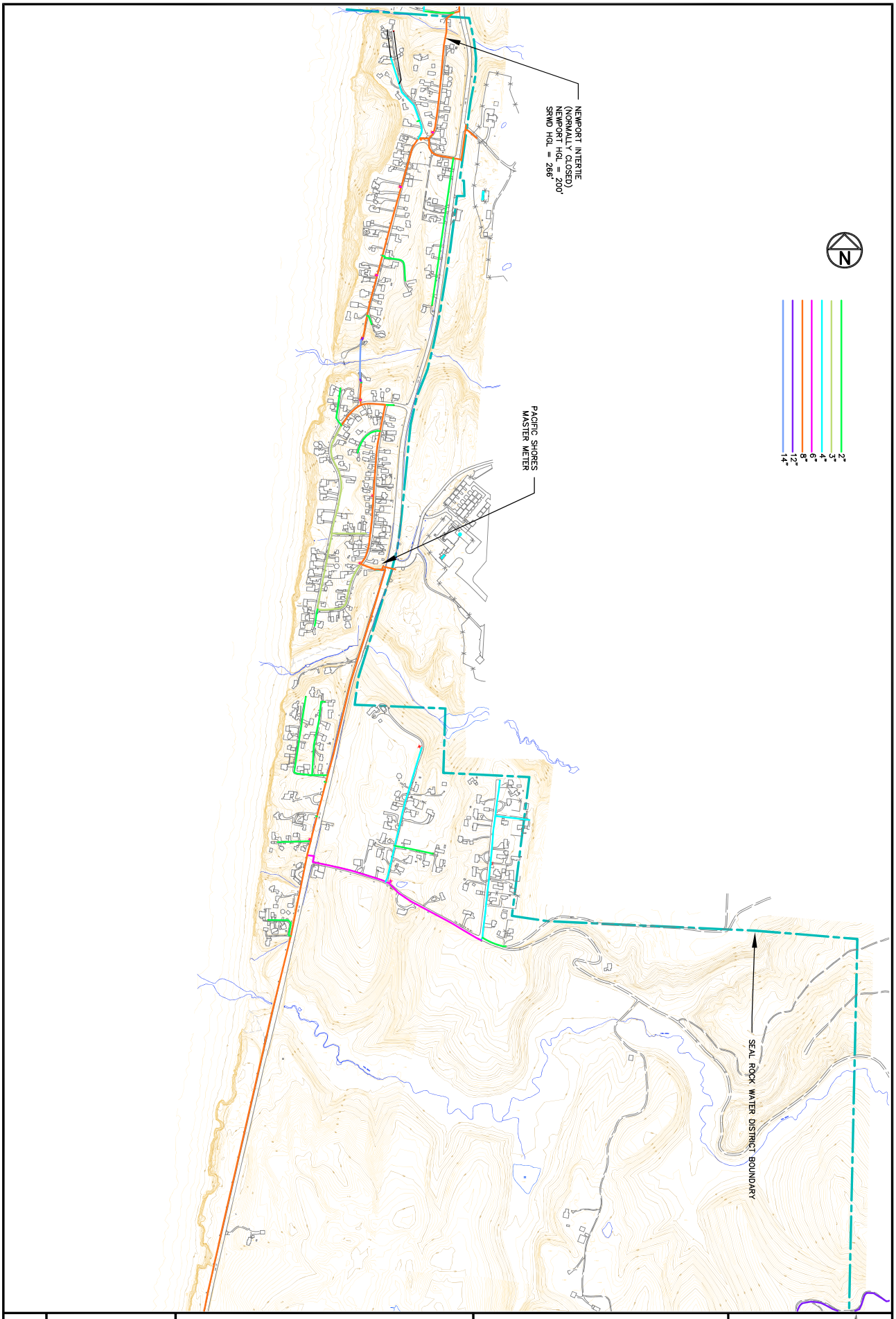


FIGURE 6.5-5

0 1"
1" = 800'

DRAWN BY: CDA
DATE: JULY 27, 2010

Existing Water System

WATER SYSTEM MASTER PLAN

SEAL ROCK WATER DISTRICT
LINCOLN COUNTY, OREGON

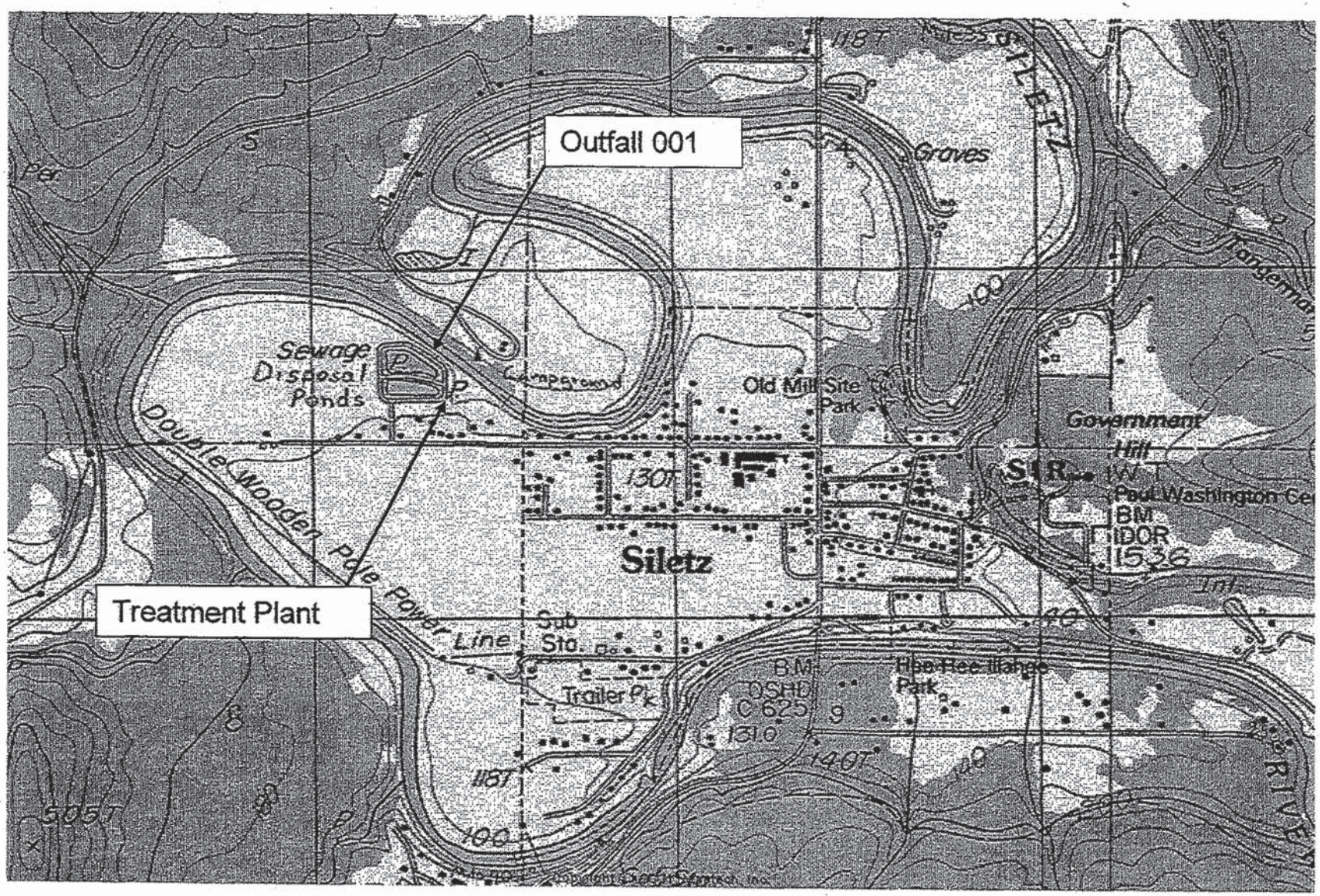
Civil West Engineering Services, Inc.

Appendix O

City of Siletz

Map/Schematic

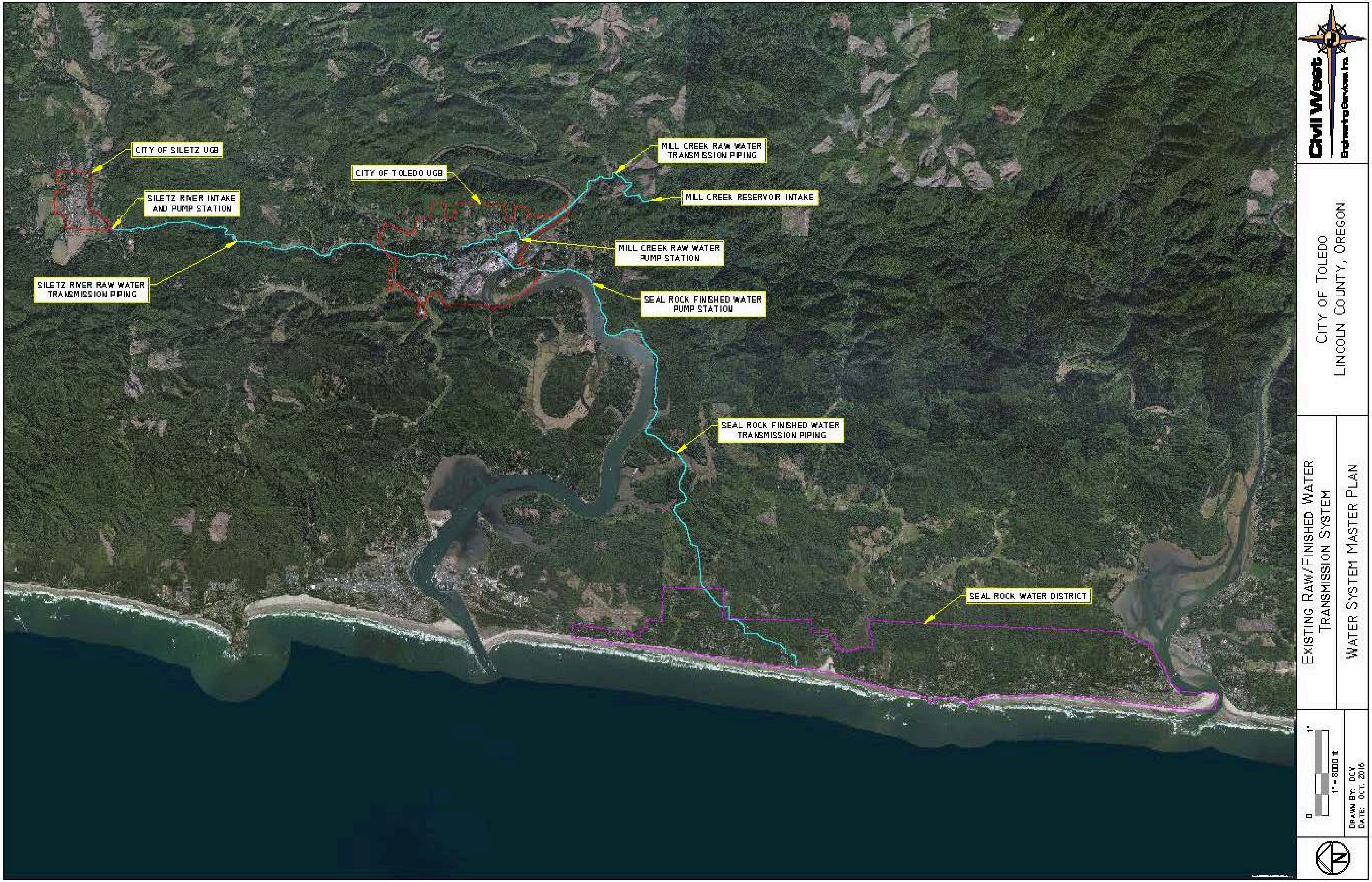
Attachment 1



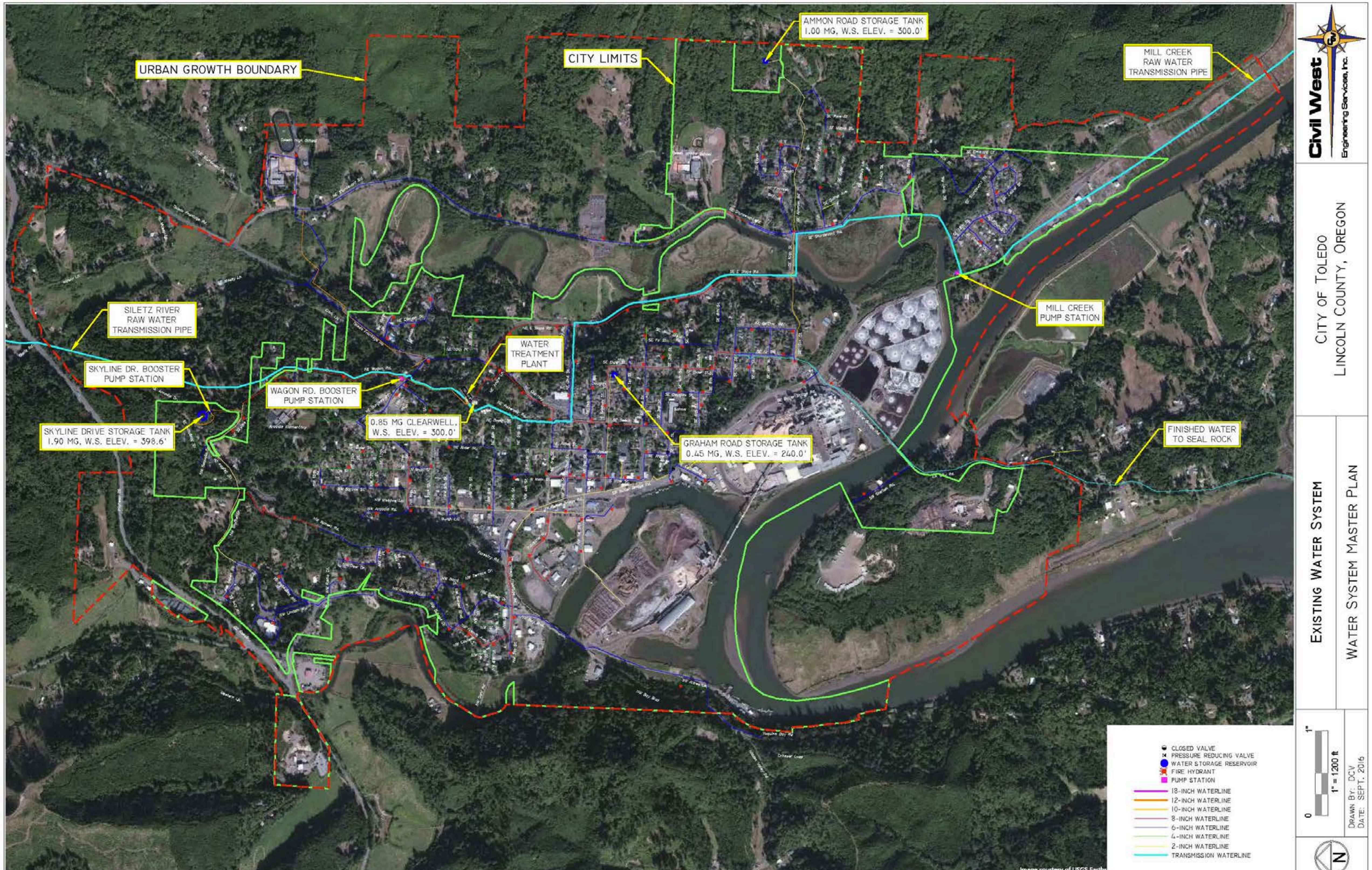
Appendix P

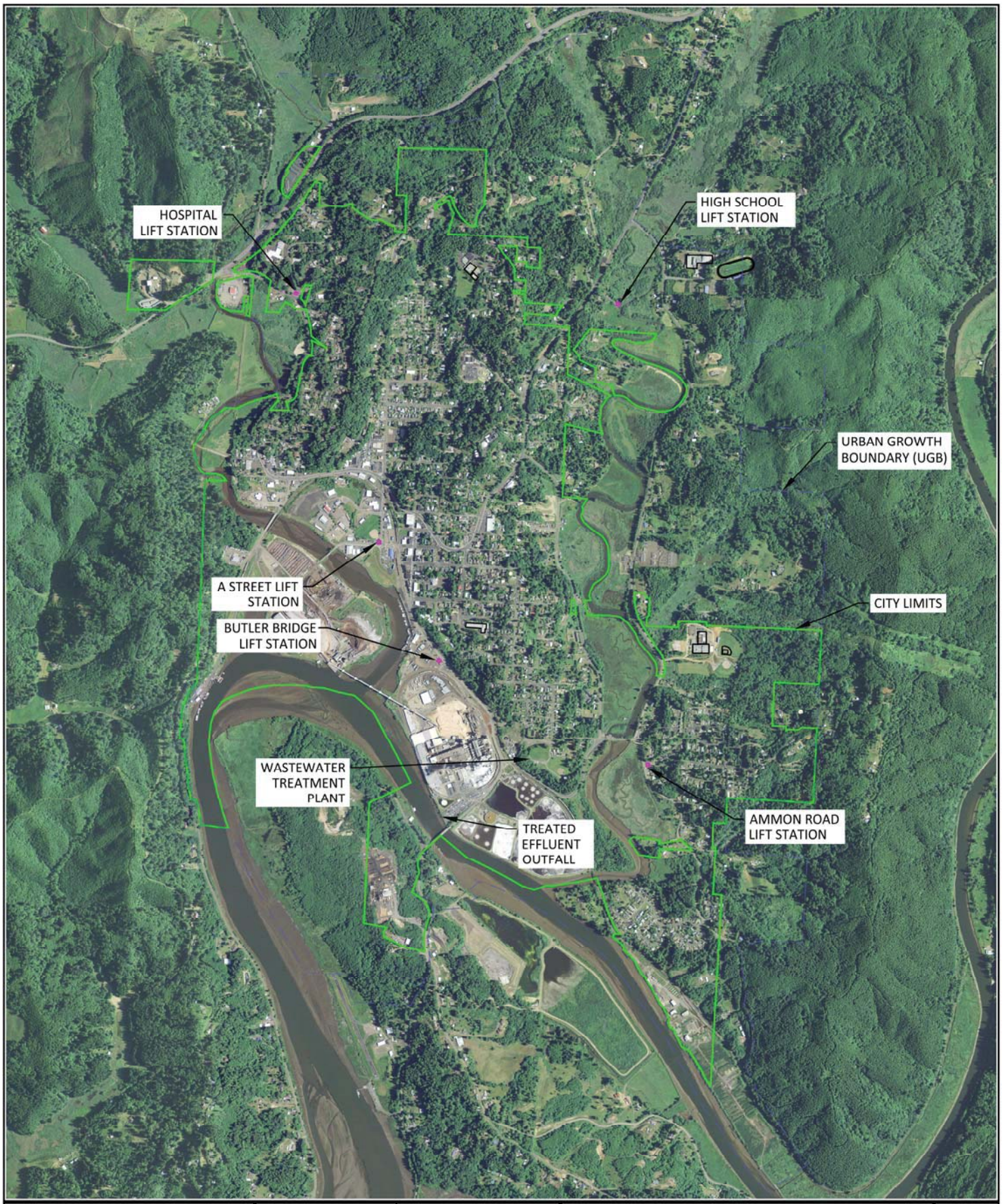
City of Toledo

Map/Schematic



CITY OF SILETZ UGB
SILETZ RIVER INTAKE AND PUMP STATION
SILETZ RIVER RAW WATER TRANSMISSION PIPING
CITY OF TOLEDO UGB
MILL CREEK RAW WATER TRANSMISSION PIPING
MILL CREEK RESERVOIR INTAKE
MILL CREEK RAW WATER PUMP STATION
SEAL ROCK FINISHED WATER PUMP STATION
SEAL ROCK FINISHED WATER TRANSMISSION PIPING
SEAL ROCK WATER DISTRICT
Civil West Engineering Services Inc.
CITY OF TOLEDO
LINCOLN COUNTY, OREGON
EXISTING RAW/FINISHED WATER TRANSMISSION SYSTEM
WATER SYSTEM MASTER PLAN
0
1"
1" = 8000 ft
DRAWN BY: DCY
DATE: OCT. 2016


URBAN GROWTH BOUNDARY
CITY LIMITS
AMMON ROAD STORAGE TANK
1.00 MG, W.S. ELEV. = 300.0'
MILL CREEK
RAW WATER
TRANSMISSION PIPE
SILETZ RIVER
RAW WATER
TRANSMISSION PIPE
SKYLINE DR. BOOSTER
PUMP STATION
WAGON RD. BOOSTER
PUMP STATION
WATER
TREATMENT
PLANT
MILL CREEK
PUMP STATION
SKYLINE DRIVE STORAGE TANK
1.90 MG, W.S. ELEV. = 398.6'
0.85 MG CLEARWELL,
W.S. ELEV. = 300.0'
GRAHAM ROAD STORAGE TANK
0.45 MG, W.S. ELEV. = 240.0'
FINISHED WATER
TO SEAL ROCK
CLOSED VALVE
PRESSURE REDUCING VALVE
WATER STORAGE RESERVOIR
FIRE HYDRANT
PUMP STATION
18-INCH WATERLINE
12-INCH WATERLINE
10-INCH WATERLINE
8-INCH WATERLINE
6-INCH WATERLINE
4-INCH WATERLINE
2-INCH WATERLINE
TRANSMISSION WATERLINE
Image courtesy of USGS Earths
Civil West
Engineering Services, Inc.
CITY OF TOLEDO
LINCOLN COUNTY, OREGON
EXISTING WATER SYSTEM
WATER SYSTEM MASTER PLAN
0
1"
1" = 1200 ft
DRAWN BY: DCV
DATE: SEPT. 2016
N



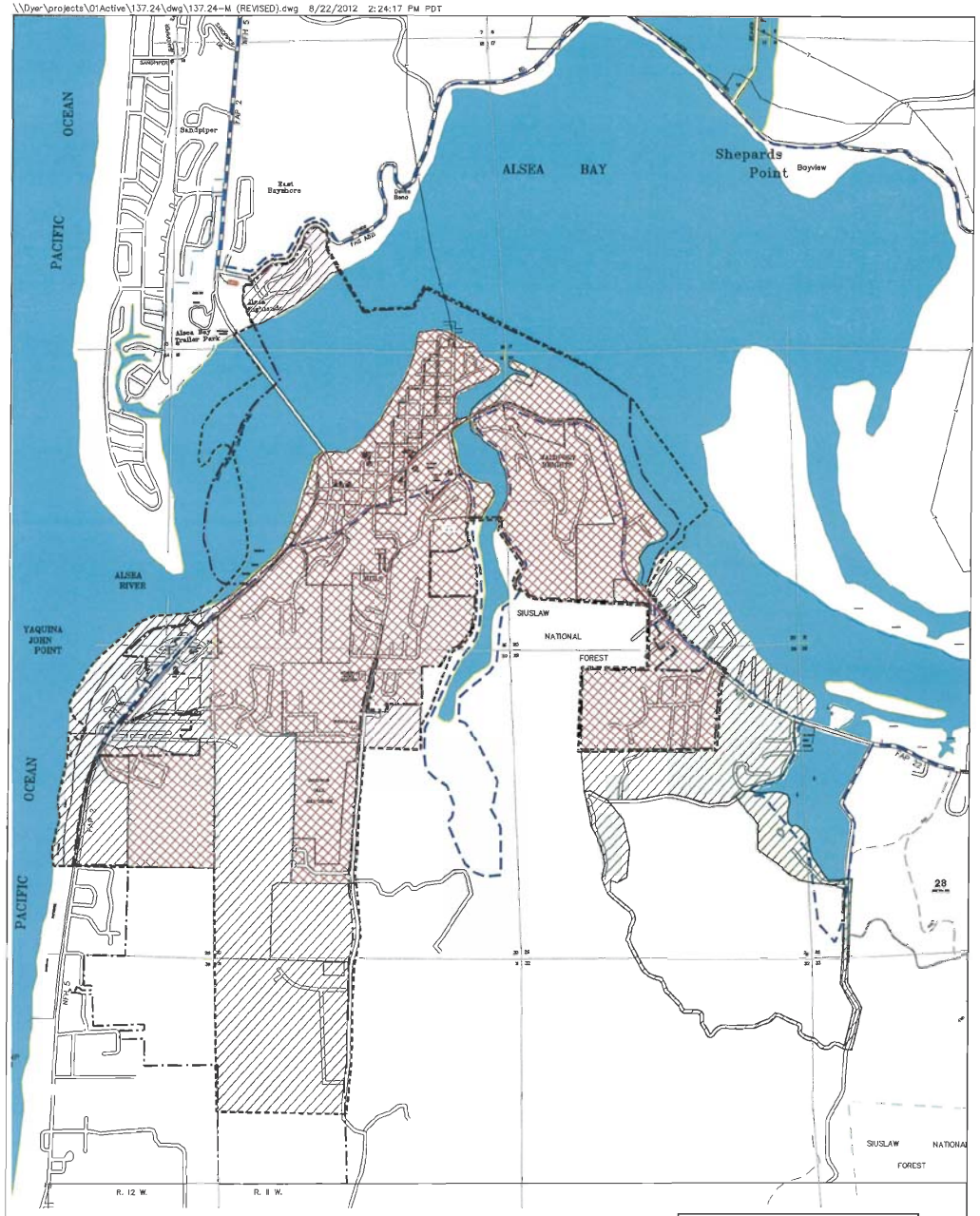
Civil West Engineering Services, Inc.	Drawn By: MLG Date: Dec. 2012	0 1"	**Vicinity Map**	FIGURE
	Wastewater Facilities Plan		City of Toledo Lincoln County, OR	3.1.2

Appendix Q

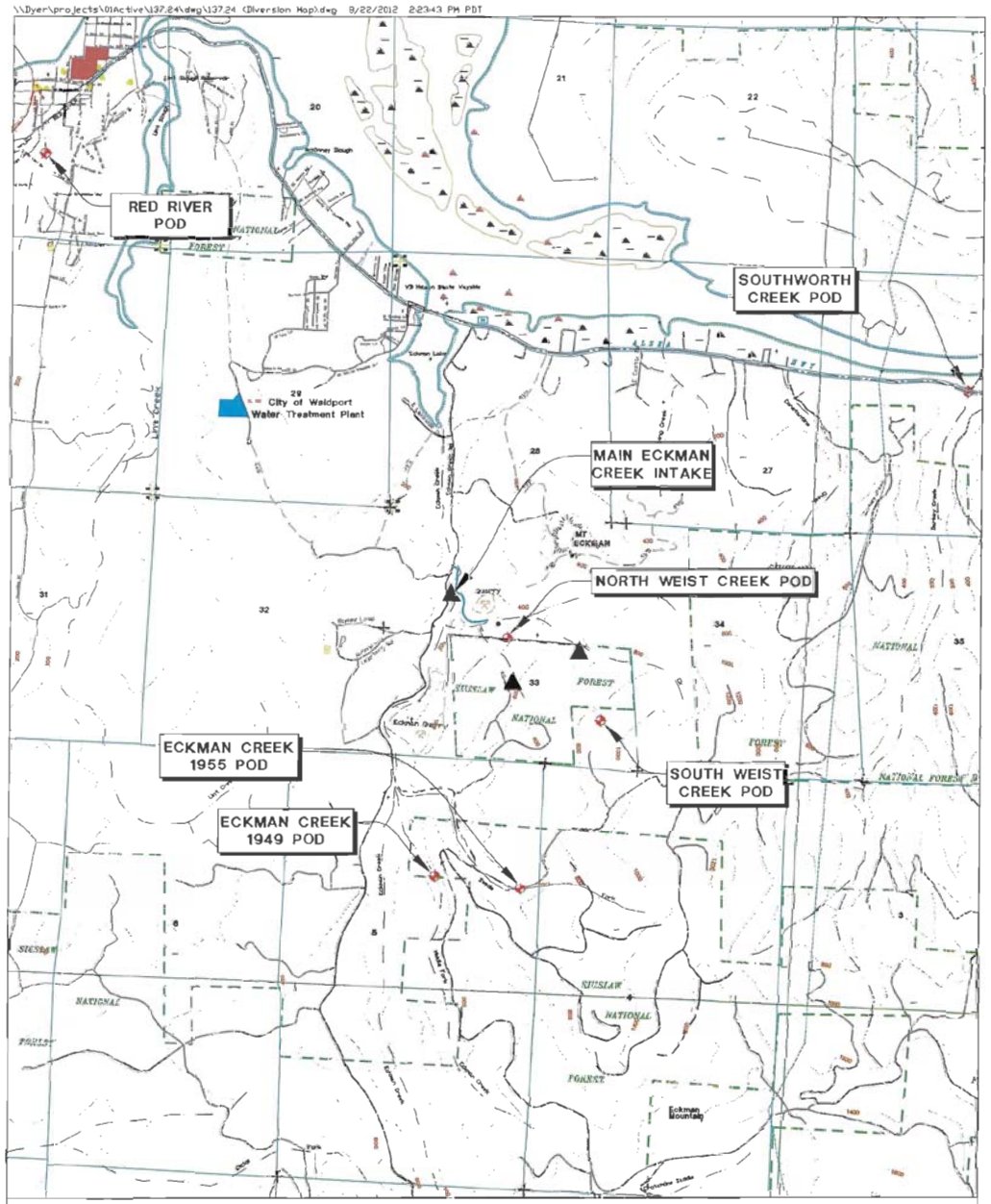
City of Waldport

Map/Schematic

\\Dyer\projects\01Active\137.24\dwg\137.24-M (REVISED).dwg 8/22/2012 2:24:17 PM PDT



THE DYER PARTNERSHIP ENGINEERS & PLANNERS DATE: APRIL, 2012 PROJECT NO.: 137.24	CITY OF WALDPORT - WATER MANAGEMENT AND CONSERVATION PLAN WATER SERVICE AREAS	FIGURE NO. 2.1.1

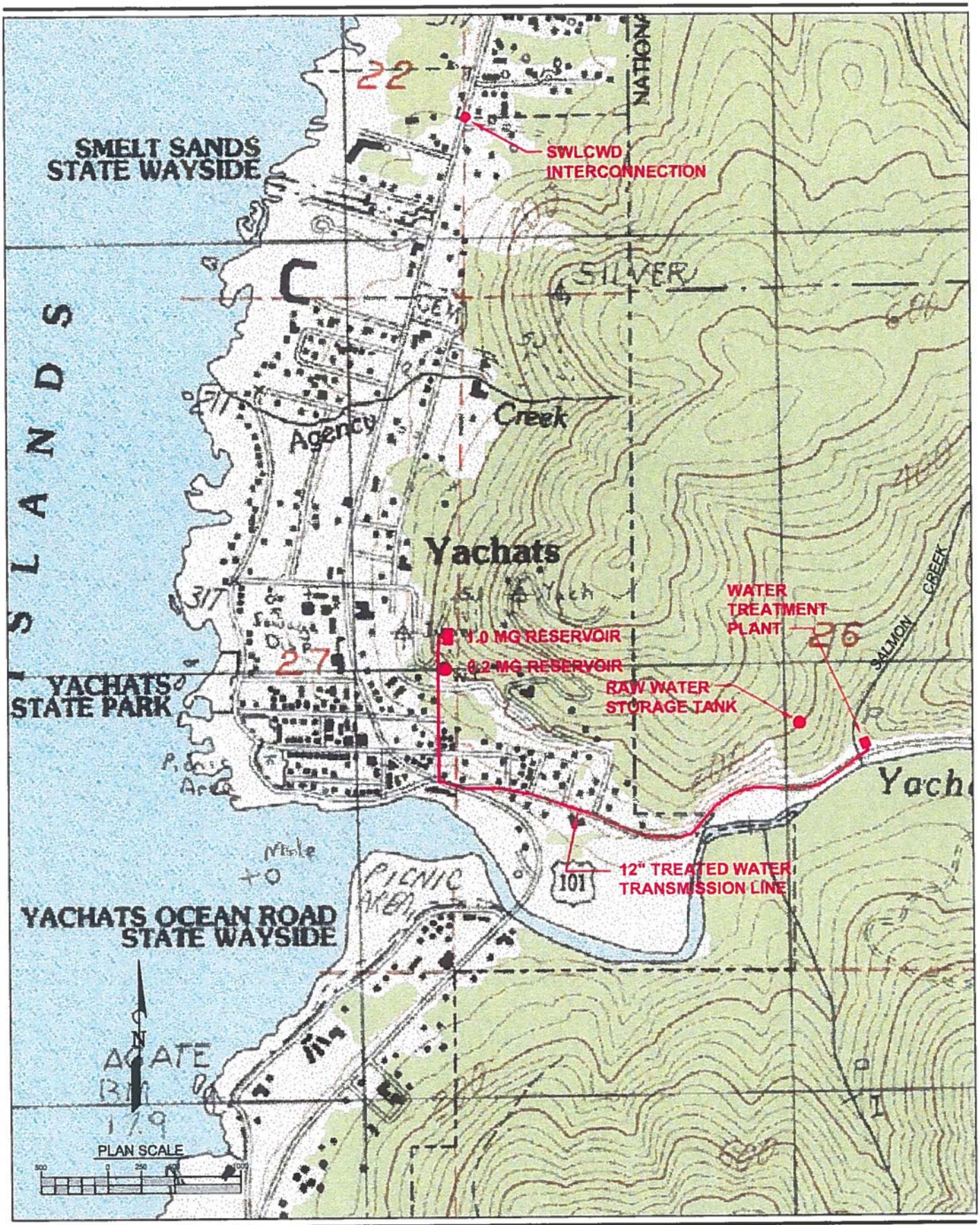


THE DYER PARTNERSHIP ENGINEERS & PLANNERS DATE: NOV., 2011 PROJECT NO.: 137.24	CITY OF WALDPORT WATER CONSERVATION MASTER PLAN DIVERSION POINT MAP	FIGURE NO. 2.2.1

Appendix R

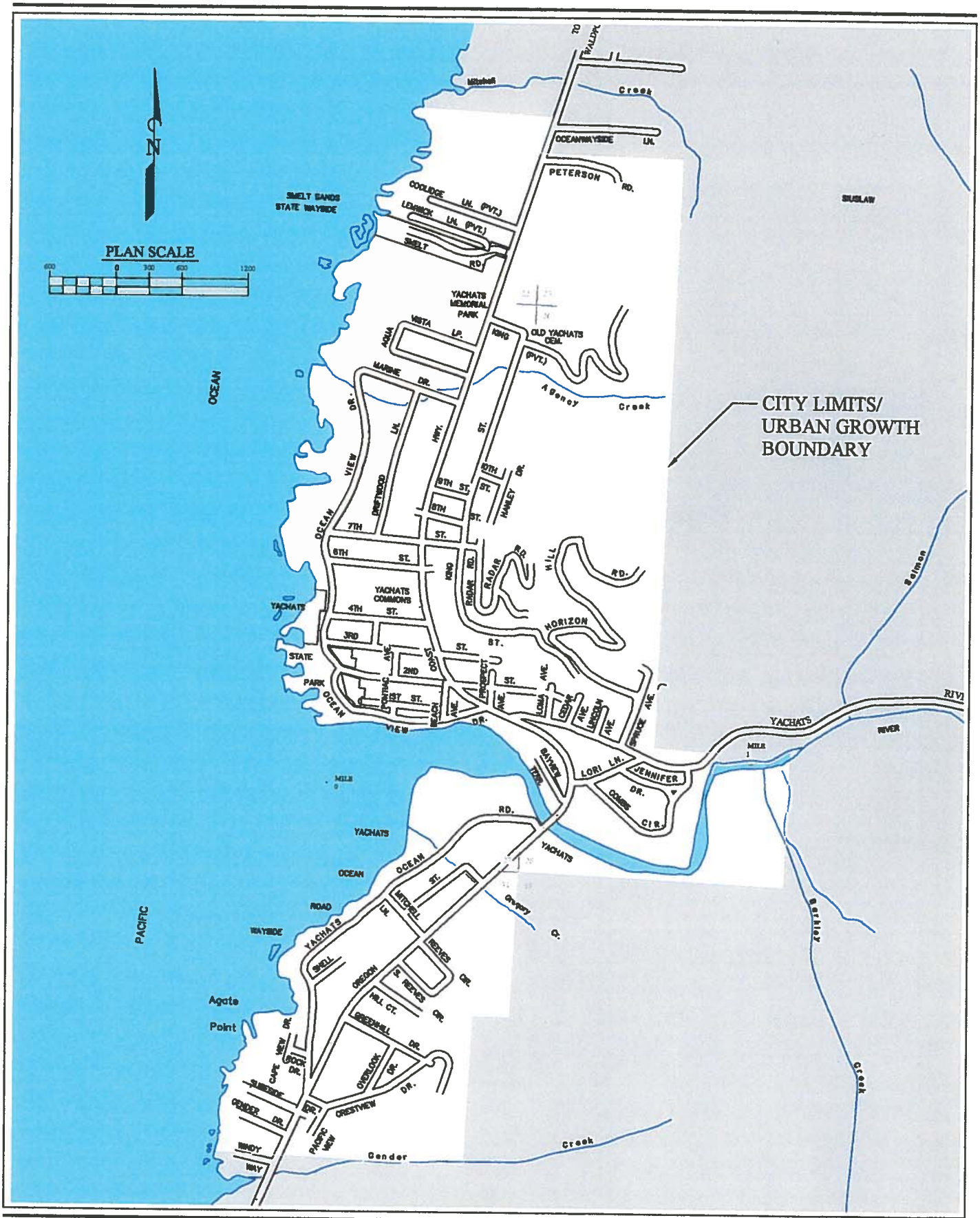
City of Yachats

Maps/Schematics



THE DYER PARTNERSHIP ENGINEERS & PLANNERS, INC.	***CITY OF YACHATS*** ***WATER MASTER PLAN***	**FIGURE NO.** **4.4.1**
DATE: JUNE, 2001 PROJECT NO.: 0510.02	***TREATMENT PLANT LOCATION***	

\\Pallo\C\01Active\0510.02\dwg\AREAMAP.dwg 04/26/2001 10:40:03 AM PDT



THE DYER PARTNERSHIP ENGINEERS & PLANNERS, INC.	***CITY OF YACHATS WATER MASTER PLAN***	**FIGURE NO.**
DATE: JUNE, 2001	***STUDY AREA MAP***	**2.1.2**
PROJECT NO.: 0510.02		