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City of Gearhart
Water Master Plan

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Prepared for

City of Gearhart
698 Pacific Way
P.O. Box 2510
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K/J Project No. 1676009*00

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%	percent
AC	asbestos cement
ADD	average daily demand
Ave	Avenue
AWWA	American Water Works Association
bgs	below ground surface
^oC	degrees Centigrade
CF	cubic feet
cfs	cubic feet per second
Cl_2	chlorine
CIP	capital improvement plan
City	City of Gearhart
DBPs	disinfection byproducts
ENR CCI	Engineering News Record Construction Cost Index
EPA	Environmental Protection Agency
$FeCl_3$	ferric chloride

FY	fiscal year
gal	gallon
gpcpd	gallons per capita per day
gpm	gallons per minute
HAA5	haloacetic acids (five)
HDPE	high-density polyethylene
HP	horsepower
Hwy	Highway
MCL	Maximum Containment Level
MDD	maximum daily demand
MRDL	maximum residual disinfectant level
MG	million gallons
mg/L	milligrams per liter
MGD	million gallons per day
MSL	Mean Sea Level
NaOCl	sodium hypochlorite
NaOH	sodium hydroxide
NGVD	National Geodetic Vertical Datum
NCEI	National Centers for Environmental Information
O&M	operation and maintenance
OAR	Oregon Administrative Rules
OHA	Oregon Health Authority
PHD	peak hour demand
POD	point of diversion
psi	pounds per square inch
PSU	Portland State University
PVC	polyvinyl chloride
PVDF	polyvinylidene fluoride
Rd	Road
RUS	Rural Utilities Service
RW	raw water
SDWA	Safe Drinking Water Act
SDWRLF	Safe Drinking Water Revolving Loan Fund
TTHM	total trihalomethanes
UGB	urban growth boundary
WMP	water master plan
WTP	Water Treatment Plant

Section 1: Executive Summary

1.1 Introduction

The purpose of this plan is to provide the City of Gearhart (City) with a comprehensive water master plan (WMP) for the future development of their water system. The plan includes a description of the federal and state regulations, existing water system, the planning criteria, a water system analysis and capital improvement plan (CIP).

1.2 Water Requirements

This section contains the regulatory evaluation, planning data and analyses used in the development of the population and water demand projections for the City WMP for the 20-year planning period from 2016 through 2037.

1.2.1 Regulatory Evaluation

The section contains a discussion of the regulatory requirements governing water utilities in the State of Oregon. The pertinent details and findings from City's WTP water quality analyses are in this Section. The City is in compliance with the Safe Drinking Water Act (SDWA) and Oregon Administrative Rules (OARs) for public water systems.

1.2.2 Historical and Projected Service Population

The City's projected population to 2037 is projected using a 1.5 percent (%) annual growth rate. The future growth rate was developed using population data obtained from Portland State University (PSU) and discussions with City Staff.

The 2010 United States (US) Census survey lists 1,450 housing units within the City with 45% of the housing units occupied. Approximately 34% of the housing units are owner occupied and 11% are renter occupied. The remaining 55% of the housing units are identified as seasonal, recreational, for sale or occasional use housing units (US Census 2010). The City estimates that the seasonal, recreational, or occasional use housing units have increased to 60% of the housing units in 2016.

The City has seen a large increase in vacation rental homes from 60 vacation homes in 2014 to 105 in 2016. The City is attempting to control the number of vacation rental homes by placing a cap on the total number of permits they issue at 120 permits.

1.2.3 Unaccounted Water

Unaccounted-for water in the City's water system is defined as the difference between the total water produced by the City's water treatment plant (WTP) combined with the water purchased from Warrenton and the total amount of metered water. This difference between water records results from total non-revenue water, leakage losses, meter discrepancies, unmetered uses such as hydrant and main flushing, operation and maintenance (O&M) uses, unauthorized

connections, fire flow uses, and other unmetered miscellaneous uses. Currently, the City is averaging about 28% water loss, which is higher than the 10% water loss goal currently recommended by American Water Works Association (AWWA). The City is working towards reducing the unaccounted water loss and their strategies are further discussed in Section 3.

1.2.4 Distribution

The City's water distribution system consists of one pressure zone with an average service pressure of 70 pounds per square inch (psi) throughout the system. The service pressure is regulated by the 1 million gallon (MG) reservoir level, operation of the booster pumps located at the WTP, and the pressure reducing valve settings at the Warrenton connections.

1.2.5 Water Demand

Future water requirements were calculated based on current per capita usage applied to future estimated population and are presented in Table 1.1. It should be noted that the large seasonal tourist population inflates the per capita usage based on the resident population.

The average daily demand (ADD) of 197 gallons per capita per day (gpcpd) was developed from historical data for the 2013 to 2015 period. The large season tourist population increases water demand in the summer months significantly more than normally occurs from just lawn irrigation. A maximum day demand (MDD) of 0.788 gallons per day (MGD) was recorded on July 3, 2016 which is equivalent to 547 gallons per minute (gpm) over a 24-hour period. Peaking factors of 2.7 and 5 were used to develop MDD and peak-hour demand (PHD) flows, respectively.

Table 1.1: Demand Projections

Year	Population Projection	ADD (MGD)	MDD (MGD)	PHD (gpm)
2013	1,480	0.29	0.77	990
2014	1,475	0.29	0.79	1020
2015	1,480	0.29	0.79	1016
2017	1,524	0.30	0.81	1042
2022	1,635	0.32	0.87	1118
2037	1,968	0.39	1.05	1346

1.2.6 Large Water Users

Large-volume users create areas of high water demand in the distribution system. The large-volume water users in the City are comprised of commercial customers and condominiums. The top ten water users in the City experience a large increase in water usage during the summer that can be attributed to the influx of tourists. The City's WTP, limited by water rights, is unable to meet the water demand during the tourist season. Therefore, the City supplements its water supply by purchasing wholesale water from the City of Warrenton. The top ten water users in the City were compiled from meter records and details are provided in Section 2.

1.3 Existing Water System Supply

1.3.1 Service Area

The service area is defined by the urban growth boundary (UGB). Figure 3.1 shows the service area of the existing water system, City limits, the UGB and land use zoning. Figure 3.2 provides a hydraulic profile of the wells, treatment process and reservoir.

The City serves a customer base that is a mix of residential and commercial users through 1,400 connections within the City. Seasonal water demand varies the most within the commercial user base during tourist season. It is anticipated that the relative ratio of residential and commercial units will remain generally unchanged into the 20-year planning period.

1.3.2 Water Supply

The City currently obtains its water from two consistent sources; the City owned and operated wells and from Warrenton. The City has historically purchased its potable water supply from Warrenton, through a 10-year wholesale agreement for the July to October time period. Currently, the City purchases water when its permitted groundwater extraction rate is seasonally reduced. The City of Warrenton conveys treated water through interconnections at the North Headworks and South Headworks located east of Highway 101 to the City.

The City's wholesale agreement allows the City to continue to purchase water from Warrenton through 2019, with emergency backup supply provided by Seaside. The City's water distribution system is also interconnected with the City of Seaside's water distribution system on the south side of City.

These connections are normally closed, and the flowmeters are monitored for cross-connection flow that may occur.

1.3.3 Water Rights

The City holds a groundwater right in the Clatsop Plains Basin which is seasonally limited to avoid a potential for interference with surface water and salt water intrusion and is summarized in Table 1.2.

Table 1.2: Water Rights Summary

Point of Diversion (POD) Description	Clatsop Plains Basin Aquifer, Wells #1 - #14 in Neacoxie Creek Basin		
Approximate POD Location	SE ¼ SE ¼ , Section 4 and NE ¼ NE ¼ Section 9, T6N, R10W		
Application No.	G-16489		
Permit No.	G-16390		
Priority Date	6/28/2005		
Permit Issuance Date	11/3/2008		
Authorized Type of Use	Municipal Use		
Authorized Date for Completion of Development	3 November 2013		
Flow Rates	**cfs**	**MGD**	**gpm**
November 1st to June 30th	2.18	1.41	980
July 1st to 31st	0.443	0.29	198
August 1st to 31st	0.289	0.19	129
Sept. 1st to 30th	0.410	0.26	184
Oct. 1st to 31st	0.485	0.31	217

Abbreviations:
cfs = cubic feet per second

1.3.4 Production Wells

A total of eight of the 14 identified wells (Well Nos. 1, 3, 5, 7, 9, 11, 13, 14) were constructed to provide sufficient capacity per water right requirements for the City's current and projected demands. The remaining wells were drilled but do not contain the necessary pumping equipment or piping to convey raw water (RW) to the WTP facility.

Each operating well is equipped with a submersible vertical turbine pump with a fixed speed drive and a magnetic flow meter, which provides the ability to monitor the individual well flow rates. Water from the eight production wells is combined and conveyed to the WTP with an 8-inch RW pipeline that enters the south side of the WTP.

The pumps are operated in various configurations for flow rates of 150 gpm, 300 gpm and 600 gpm. The wells are throttled as needed to meet the August 129 gpm instantaneous limit.

1.3.5 Water Treatment Plant

The water treatment plant was constructed and commissioned in 2012. The water treatment process utilizes coagulation assisted membrane filtration to remove arsenic from the water. The water is then disinfected and discharged to a 0.54 MG clearwell which provides chlorine contact time and water storage for fire flow. Water booster pumps located at the treatment plant pump the treated water from the clearwell into the water distribution system.

The WTP normal operating hours are from 8 am to 5 pm. The treatment plant typically operates both membrane filtration skids during normal, non-water rights restricted periods. When the water rights are reduced from July to October, the WTP operates only one of the skid units.

Mechanical components (valves, strainers, etc.), chemical systems, membrane skids and pumps are maintained periodically, and maintenance schedules are listed in their respective sections of the WTP Operation and Maintenance Manual. All the valves in the membrane filtration system were replaced during the first year (2012) and the membranes were replaced in 2016 under a prorated warranty.

1.3.6 Treated Water Storage

The City has one treated water reservoir located on a hill northeast of the City. The 1 MG reservoir was constructed in 2012 to provide operational peaking, equalization storage, fire flow storage and emergency storage. A mixer is installed in the reservoir to prevent stratification, minimize water age, and maintain a consistent chlorine residual throughout the reservoir.

1.3.7 Transmission and Distribution Pipelines

The City's water transmission and distribution system includes approximately 23 miles of pipe, ranging from 2-inch to 16-inch diameter. The water distribution system pipe materials are comprised of approximately 60% asbestos cement and 40% polyvinyl chloride (PVC). A high-density polyethylene (HDPE) transmission main connects the 1-MG reservoir to the distribution system. The City's distribution system consists of one pressure zone with an average service pressure of 70 psi. There are no known lead goosenecks in the distribution system. Approximately 95% of the water service connections are copper pipe. Figure 3.3 shows the distribution system within the service area including water lines, valves and hydrants.

The City regularly replaces hydrants and valves as necessary. The valves and hydrants within the system are in good working condition.

1.4 Water System Analysis

1.4.1 Demand Allocation and Growth

The City's population is projected to increase by 1.5% per year over the next 20 years as discussed in Section 2. The City anticipates construction of a new housing development consisting of 120 new single family residential homes by 2022 on Highland Lane and Main Street. The increased growth will place additional demand on the WTP and distribution system.

1.4.2 Water Source and Supply

The City obtains water from two water sources, the WTP (beach wells) and Warrenton, during the summer. The wholesale agreements with both Warrenton and Seaside will allow the City to meet water demand during the tourist season when the WTP is limited by reduced water rights.

1.4.3 Water Storage

The City has adequate water storage over the planning period and no additional storage is needed based on projected water demands. The City may reanalyze population growth and storage requirements in 2032. If the growth rates increase, the City may have to construct an additional reservoir before 2037.

1.4.4 Computer Simulation Model

The City's water distribution system was modeled using EPANET 2 software to simulate the hydraulics of the City's water system. The hydraulic modeling of the system identified key upgrades that are required to meet water demand and address pressure and fire flow deficiencies in the system through 2037. The system was evaluated in the years 2017 (present conditions), 2022 (five-year analysis and new Highland Lane Development addition) and in 2037.

The City has dedicated high-flow pumps connected to the distribution system that can be used during a fire event. Due to pressure concerns within the City's aged pipe infrastructure, it is unlikely the high-flow pumps will be utilized. However, per the City's wholesale water agreements with Warrenton and Seaside, both are a reliable source of water during a fire event.

Fire flow analysis was evaluated for both current and future MDD, with the storage reservoir half full, to determine restrictions within the system. The model results indicate that fire flow requirements are not currently met at the Gearhart By the Sea Resort (Gearhart House and Kelly House), a densely populated property. Improvements to the water distribution system in this area is a priority and will dictate the repair and capital improvement schedule for the City's distribution system. Section 4 details the deficiencies and improvements that would need to occur to meet fire flow requirements.

1.4.5 Distribution System Improvements

1.4.5.1 Hillila Road and Marion Avenue Loops

Waterline loops along Marion Avenue (Ave) and Hillila Road (Rd) do not provide adequate flow to maintain system pressures under a fire flow condition at the resort. Without additional fire flow supplied by Warrenton, Marion and Hillila loops should be constructed as soon as possible. Fire flow requirements are not currently met at the resort without operating a high-flow booster pump. Construction of the new loops on Hillila Rd and Marion Ave. will allow the City's system to meet residual pressure requirements during fire events at the Kelly House using only City-produced water.

1.4.5.2 Highway 101 Segment

The water line on Highway (Hwy) 101 between G Street and Sandy Ridge Rd is constructed of aging asbestos cement (AC) pipe line that varies from 10-inch to 6-inch to 18-inch PVC C900. This line is undersized and believed to be in poor condition.

It should be upgraded to 18-inch PVC before 2037 to meet capacity requirements. The increase in pipe size will provide sufficient pressure within the system during a fire at the resort if the City is relying solely on its own water supply.

1.4.5.3 Ridge Path and Cottage Avenue Pipe Segment

Replacement of this Ridge Path pipe segment was not identified through modeling as a critical repair within the next 20 years, but the City has indicated that the segment frequently needs repairs after storms. The segment is predominately composed of AC pipe installed in the early 1960's. The water line is surrounded by tree roots which have the potential to damage the pipe as the trees fall during storms.

The AC pipe segment located on Cottage Avenue was installed in the early 1960's and requires frequent repairs. The City has identified the segment as one that needs to be replaced in the next 20 years due to age and repair cost.

1.4.6 Water Meters

The City is actively engaged in reducing their high unaccounted water losses. The City has been actively replacing aged meters throughout their system. The City has seen an increase in water consumption measured at residential units where new meters have been installed. Aged meters typically run slower and under record the water use. The City estimates a large portion of water meters within their system are over 20 years old and the new meters will record water consumption with a higher accuracy.

1.5 Capital Improvement Plan (CIP) and Financial Plan Development

1.5.1 CIP

This section contains the recommended Capital Improvements to the City's water system over the next 20 years. A description of each project is included in Section 5. The City's CIP contains three project types: maintenance projects, distribution system improvements and general improvements. The CIP summary table is shown in Table 1.3. The costs shown are 2016 dollars Engineering New Record Construction Cost Index (ENR CCI) 10,388 (2016 20-City Average); therefore, the City will need to adjust the costs depending upon when construction occurs. The costs listed in the table include a 30% contingency (excluding the water meter installation).

Table 1.3: Capital Improvement Plan - by Scheduled Year

Project Description	2016 Project Cost[1]	Construction Year	Priority	Notes
Maintenance Projects				
Replace Reservoir Cathodic Protection Anodes	$13,000	2037	High	Project is funded using WTP Facility Equipment Maintenance fund
Membrane Replacement	$100,000	2022, 2027,2032,2037	High	Membrane Life expectancy 5 to 7 years
Meter Replacement	$60,000/year	2017-2021	Critical	High Priority, funding is already secured
Distribution System				
Marion Loop Construction	$90,000	2017	High, 3a	Survey for project site is complete
Hillila Loop Construction	$390,000	2019	High, 3a	
Highway 101 Pipe Replacement	$3,710,000	2033	Critical, 1	Replacement may occur sooner if repairs become excessive or combined with a highway improvement project
Ridge Path Pipe Replacement	$960,000	2018	High, 2	
Cottage Avenue Pipe Replacement	$680,000	2020	High, 3b	
General Improvements				
Third Treatment Skid			Low	New skid is dependent on future demand, revisit in 5 years
New WTP Pump (300 gpm)	50,000	As necessary	Low	Project will be funded using WTP Facility Equipment Maintenance fund

Notes

1. 2016 ENR CCI 20-City Index 10338

1.5.2 Funding

The City will need to generate approximately $311,000 per year (2016 dollars) from the Water Reserve Fund to fund the CIP internally unless the improvements are funded/financed over a longer time period.

Section 2: Water Requirements

This section contains the planning data and analyses used in the development of the population and water demand projections for the City Water Master Plan for the 20-year planning period from 2016 through 2037. It also discusses the water treatment and water quality requirements and the City's water quality goals.

2.1 Definition of Terms

The following definitions are used in this section:

Demand:	The total quantity of water supplied for a given period of time to meet the various required uses, including: residential, commercial, industrial, non-residential, fire fighting, system losses, and other unaccounted-for and miscellaneous uses.
Unaccounted-for Demand:	The difference between the total amount of water withdrawn from the source and the total amount of metered water.
Fire Flow:	Flowrate requirements for buildings and structures fire suppression.

The different levels of water demands are designated as ADD, MDD, and PHD.

Average Daily Demand (ADD):	The total volume of water delivered to the system in one year, divided by 365 days.
Maximum Daily Demand (MDD):	The total flow on the maximum day of the year, or if expressed as gallons per minute, it is the average flow rate on the peak day of the year.
Peak Hourly Demand (PHD):	The maximum volume of water delivered to the system in any single hour of the year.

The different units to be used in this section include: gallons per minute (gpm), gallons per capita per day (gpcpd), million gallons (MG), and million gallons per day (MGD).

2.2 Regulatory Evaluation

2.2.1 Regulatory Requirements

Drinking water quality is regulated by federal law, including the SDWA and subsequent amendments to the SDWA, and by State law, including OARs for public water systems. The Environmental Protection Agency (EPA) and State agencies enforce drinking water regulations.

In Oregon, the Oregon Health Authority is the primary agency in the enforcement of federal and state regulations for public water systems.

2.2.2 Federal Regulations

The SDWA and the amendments thereof, provide the minimum treatment requirements for drinking water quality. The states can use these minimum requirements or develop requirements that are more stringent. OARs, developed for the State of Oregon, are the applicable drinking water quality requirements that meet federal regulations. The federal regulatory requirements on the treatment of drinking water are, therefore, addressed in the discussion on state regulations.

2.2.3 State Regulations

OAR Chapter 333 lists the applicable drinking water quality requirements for all public water systems in Oregon. These rules were developed by the Public Health Division of the Oregon Department of Human Services and became effective in December 1992 and are periodically amended. OAR Chapter 333 sets Maximum Containment Levels (MCLs) and action levels for various contaminants, outlines treatment requirements and performance standards, covers treatment requirements for corrosion control, provides sampling and analytical requirements, describes public notice guidelines, and presents other requirements related to the construction and operation of water treatment plants.

2.3 Water Treatment Requirements

2.3.1 MCLs and Action Levels

OAR 333-061-0020 defines MCLs as the maximum allowable level of a contaminant in water delivered to the users of the public water system. Action levels were established for lead and copper concentrations measured at the customers tap rather than MCLs. The action levels are set for the 90th percentile concentration of lead or copper in targeted tap samples which determines if a water system needs to implement a corrosion control treatment technique. The required MCLs and action levels are presented in OAR 333-061-0030. MCLs are set for inorganic chemicals, organic chemicals, turbidity, microbiological contaminants, and radioactive substances. Action levels are set for lead, and copper. The regulations further delineate these levels based on water source. The requirements for systems with groundwater (not under the influence of surface water) sources are described in this section.

MCLs and actions levels for various inorganic chemicals are summarized in Table 2.1 and apply to both surface and groundwater sources.

Table 2.1: MCLs and Action Levels for Inorganic Chemicals defined in OAR 333-061-0030

Inorganic Chemical	MCL	Action Level	Treated Water[1]
	(mg/L)	(mg/L)	(mg/L)
Antimony	0.006		ND
Arsenic	0.010		ND[2]
Barium	2		0.00107
Cadmium	0.005		ND
Chromium	0.1		ND
Copper		1.3	0.346, ND[3]
Cyanide	0.2		ND
Fluoride	4.0		0.15
Lead		0.015	ND[3]
Nitrate (as N)	10		ND[2]
Nitrite (as N)	1		ND[2]

Notes/Abbreviations:

1. Sample collected on 4/12/2016
2. Sample collected on 1/14/2016
3. Sample collected on 4/19/2013, tap sample

mg/L = milligrams per liter.
N = Nitrogen
ND = Non-Detect

OAR 333-061-0050 specifies the allowable best available treatment technology for achieving compliance with the arsenic MCL. Arsenic removal is described in Section 3.

Exceeding the MCL for fluoride requires public notice as discussed in OAR 333-061-0042. In addition to the fluoride MCL in Table 2.1, there is a secondary fluoride MCL of 2.0 mg/L established for aesthetic reasons. Per OAR 333-061-0042(7) public notice is required if the secondary MCL is exceeded.

The lead or copper action level is exceeded when the lead or copper concentration in more than 10 percent (%) of the tap water samples collected from targeted premise plumbing during any monitoring period exceed the action level in Table 2.1. If either of these action levels is exceeded the treatment requirements for corrosion control must be addressed. These treatment requirements are covered in OAR 333-061-0034 and discussed later in this section.

MCLs have been established for organic chemicals including volatile organic and synthetic organic chemicals. The listing of MCLs for organic chemicals is extensive and can be found in OAR 333-061-0030 section (2).

MCLs for disinfection byproducts (DBPs) are summarized in Table 2.2. Samples are collected at locations within the City's distribution system likely to have elevated DBPs.

Table 2.2: MCLs for Disinfection Byproducts Defined in OAR 333-061-0030

Disinfection Byproduct	MCL (mg/L)	Sample[1] (mg/L)
Total Trihalomethanes (TTHM)	0.080	0.024
Haloacetic acids (five) (HAA5)	0.060	0.008

Notes:

1. Sampled on 4/4/2016 at G-St and S-Ocean Ave

MCLs for THHM and HAA5 are calculated as a locational running annual average (LRAA) of detected DBPs in the distribution system. The MCL applies to each location sampled in the distribution system.

Based on the results of sample collection and analysis, City's WTP has consistently produced water with quality meeting the requirements of OAR 333-061-0030.

2.3.2 Treatment Requirements and Performance Standards

Treatment requirements and performance standards are presented in OAR 333-061-0032.

2.3.3 Pathogen Removal and Disinfection Standards

As covered in OAR 333-061-0032, the pathogen removal (disinfection) requirements are dependent on the type of source water and whether the treatment facilities provide filtration. The City's WTP can provide 4-log removal of *Giardia* and *Cryptosporidium* and 0.5-log virus removal; although, that is not a requirement for groundwater treatment.

The City purchases water from Warrenton through a wholesale agreement when the City's water right reduces the quantity of water diversion allowed from the wellfield (further discussed in Section 3). The responsibilities of water suppliers specified under OAR 333-061-0025 dictates that the City of Warrenton is responsible to treat the surface water to meet OAR 333-061-0032 when the City of Warrenton provides water to the City. If the chlorine residual is not maintained in the City's distribution lines, the City can request the City of Warrenton to increase their chlorine dose to maintain the required residual in the distribution lines. The City must maintain a disinfectant residual within their distribution system due to the addition of treated surface water.

Effective April 2016, treatment techniques can be used to meet compliance with the MCL for E. *coli* as specified in OAR 333-061-0030.The City maintains a disinfectant residual throughout the distribution system achieving compliance with the E. *coli* MCL. OAR 333-061-0031 mandates maximum residual disinfectant levels (MRDL) in the distribution system. The chlorine residual entering the distribution system must not exceed 4.0 mg/L as Cl_2. The chlorine residual log is provided in Appendix A.

2.3.4 Treatment Requirements for Corrosion Control

The treatment requirements and performance standards for corrosion control are set forth in OAR 333-061-0034. All public water systems are required to monitor for lead and copper levels at targeted customer's taps. Monitoring guidelines are outlined in OAR 333-061-0034. When the concentration of lead and/or copper exceeds the action levels for these contaminants, the public water system is required to adhere to the subsequent treatment requirements for corrosion control.

Lead and copper concentrations did not exceed the action level concentrations specified in OAR 333-061-0034 when they were tested in April 2013. Reduced Monitoring, as specified in OAR 333-061-0036, allows the City to collect lead and copper tap samples once every three years. Lead and copper sampling was completed in July 2016 for the current monitoring period.

2.3.5 Turbidity Removal

As covered in OAR 333-061-0030, the MCL for turbidity is applicable only to surface water sources. The City receives treated surface water from the Warrenton through a wholesale agreement covered in Section 3 typically from July to October. The responsibilities of water suppliers specified under OAR 333-061-0025 dictates that the City of Warrenton is responsible to treat the surface water to meet the requirements in OAR 333-061-0030.

2.4 Treated Water Goals

The City's goal is to comply with all primary MCLs. Specific water quality goals are listed in the following Table.

Table 2.3: Treated Water Quality Goals

Parameter	Units	Goal
Arsenic	mg/L	Less than 0.005
Fluoride	mg/L	0.7 to 0.9
Chlorine (leaving WTP)	mg/L	0.75 to 1.00
Chlorine (at dead ends) or	mg/L	Greater than or equal to 0.20
HPC (at dead ends)	CFU/100 mL	Less than 500
pH (leaving WTP)	Standard units	7.0 to 8.0
Lead (at targeted sample taps)	mg/L	Less than 0.005
Copper (at targeted sample taps)	mg/L	Less than 0.5

Notes/Abbreviations
CFU = colony forming units

2.5 Historical and Projected Service Area Population

The most recent population figures available for the water service area are those developed by Portland State University Population Research Center Annual Population Estimates, which lists the City's 2015 population at 1,480. The City has seen a modest increase in population since 2000 as shown in Figure 2.1.

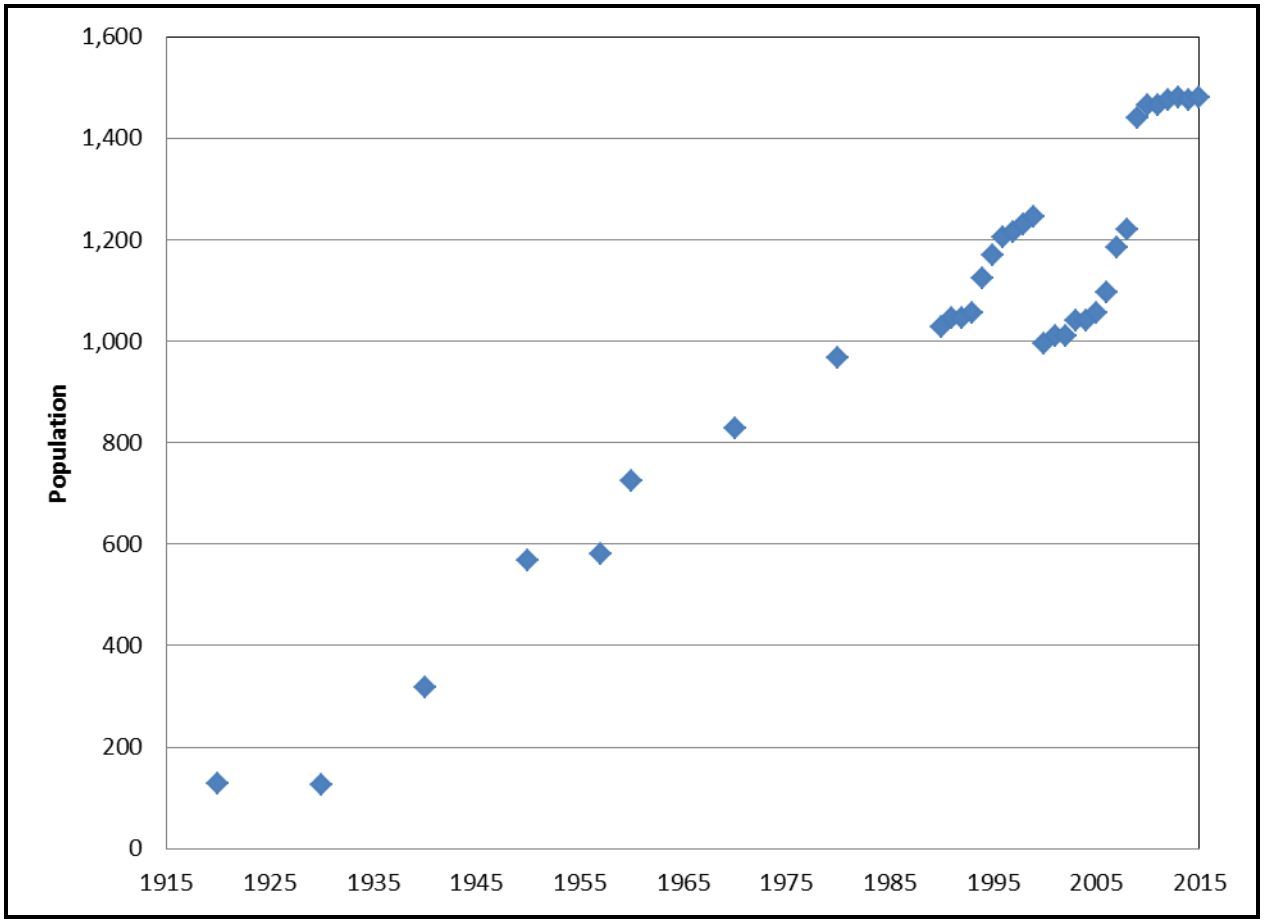


Figure 2.1: Historical Population Data

Note: Historical data provided by Portland State University from 1920 to 2015.

The City's projected population to 2037 is estimated using a 1.5% growth rate. The future growth rate was developed using population data obtained from PSU and discussions with City Staff. Table 2.4 provides the projected population growth with an upper and lower projection forecast. The upper population growth rate was developed using the City's historical growth rate from 1960 to 2015 and set to 1.9%. The lower population growth rate was determined by interpolating data developed in the NW Coastal Water Supply Task Force Plan (Murray Smith & Associates, May 2009) and were used to extrapolate the future population numbers based on the City's 2011 population.

Table 2.4: Projected Populations

Year	0.9% Growth Rate	1.5% Growth Rate	1.9% Growth Rate
2015	1,480	1,480	1,480
2017	1,489	1,524	1,536
2022	1,529	1,635	1,677
2037	1,764	1,968	2,099

2.5.1 Residential Units

The 2010 US Census survey lists 1,450 housing units within the City with 45% of the housing units occupied. Approximately 34% of the housing units are owner occupied and 11% renter occupied. The remaining 55% of the housing units are identified as seasonal, recreational, for sale or occasional use housing units. (US Census 2010). The City estimates that seasonal, recreational, or occasional use housing units have increased to 60% of the total housing units in 2016.

The City has seen a large increase in vacation rental homes from 60 vacation homes in 2014 to 105 in 2016. The City is attempting to control the number of vacation rental homes by placing a cap on the total number of permits they issue at 120 permits.

2.6 Historical Water Usage and Future Demand Projections

2.6.1 Unaccounted-for Water

Unaccounted-for water in the City's water system is defined as the water supplied from the City's WTP plus wholesale water purchased from Warrenton minus the total amount of metered water. This difference between water records results from total non-revenue water, leakage losses, meter discrepancies, unmetered uses such as hydrant and main flushing, operation and maintenance uses, unauthorized connections, fire flow uses, and other unmetered miscellaneous uses.

The average unaccounted-for water in the City's water system is about 30 MG per year (28% of the water). Table 2.5 displays a summary of the total water purchased and consumed with the resulting unaccounted-for water, from the years 2013 to 2015, and the corresponding three-year averages. A goal of less than 10% unaccounted for water is currently recommended by AWWA. Ensuring that the City is metering all users and is aggressively detecting and repairing water system leaks will help to reduce the amount of unaccounted-for water and decrease the reliance on purchasing water from the City of Warrenton. This will be discussed in further detail in the Capital Improvements section of this WMP.

Total Non-Revenue Water includes water usage at the WTP, City Hall, City Shop, fire station (general use at the fire station, hydrant flushing cycles and fire flow) and flushing the City lines. Some of the non-revenue water users are also not metered and makes up a portion of the unaccounted water.

Table 2.5: Historical Unaccounted-for Water

Year	2013	2014	2015	Average
WTP + Warrenton (MG)	104	107	107	106
Billing Records (MG)[4]	67	73	86	75
WTP Water usage (MG/year)[1]	0.06	0.06	0.06	0.06
WTP Irrigation (MG/year)[1]	0.11	0.11	0.11	0.11
City Hall (MG/year)[2]	0.06	0.06	0.06	0.06
Fire Station (MG/year)[3]	0.09	0.10	0.10	0.09
Flushing Lines (MG/year)[4]	0.9	0.9	0.9	1
Total Non-Revenue Water	**1**	**1**	**1**	**1**
Unaccounted Water (MG)	**36**	**33**	**20**	**30**
Unaccounted Water (%)	**34%**	**31%**	**18%**	**28%**

Notes:

1. Value was calculated using a master meter that began recording when the WTP was commissioned
2. City Hall consumption was estimated using residential equivalent units (Metcalf and Eddy - International Edition (4th Edition))
3. Fire Station water usage was estimated using data from Engineering and Contracting, Volume 54
4. Water consumption was estimated using data provided by the City

Water Meter Replacement

The City is currently replacing broken and aged meters throughout their distribution system. The City estimates that the meter replacement program will take three to five additional years to complete (project completion year: 2019). To date, the City has replaced a small number of the meters; however, the City has replaced the high-volume meters mentioned in Section 2.5.3, Large-Volume Users.

The meter replacement program will help determine the extent that the old meters are causing the City to lose revenue and should decrease the unaccounted-for water. As water meters age they tend to lose accuracy and underestimate the flow rate and volume.

2.6.2 Water Management and Conservation Plan

The City submitted its Water Management and Conservation Plan per OAR Chapter 690, Division 086 in 2012. The Oregon Water Resources Department reviewed the plan and found it consistent with the relevant requirements. The plan was approved on 6 September 2012 and remains in effect until 5 September 2022.

2.6.3 Distribution

The City's water distribution system consists of one pressure zone with an average service pressure of 70 pounds per square inch (psi) throughout the system. The service pressure is regulated by the 1 MG reservoir level, operation of the booster pumps located at the WTP, and the pressure reducing valve settings at the Warrenton connections.

2.6.4 Fire Flows

Fire flow demand is the amount of water required to fight a fire for a specified period of time. The City has the following fire flow requirements: 3,000 gpm for three hours in commercial and industrial areas, 1,000 gpm for two hours in urban residential areas, and 1,500 gpm for two hours in the rural residential areas. The largest volume of these three conditions is used for fire flow storage and supply requirements. They are not cumulative. Fire flows are assumed to occur concurrently with MDD when evaluating the capability of a water distribution system to meet fire flow conditions. A minimum pressure of 20 psi needs to be maintained throughout the distribution system during fire flows.

2.7 Water Demand Forecast

The average daily demand (ADD) was developed from data for the period 2013 through 2015. An average daily per capita demand of 197 gpcpd was then calculated. Peaking factors were applied ADD to develop two commonly used demands; maximum daily demand (MDD) and peak-hour demand (PHD).

Historically, MDD occurs on Memorial Day or the 4th of July weekend in the City. Due to the large influx of tourists during the summer, the MDD and PHD peaking factor tends is higher than typical. A MDD of 0.788 MGD was recorded on July 3, 2016, which is equivalent to 547 gpm over a 24-hour period. This results in a MDD peaking factor of 2.7. A peaking factor of 5 was used to estimate the PHD. Using this data, future demands were calculated by taking the average, maximum and peak hourly demand per capita and multiplying by the projected population projections in Table 2.6.

Table 2.6: Historical Demand and Future Demand Projections

Year	Population Projection	ADD (MGD)	MDD (MGD)	PHD (gpm)
2013	1,480	0.29	0.77	990
2014	1,475	0.29	079	1020
2015	1,480	0.29	0.79	1016
2017	1,524	0.30	0.81	1042
2022	1,635	0.32	0.87	1118
2037	1,968	0.39	1.05	1346

2.7.1 Large-Volume Users

Large-volume users create high nodal water demands on the system. The large-volume users for the City are comprised of commercial customers and condominiums. The top ten water users in the City were compiled from meter records and are listed in Table 2.7. The City's top water user is the Gearhart House located in the high density residential area.

Water consumption drastically increases for the commercial customers in the summer due to an influx of tourists. The City's WTP, limited by water rights, is unable to meet the water demand

during the tourist season and supplements its water source with the City of Warrenton's treated surface water.

Table 2.7: Large-Volume Consumers

Customer Name	Winter Volume (gal/month)	Summer Volume (gal/month)
Gearhart House	261,800	822,800
Kelly House	167,552	477,224
Bud's Campground	76,296	148,104
Pacific Way Café	71,060	92,752
Pacific View Condos	44,880	127,160
Windjammer	44,880	126,412
Bayview Transit	33,660	133,892
Surfside Condos	29,172	127,160
Gearhart Ocean Inn	22,440	112,200
Windward Condos	13,464	158,576

Abbreviation:
gal = gallons

Section 3: Existing Water System Supply

3.1 City Water System Description

This Section provides a description of the current service area, water source and water rights, interconnections with other municipalities, the City's WTP, the distribution system, and water use and customer characteristics.

3.2 Current Service Area

The 2015 Portland State University Population Research Center Annual Population Estimates list the total current City population at 1,480. The City's current service area is not completely contained within City limits but is completely contained within the UGB. The PSU population estimate includes all individuals within the UGB served by the City's water system. The City's UGB still allows for development and expansion. The zoning map on Figure 3.1 depicts the City's limits, and UGB.

Figure 3.1, the City's urban growth map, displays the areas where new residential and commercial growth is anticipated within the City. The City anticipates a new condominium unit will be developed within the next five years.

3.3 Water Use and Customer Characteristics

The City serves a customer base that is a mix of residential and commercial users through 1,400 connections within the City. The City also provides water for operational and municipal uses such as park, ball fields, and landscape irrigation that is metered, and considered public authority use. The City does not meter non-revenue water use at the fire station, City Hall and the City Shop.

Residential customers in the City are typically single/multi-family residences with typical residential landscaping common to the region. Seasonal water demand varies the most in this customer class. The City's atypical connections include the elementary school and the high density, multiple occupancy dwellings on the west side of the City. The City's commercial customers are restaurants, bars, and retail establishments with indoor water needs and little outdoor water usage. Commercial customer demand is typically consistent throughout the year and diurnal use patterns are consistent as well. It is anticipated that the relative ratio of residential and commercial units will remain generally unchanged into the foreseeable future.

3.4 Sources of Supply

The City currently obtains its water from two consistent sources; the City owned and operated wells and from Warrenton. The City is currently and has historically purchased its potable water supply from Warrenton, through a 10-year wholesale agreement. Currently, the City purchases water when its permitted groundwater extraction rate is seasonally reduced.

The City's wholesale agreement allows the City to continue to purchase water from Warrenton through 2019, with emergency backup supply provided by Seaside.

3.5 City Water Rights

The City holds a groundwater right in the Clatsop Plains Basin which is seasonally limited to avoid the potential for interference with surface water and salt water intrusion. The City obtains water from the Clatsop Plains Basin under a permitted water right through Wells # 1 - #14 in Neacoxie Creek Basin, the exact locations of which can be found in Appendix B. Until additional water diversion quantity is obtained, the maximum well capacity will be limited seasonally in accordance with Table 3.1. A copy of the water right permit document is provided in Appendix C.

Table 3.1: Water Rights Summary

Point of Diversion (POD) Description	Clatsop Plains Basin Aquifer, Wells #1 - #14 in Neacoxie Creek Basin		
Approximate POD Location	SE ¼ SE ¼ , Section 4 and NE ¼ NE ¼ Section 9, T6N, R10W		
Application No.	G-16489		
Permit No.	G-16390		
Priority Date	6/28/2005		
Permit Issuance Date	11/3/2008		
Authorized Type of Use	Municipal Use		
Authorized Date for Completion of Development	3 November 2013		
Flow Rates	**cfs**	**MGD**	**gpm**
November 1st to June 30th	2.18	1.41	980
July 1st to 31st	0.443	0.29	198
August 1st to 31st	0.289	0.19	129
Sept. 1st to 30th	0.410	0.26	184
Oct. 1st to 31st	0.485	0.31	217

3.5.1 Interconnections with Other Municipal Supply Systems

The City currently purchases water from the City of Warrenton through interconnections at the North Headworks and South Headworks located east of Highway 101. The City's water distribution system is also interconnected with the City of Seaside's water distribution system on the south side of City. The City also has an emergency intertie to supply Pinehurst Estates which is normally supplied by Warrenton. These connections are normally closed, and the flowmeters are monitored for unanticipated flows that may occur. The City has recently found that the Pinehurst Estates connection was opening prematurely and back feeding Pinehurst Estates.

The City is financially responsible to maintain, test, and calibrate the master flow meter at the interconnection with the City of Seaside to comply with their wholesale agreements. The City does not bear the cost or other maintenance responsibilities for the water master meters that are tied to the City of Warrenton.

3.5.1.1 Warrenton Water Supply

The City entered into an agreement with Warrenton in 2009 as a complimentary source of water to help meet water demands between July 1st and October 31st and as an emergency backup. Copies of the agreements are included in Appendix D.

3.5.1.2 Seaside Water Supply

The City has entered into agreement with Seaside in February 2012 as an emergency backup. Copies of the agreements are included in Appendix E.

3.6 Production Well Description

Upon completion of the water supply and treatment facilities in 2012, the City commenced operation of the facilities to exercise and perfect the permitted water rights. The permit describes the water source from 14 well sites located as follows:

- Well 1 - SE ¼ SE ¼, Section 4, T6N, R10W, W.M.; 3658 Feet North & 1136 Feet West From E ¼ Corner, Section 9
- Well 2 - SE ¼ SE ¼, Section 4, T6N, R10W, W.M.; 3528 Feet North & 1136 Feet West From E ¼ Corner, Section 9
- Well 3 - SE ¼ SE ¼, Section 4, T6N, R10W, W.M.; 3398 Feet North & 1136 Feet West From E ¼ Corner, Section 9
- Well 4 - SE ¼ SE ¼, Section 4, T6N, R10W, W.M.; 3268 Feet North & 1136 Feet West From E ¼ Corner, Section 9
- Well 5 - SE ¼ SE ¼, Section 4, T6N, R10W, W.M.; 3138 Feet North & 1136 Feet West From E ¼ Corner, Section 9
- Well 6 - SE ¼ SE ¼, Section 4, T6N, R10W, W.M.; 3008 Feet North & 1136 Feet West From E ¼ Corner, Section 9
- Well 7 - SE ¼ SE ¼, Section 4, T6N, R10W, W.M.; 2878 Feet North & 1136 Feet West From E ¼ Corner, Section 9
- Well 8 - SE ¼ SE ¼, Section 4, T6N, R10W, W.M.; 2819 Feet North & 1136 Feet West From E ¼ Corner, Section 9
- Well 9 - SE ¼ SE ¼, Section 4, T6N, R10W, W.M.; 2759 Feet North & 1136 Feet West From E ¼ Corner, Section 9

- Well 10 - NE ¼ NE ¼, Section 9, T6N, R10W, W.M.; 2699 Feet North & 1136 Feet West From E ¼ Corner, Section 9
- Well 11 - NE ¼ NE ¼, Section 9, T6N, R10W, W.M.; 2639 Feet North & 1136 Feet West From E ¼ Corner, Section 9
- Well 12 - NE ¼ NE ¼, Section 9, T6N, R10W, W.M.; 2577 Feet North & 1096 Feet West From E ¼ Corner, Section 9
- Well 13 - NE ¼ NE ¼, Section 9, T6N, R10W, W.M.; 2517 Feet North & 1096 Feet West From E ¼ Corner, Section 9
- Well 14 - NE ¼ NE ¼, Section 9, T6N, R10W, W.M.; 2457 Feet North & 1096 Feet West From E ¼ Corner, Section 9

A total of eight of the 14 identified wells (Well Nos. 1, 3, 5, 7, 9, 11, 13, 14) were completed with pumping equipment and connected to the WTP to provide sufficient capacity per water right requirements for the City's current and projected demands. The remaining wells were drilled but do not contain the necessary equipment or piping to convey RW to the WTP facility.

The eight production wells currently in operation were constructed to an overall depth of 119 to 159 feet below ground surface (bgs), with 10-inch steel casings. The well design data are shown in Table 3.2.

Table 3.2: Well Design Criteria

Well No.	Ground Elevation (MSL)	Depth (Feet bgs)	Screen Length (Feet)	Top of Screen (bgs)
1	33.83	119	30	84
3	31.79	119	30	84
5	28.03	117	30	81
7	28.56	131	30	95
9	28.12	123	30	88
11	32.34	125	30	90
13	29.59	157	50	100
14	32.23	159	50	102

Abbreviations:
MSL = mean sea level

3.6.1 Well Operation and Maintenance

Each operating well is equipped with a submersible vertical turbine pump with a fixed speed drive and a magnetic flow meter, which provides the ability to monitor the individual well flow rates. Water from the eight production wells is combined and conveyed to the WTP through an 8-inch RW pipeline that enters the south side of the WTP.

The well pumps were designed to operate at approximately 60% of the 24-hour constant rate pump test performed following well completion. Table 3.3 presents the well production data.

Table 3.3: Well Production Data

Well No.	Pump Capacity (gpm)	24-hr Constant Rate Pump Test (gpm)
1	75	125
3	60	100
5	120	200
7	156	260
9	156	260
11	120	200
13	210	350
14	168	280
	Total: 1,065	

The pumps are operated in various configurations for flow rates of 150 gpm, 300 gpm and 600 gpm shown below in Table 3.4. The wells are throttled between alternatives 1 and 2 to meet the 129 gpm instantaneous limit.

Table 3.4: Well Pump Flow and Operation Options

		Pump No.							
		1	**3**	**5**	**7**	**8**	**11**	**13**	**14**
Alternative	**Flow**	**75**	**60**	**120**	**156**	**156**	**120**	**210**	**165**
1	150				X				
2	150					X			
3	300	X	X	X					
4	300				X	X			
5	300						X	X	
6	300					X			X
7	600	X	X	X	X	X			
8	600			X			X	X	X

The combined design pumping capacity of the wells is 1,065 gpm or 855 gpm with the largest well out of service. The treatment plant rated capacity is 300 gpm per membrane skid or 600 gpm with both membrane skids in operation. The membrane skid rating is an average flow rate given that the membranes are periodically off line for backwashing and cleaning. There are provisions to install a future third 300 gpm membrane skid which would provide 600 gpm of firm treatment capacity with one membrane skid out of service.

The well field, well vaults, and wells (pumps and necessary appurtenances) are periodically inspected ensuring the system is operating within the design parameters.

Table 3.5 lists the suggested maintenance schedule and tasks required for the well field.

Table 3.5: Well Field Maintenance

	Frequency	Task
Well Field Inspection	Periodic	Inspect overall condition and for vandalism
Well Pumps	Daily Inspection	Inspect pumps and level sensors for proper operation and electrical connections
Sand Testing	As needed	Further development of well or installation of a sand separator
Well Disinfection	After extended period of inactivity or coliform bacteria presence	Chlorinate, flush chlorinated water and legally dispose the disinfecting water

As of May 2016, the City has reported that the wells are operating at the same capacity and drawdown as they did since beginning operation.

3.7 Water Treatment Plant

The water treatment plant was constructed and commissioned in 2012. The water treatment process utilizes coagulation assisted membrane filtration to remove arsenic from the water. The water is then disinfected and discharged to a 0.54 MG clearwell which provides chlorine contact time and water storage for fire flow. Water booster pumps located at the treatment plant pump the treated water from the WTP clearwell to the water distribution system.

The WTP has had the following maintenance repairs:

- All the valves on the membrane skid were replaced during the first year.
- All the membranes in the membrane filtration system were replaced in 2016 under a partial warranty.

The WTP normal operating hours are from 8 a.m. to 5 p.m. The WTP typically operates both membrane filtration skids during normal, non-water rights restricted periods. When the water rights are reduced from July to October, the WTP operates only one of the skid units.

Mechanical components (valves, strainers, etc.), chemical systems, membrane skids and pumps are maintained periodically, and maintenance schedules are listed in their respective sections of the O&M Manual.

3.7.1 Primary Chemical Addition and Filtration

The Raw Water (RW) pipeline enters the south side of the Treatment Building and conveys the water to an in-line mechanical flash mixer. Sodium hypochlorite (NaOCl) and ferric chloride ($FeCl_3$) are injected into the pipeline and are blended with the RW at the in-line flash mixer which provides sufficient mixing to blend the chemicals and RW. Sodium hypochlorite is used to oxidize arsenite (As(III)) to arsenate (As(V)) prior to adsorption onto the iron oxide precipitate. Sufficient NaOCl must be added to oxidize the hydrogen sulfide and ammonia in the water and provide a free chlorine residual for the distribution system.

The coagulated water flows through an automatic strainer that removes particles that are 250-micron in size or larger located immediately upstream of the contact pipe. The water then flows through the contact pipe downstream of the strainer providing contact time for ferric hydroxide ($Fe(OH)_3$) precipitation and adsorption of As(V). The coagulated water flows from the contact pipeline through overhead break tank pipelines and then to the membrane tank(s). The break tank pipelines are sized to allow rapid refilling of the membrane tanks following a draindown of the waste solids.

3.7.2 Oxidant/Coagulant Operation and Maintenance

Sodium hypochlorite and ferric chloride are stored on-site. The chemicals and metering pumps are inspected daily, ensuring an adequate supply of chemicals and proper operation of the pumps.

Table 3.6 lists the suggested maintenance schedule and tasks required chemical system.

Table 3.6: Chemical Feed System Maintenance

	Frequency	Task
Chemical System	Weekly	Inspect tanks, piping and chemical supply
Metering Pumps	Quarterly	Clean and inspect interior. Replace LoadSure tubing element at recommended tube occlusion intervals. Replace equipment as necessary
Metering Pumps	Daily	Ensure proper operation of metering pumps (check that pumps are providing the correct dosage and that the feed rates are correct)

3.7.3 Membrane Filtration System

3.7.3.1 Normal Operations

The membrane filtration system has two membrane skids each with a nominal capacity of 300 gpm and maximum filtration rate of 364 gpm (instantaneous). Space is allocated in the building for a third 300 gpm unit. The membranes are hollow strand porous polyvinylidene fluoride (PVDF) fibers that prevent the passage of particulate contaminants while permitting water

molecules to flow to the inside of each strand. This selective filtration is possible because the surface of each membrane fiber consists of billions of microscopic pores that block the passage of particles larger than the pore size. Filtration is achieved by drawing coagulated water through the wall of the membrane fiber under low vacuum pressure and conveying the treated water (permeate) to the main permeate collection pipes. The submerged microfiltration membrane utilizes a hollow-fiber membrane that has nominal and absolute pore sizes of 0.04 and 0.1 microns respectively. The small pore size excludes particulate matter including precipitated iron and arsenic solids, bacteria, pathogens and certain viruses. The membrane system is rated for providing 4-log removal of *Giardia* and *Cryptosporidium* and 0.5-log virus removal.

3.7.3.2 Membrane Backwash Design Criteria

The membranes are physically cleaned by periodic backwashing (normal backwash) involving air scour and reverse filtration. Air scour is used during the backwash process to agitate the hollow fibers and scour solids (fouling layer) from the outside of the membranes. During the reverse filtration, the flow through the membranes is reversed by filtrate pumps pushing treated water from inside the fibers to clean the outside of the membrane removing more solids on the membrane exterior surfaces. The membrane backwash is initiated, typically after 20 to 60 minutes of water filtration and set for a duration of two or three minutes.

The City performs maintenance washes every one to two days. The fouling layer is chemically oxidized during a maintenance wash using NaOCl. Maintenance backwashes occur after a normal backwash and takes 45 minutes to complete. The membrane tank is filled with water and the water is recirculated using the filtrate pump. Recirculation is followed by a soak, tank drain down, liquid backwash, rinse and filter to waste. The membrane tank is then refilled with coagulated water and returns to normal filtration.

The clean-in-place (CIP) is a more intensive chemical cleaning used monthly to remove organic and inorganic fouling from the membranes. Citric acid ($C_6H_8O_7$) or sulfuric acid (H_2SO_4) is used for removal of inorganic fouling and NaOCl is used to remove organic fouling. The City uses H_2SO_4 more often than citric acid to reduce chemical costs. After a backwash, the membrane tank is filled with treated water heated to 25 degrees centigrade (°C) with an immersion heater. The cleaning chemical is added to the membrane tank and the solution is recirculated through the membranes. After the membranes are soaked in the chemical solution the membrane tank contents are pumped to the neutralization system. The membranes are then backwashed, followed by filter to waste, to confirm the chemicals have been removed from the treated water. A similar NaOCl CIP occurs after a citric acid CIP.

3.7.3.3 Backwash Tank

Waste from the maintenance washes and CIPs is neutralized with the chemical waste neutralization system. The neutralization system used sodium hydroxide (NaOH) to neutralize acid wastes and sodium bisulfite to neutralize NaOCl wastes. The neutralizing chemicals are added to the neutralization tank and the pH or chlorine concentration in the tank monitored prior to discharge to the backwash tank.

The waste solids are settled in the backwash tanks and then the clarified wastewater is decanted through sluice gates to the adjacent decant channel from which submersible pumps

pump the wastewater to a drainfield for disposal. Periodically, the settled waste solids are removed from the backwash tank with a vacuum truck for disposal at a wastewater treatment plant.

3.7.3.4 Membrane Operation and Maintenance

The WTP operators have reported that both membrane units are in operation during high demand periods in May and June preceding when the water right limits are reduced. There is no redundant unit during high demand periods. Unit failure could lead the City to purchase water from Warrenton earlier than their typical seasonal purchase season.

The skid mounted membrane filtration equipment is located above grade and easily accessible for inspection and maintenance procedures. Daily visual inspections should include the following:

- Check for leaks in piping;
- Verify operation of all equipment and valves;
- Verify operation of instrumentation;
- Verify chemical levels in chemical tanks.

Table 3.7 lists the suggested maintenance schedule and tasks required for the Membrane Filtration System.

Table 3.7: Membrane Filtration System Maintenance

	Frequency	Task
Membrane Skid	Daily/weekly	Inspect mechanical components
Permeate Pump	500 hours	Check motor, megger the motor, and electrical connection
Air Compressor	500 hours	Clean air filter, check belt tension, clean and check condenser dryer for auto drain
Chemical System	Weekly	Inspect mechanical components and chemical supply pumps (replace ball checks annually)
Instruments (turbidimeter, particle counter, flowmeter, level transmitter, pressure transmitter and pH/ORP probe)	As Needed	Clean and calibrate as needed

The City's WTP operators have reported that the Membrane Filtration System is in good working condition after the warranty replacement of the membranes in 2016.

3.7.4 Sodium Hydroxide

NaOH can be added to the water downstream of the membranes to raise the water's pH if needed. This would reduce the potential for corrosion of plumbing and elevated lead and copper concentrations in tap water due to low finished water pH conditions.

The City has not had to adjust the treated water pH with NaOH to meet the lead and copper action levels of the Lead and Copper Rule.

3.7.5 Clearwell

The purpose of the clearwell is to store water to meet peak demands and allow for a more uniform water production rate. The clearwell is divided into two cells and isolation valves are provided upstream and downstream of each cell to allow bypassing of one of the cells for draining, inspection and maintenance. Each cell has a 10-inch overflow pipe that overflows to a drainage ditch on the east side of the WTP site. The bottom of each clearwell cell is sloped to a grated sump. A portable pump can be installed in the sump through the access hatch to completely drain the clearwell cell. Level instruments in each clearwell cell are used to start and stop water production from the membrane system. The clearwell design criteria are shown in Table 3.8.

Table 3.8: Clearwell Design Criteria

Description	Item
Number of Clearwell Cells	2
Cell Size	60 ft X 60 ft
Total Clearwell Volume	540,000 gallons
Nominal Water Depth	10 ft
Minimum Water Elevation[(a)]	20 ft
Nominal Water Elevation[(a)]	27 ft
Maximum Water Elevation[(a)]	30 ft
Overflow Water Elevation[(a)]	31 ft

Note:
(a) Datum NGVD 29 (1947 adjustment)

3.7.6 Pumps

The treated water pumps are supplied water from the clearwell and pump into the water distribution system. A surge tank (5,000-gallon capacity) is provided to minimize pressure surges when the booster pumps come on line or are shut down.

The treated water pumps consist of three fixed speed vertical turbine booster pumps and two fixed speed high demand (fire flow) pumps summarized below in Table 3.9. The booster pumps were provided to meet current and future domestic water demands. The firm pumping capacity

of the three smaller pumps with one 600 gpm pump out of service is 900 gpm. This capacity can meet the projected maximum day demand.

Table 3.9: Treated Water Pump Design Criteria

Pump No.	Motor (HP)	Design Operating Point		Shutoff Head	Pump Stages	Pump Discharge
		(gpm)	(feet)	(feet)	No.	(inches)
P-710 Booster Pump 1	25	300	176	215	3	4
P-720 Booster Pump 2	50	600	184	312	6	6
P-730 Booster Pump 3	50	600	184	312	6	6
P-740 High Demand Pump 1	250	2,000	189	269	2	10
P-750 High Demand Pump 2 [1)]	250	2,000	365	558	4	10

Notes/Abbreviations:

1. Pump P-750 is not connected to the system due to pressure concerns.

HP = horsepower

3.7.6.1 Booster Pump Operation and Maintenance

The high demand pumps are larger constant speed vertical turbine pumps that were provided to supply water during high demand periods (fire flow). One of the high demand pumps serves as the duty pump and the other is a standby pump. The design operating point for the high demand booster pump (P-750) exceeds shutoff head for the three smaller pumps. Therefore, the system was programmed not to operate the high demand pumps concurrently with the three smaller booster pumps and the firm pumping capacity for the booster pumps is 2,000 gpm.

The high demand pumps will not operate except in an emergency as they are not needed for normal operation and due to pressure concerns related to the condition of the AC pipe.

The pump heads and motors are located above grade and are easily accessible for inspection and maintenance procedures. The pump bowls are set in vertical pump cans attached to the 16-inch finished water line connected to the clearwell. The pump motors and pumps can be removed for inspection or maintenance with an overhead monorail crane.

Table 3.10 lists the suggested maintenance schedule and tasks required for the pump maintenance.

Table 3.10: Treated Water Pumps Maintenance

Component	Frequency	Task
Drive Motor	Weekly	Clean mechanical components
Drive Motor	Monthly	Check motor bearing
Mechanical Seals	Weekly	Inspect seals and shaft area for leakage and vibration. Ensure the seals are flushing through the port discharge Repair or replace as necessary
Head Shaft	Quarterly or 2,000 hours	Check the shaft for scoring. Repair as necessary
Pump	Semi-annually or 4,000 operating hours	Check operating vibration of the pump and discharge pressure against initial field tests
Pump	Annually	Check pump efficiency and inspect suction bowl bearing

3.8 Treated Water Storage

A 14-inch transmission main connects a 1 MG reservoir located on a hill northeast of the City to the water distribution system. The reservoir was constructed in 2012 to provide peaking equalization storage, fire flow storage and emergency storage.

The reservoir is constructed with a concrete floor and bolted steel side walls and aluminum strut and panel dome roof. The exterior and interior of the tank side walls is protected with glass-fused–to-steel coating system. A cathodic protection system is provided to prevent corrosion of interior submerged metallic surfaces. The reservoir has separate inlet and outline connections and a submersible mixing system is provided in the reservoir to reduce thermal stratification and short circuiting while maintaining a chlorine residual throughout the reservoir. A sampling station is located outside the reservoir. Table 3.11 below describes the reservoir design criteria.

Table 3.11: Reservoir Design Criteria

Description	Item
Type	Bolted steel with fused glass coating
Diameter	87 ft
Side Wall Height	29 ft
Overflow Level (Elevation)	23 ft (El. 200 ft)
Cathodic Protection	
Anode Type	Magnesium rods
Anode Size	20 ft x 2.02 inch dia.
Number of Anodes	10
Design Life	27 years
Mixing System	
Type / Material	Submersible / Stainless
Power Supply	120 VAC
Minimum Water Depth	2 ft

3.8.1 Storage Operations and Maintenance

The reservoir is inspected monthly to maintain the integrity of the reservoir and preserve the water quality.

Table 3.12 lists the suggested maintenance schedule and tasks required for the reservoir.

Table 3.12: Reservoir Maintenance

	Frequency	Task
Structural Inspections	Monthly	Inspect reservoir to prevent loss of structural integrity
Sanitary Inspections	Monthly	Inspect reservoir site for security and cleanliness
Mixing System Inspection	Monthly	Inspect mixing system for signs of wear
Cathodic Protection Inspections	Monthly	Inspect cathodic protection system and check anode potential
Cathodic Protection Inspections	Annually	Professional testing/inspection of the cathodic protection system
Tank Vent	Annually	Verify the screen is in place and there is no blockage
Reservoir Washouts	As necessary, recommended once every three years	Remove sediment from the bottom of the reservoir

City officials reported the periodic inspections indicate that the reservoir is performing well, and the cathodic protection is operating. The City also reported that no leaks, signs of settlement, erosion, cracking, and damaged concrete or exposed reinforcing steel have been discovered during the routine inspections.

3.9 Transmission and Distribution Pipelines

The City's distribution system consists of one pressure zone with an average service pressure of 70 psi. The City has identified 90 psi as the maximum allowable pressure within the system. The service pressure will be regulated by the reservoir levels, operation of the booster pumps located at the WTP, and the pressure reducing valves at the Warrenton connection.

The City's water transmission and distribution system includes approximately 23 miles of pipe, ranging from 2-inch to 16-inch diameter. The water distribution system pipe materials are comprised of approximately 60% asbestos cement and 40% polyvinyl chloride (PVC). There are no known lead goosenecks in the distribution system. Approximately 95% of the water service connections are copper pipe. The size distribution for the pipe is listed below in Table 3.13.

Table 3.13: Distribution Pipeline Data

Mainline Size	Length (ft)	Type of Pipe	Comments
14 inches	6212	HDPE	line to 1-MG storage tank
12 inches	2905	PVC	-
10 inches	15605	Asbestos Cement	-
8 inches	24925	Asbestos Cement/PVC[1]	-
6 inches	34920	Asbestos Cement/PVC[1]	-
4 inches	15360	Asbestos Cement/PVC[1]	-
3 inches	1250	Asbestos Cement/PVC	-
2 inches	3570	PVC	-

Notes:

1. Pipe is predominately Asbestos Cement.

Figure 3.2 is a hydraulic profile of the wells, treatment process and reservoir. Figure 3.3 shows the distribution system within the service area including water lines, valves and hydrants.

3.9.1 Distribution System Operation and Maintenance

Thirty dead-ends within the City's distribution system are flushed twice a year. Hydrants within the City are flushed once a year. Hydrants and valves are inspected and exercised annually.

Section 4: Water System Analysis

This section contains an analysis of the capacity of the City water system for existing and future water demands. The analysis includes the evaluation of the water source, storage, transmission, and distribution components of the water system.

4.1 Demand Allocation and Growth

The City's population is projected to increase by 1.5% per year over the next 20 years as discussed in Section 2. The City anticipates the construction of a new housing development consisting of 120 new single residential homes by 2022 on Highland Lane and Main Street. The associated population growth is expected to occur between 2022 and 2037 as it is unlikely the developments will be built out by 2022. Forty percent of the homes are assumed to be occupied by 2022 using an average household size of 2.25 and the City's future growth projection rate. (US Census, 2010)

The increased growth will place additional demand on the WTP and distribution system. The population growth is shown below in Table 4.1.

Table 4.1: City Projected Population (1.5% Growth Rate)

Year	Population
2015	1,480
2017	1,524
2022	1,635
2037	1,968

4.2 Water Source and Supply

As discussed in Sections 2 and 3, the City obtains water from two sources, the WTP and Warrenton during the summer. In addition, the City has an agreement to buy water from Seaside in the event of an emergency.

With limited ground water rights during the summer, the City will continue to purchase water from Warrenton. This Section discusses other potential water sources that will help the City meet future water demands.

4.2.1 Production Well Flexibility

The City operates eight of the 14 wells initially constructed. The remaining wells, not in operation, were drilled but do not contain the necessary equipment or piping. The City would need to purchase and install additional pumping equipment and piping connecting to the existing system to operate the remaining wells. This is a viable option for maintaining production capacity if one or more wells in operation fail by utilizing the redundancy built into the existing system. In the event one well fails, the City can relocate equipment to one of the unused wells

quickly and restore water supply capacity. The City is also investigating additional water rights they could transfer to supplement their existing rights to increase capacity.

4.2.2 Wholesale Water Purchase From Warrenton

The City's wholesale water agreement with the City of Warrenton expires in 2019. It is highly recommended that the City renegotiate their agreement with the City of Warrenton as soon as possible to continue to meet water demands. Currently the City does not have a limit on the amount of water they can purchase from the City of Warrenton.

4.2.3 Emergency Water Supply from the City of Seaside

The City's wholesale water agreement with Seaside expires in 2022. It is recommended that the City renegotiate their agreement with Seaside in 2021 to continue to have a source of water during emergencies.

4.3 Water Treatment Plant

The City's WTP production capacity was evaluated during the following time periods:

- Average winter (November to May) water demand
- June (before the WTP's water production rates are reduced by limited water rights)
- Tourist Season from July to October.

The WTP produces sufficient treated water to meet winter water demand from November to May with one skid online and one redundant skid as shown below in Table 4.2.

Table 4.2: Projected Winter Water Production Requirements

	Water Production Requirements, gpm	Surplus Capacity Available, gpm
2013	154	146
2014	138	162
2015	128	172
2017	145	155
2022	156	144
2037	187	113

Note:

Surplus capacity available assumes one skid is online and the other is the redundant skid.
Assumes 24 hours per day operation

As previously mentioned in Section 3, the nominal treatment capacity for each skid is 300 gpm. The WTP produces sufficient treated water during November to May to meet projected demand for the 20-year planning window.

However, water demands within the City for the month of June have increased over the past three years, and the projected growth increases as the City's population grows as shown in Table 4.3 below. The data indicates that the City will need to operate two skids during the month of June to meet water demands. If one membrane skid is down for an extended period, the City will need to purchase water from Warrenton to make up the shortfall.

Table 4.3: Projected June Water Production Requirements

Year	June ADD (gpm)	Surplus Capacity Available with One Skid (gpm)	Surplus Capacity Available with Two Skids (gpm)
2013	256	44	344
2014	300	0	300
2015	320	-	280
2017	302	-	298
2022	324	-	276
2037	390	-	210

Note:
Assumes 24 hour per day operation

The increased water demand during the summer is caused by the inflow of tourists to the City and increased landscape irrigation. As mentioned in Section 2, approximately 60% of the residential units within the City are seasonally occupied and tend to be vacant during the winter. Warmer weather, fewer storms and reduced precipitation during the summer typically encourage a higher influx of tourists towards the coast, increasing both revenue and water demand constraints on the City. Figure 4.1 presents weather and precipitation data from the National Centers for Environmental Information (NCEI) below for the past 16 years.

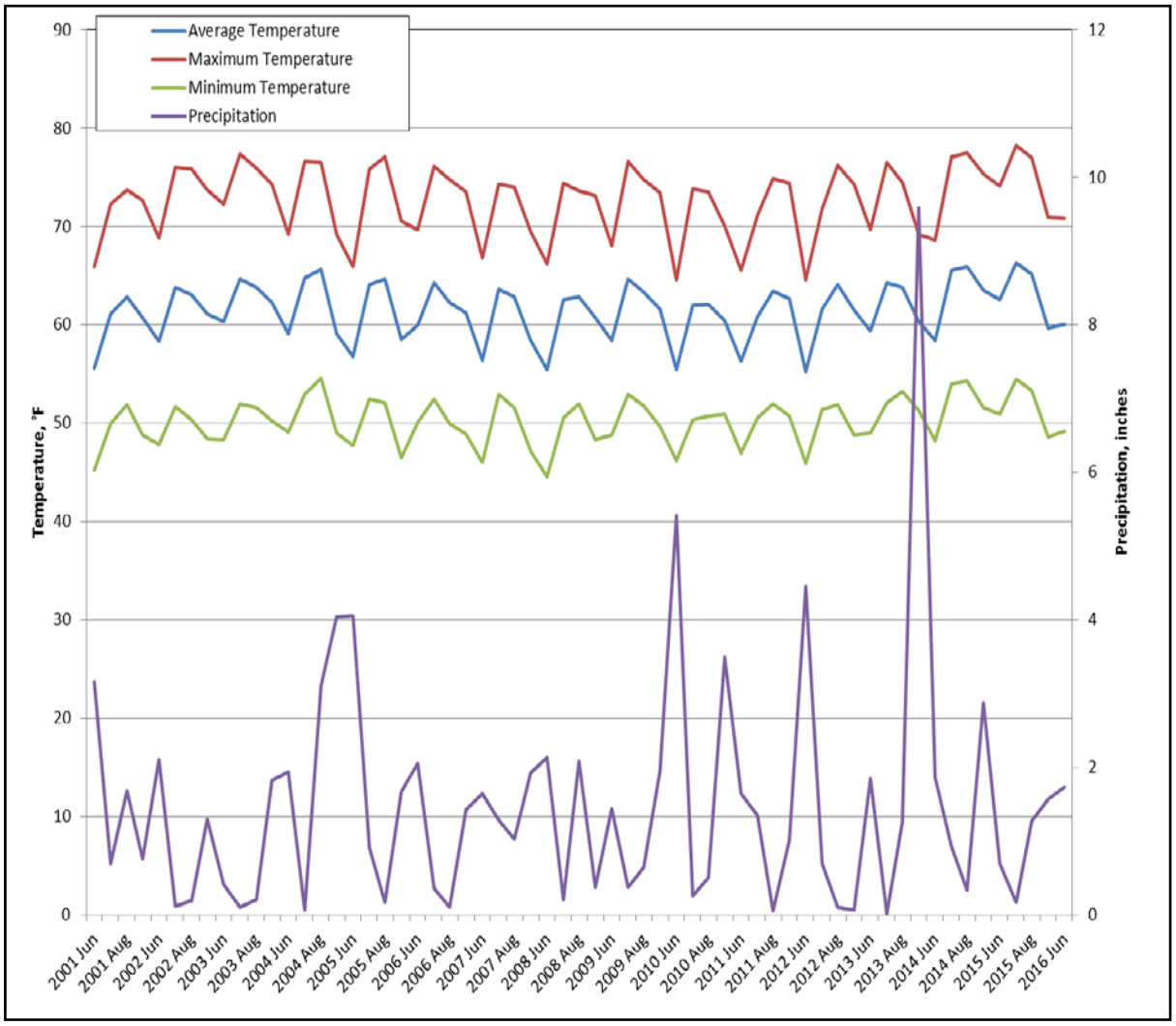


Figure 4.1 Oregon Coast Climate Date

The City has two potential solutions to provide firm, reliable capacity for meeting June water demands:

1) purchase water from the City of Warrenton to make up shortfalls, or

2) install a third treatment skid in the WTP. The water rights are not limited in June and the WTP would be able to produce 600 gpm with two skids online and one skid in reserve.

4.4 Storage

The City's reservoir storage capacity was evaluated using the following criteria:

- Peaking equalization storage: used when demands are greater than the MDD supply capability of the system. Storage for peaking equalization is calculated as 25% of the MDD.

- Fire flow storage volume is determined based on fire flows of 3,000 gpm for three hours in commercial and industrial areas, 1,000 gpm for two hours in urban residential areas, and 1,500 gpm for two hours in the rural residential areas. The largest volume of these three conditions (0.54 MG) is used for fire flow. They are not cumulative.

- Emergency/standby storage requirements have the most flexibility in sizing and depend largely on the individual system makeup, lengths of historical emergency outages, and the level of risk the utility is willing to take. An emergency storage volume requirement of twice the ADD is assumed. The summer ADD is far greater than the winter ADD because of the large transient (tourist) population during the summer. The summer ADD was used to determine the emergency storage requirements.

The storage is estimated by summing the equalization storage and the larger of the emergency or fire storage on the assumption that a fire and the need for emergency supply would not occur simultaneously. In this case, the emergency storage requirement exceeds the fire storage requirement. The available storage in the clearwell is included in the total storage. The future reservoir storage requirement was calculated as show in Table 4.4.

Through the City's wholesale water agreements with Warrenton and Seaside, additional fire flow can be provided by either Warrenton or Seaside ensuring the City has an adequate fire flow supply.

Table 4.4: Projected Required Storage

Required Storage				
Year	2015	2017	2022	2037
Equalization (25% of MDD) (MG)	0.20	0.20	0.22	0.26
Fire Flow (3000 gpm @ 3 hours) (MG)	-	-	-	-
Emergency Storage (2 x Summer ADD) (MG)	0.98	0.96	1.03	1.24
Total Storage Required (MG)	**1.18**	**1.16**	**1.25**	**1.50**
Available Storage				
Storage Available in Reservoir (MG)	1.00	1.00	1.00	1.00
Storage Available in Clearwell (MG)	0.54	0.54	0.54	0.54
Total Storage Available (Reservoir + Clearwell) (MG)	1.54	1.54	1.54	1.54
Additional Storage Available (MG)	**0.36**	**0.38**	**0.29**	**0.04**

Note:

A new residential community was added into the water calculations in 2022 on Highland Lane and Main Street.

The City's treated water storage capacity (reservoir and clearwell) meets the City's water needs to 2037, provided present growth projections remain consistent. It is recommended that the City

reanalyze population growth and storage requirements in 2032. If the growth rates increase, the City may have to construct an additional reservoir before 2037.

4.5 Distribution System

4.5.1 Computer Simulation Model – EPANET 2

The City's water system was modeled using EPANET 2 software to simulate the hydraulics of the City's water system. The model consists of a graphical network of pipes, pumps, and storage reservoirs that is very useful for determining the effects of different future and existing scenarios. The lengths, diameter, and friction loss characteristics of the piping are input into the system. Existing maps of the water system and other information provided from the City were utilized. Elevations were verified using Google Earth and likely have an accuracy of ±5 feet which translate to a pressure difference of about ± 2 psi.

The model was updated and calibrated in 2012 and includes the WTP. The City collected water consumption data on 3 July 2016 validating the MDD peaking factor used in the Model. As mentioned in Section 2, historically MDD occurs on Memorial Day or the 4th of July weekend in the City.

Several operational scenarios have been introduced into the water system model, which in turn provides an output indicating how the system will respond to different scenarios. The output lists the pressure and hydraulic grade line at each pipe junction or hydrant, velocity and friction losses through each pipe segment, and the operating conditions of all the facilities in the model.

4.5.2 Model Results and Limitations

The hydraulic modeling of the system identified key upgrades that are required to meet water demand and address pressure and fire flow deficiencies in the system through 2037. The system was evaluated in the years 2017 (present conditions), 2022 (five-year analysis and new Highland Lane Development addition) and in 2037.

The model distributed unaccounted for water within the City's distribution system. The scenarios modeled were based on the City's anecdotal evidence of issues in the water system. City comments regarding the current condition was included in the distribution system analysis.

4.5.2.1 High Demand Pumps and Additional Fire Flow Sources

The City has two dedicated high demand pumps connected to their distribution system that they can use during a fire event. The City has emphasized that they would prefer not to use the high demand pumps due to the potential for damage to their aged pipe infrastructure. One high demand pump has been modified to reduce the system pressure during operation, but the high demand pumps have not been used. Per the City's wholesale water agreements with Warrenton and Seaside, both are a reliable source of water during a fire event.

4.5.2.2 Fire Flow Analysis

Fire flow accounts for the maximum instantaneous water demand within the City's water system. As discussed in Section 2, the water system needs to supply the required fire flow to the fire location while the residual pressure within the distribution system does not drop below 20 psi.

4.5.2.3 Fire Flow for Water Supply Scenario 1: City Sources

Fire flow modeling was conducted for Scenario 1 under both current and future MDD with the storage reservoir half full to determine if restrictions exist within the system. The model does not account for the additional fire flow capacity available through the emergency connections with Warrenton and Seaside. It assumes all firefighting water comes from the City's reservoir and the WTP clearwell. Fire flow scenarios were completed using the assumption that multiple large fires would not occur simultaneously.

During fire flow events, the main booster pumps are turned off and only one high demand pump operates.

The model results indicate that fire flow requirements are not currently met at the Gearhart by the Sea Resort (Gearhart House and Kelly House), a densely populated residential property. Improvements to the water distribution system in this area are a priority and will dictate the improvements schedule within the City's distribution system. Table 4.5 below shows the deficiencies and improvements needed to meet fire flow requirements in that respective year.

Table 4.5: EPANET Results: Based on the City's Water Supply

Area	Demand Year	Deficiencies	Resolution
School	2017	No deficiencies	Flow and pressure requirements are met
Resort	2017	Residual pressure within system is below 20 psi	Pressure requirements are not met.
Resort	2017	No deficiencies after improvements	Assume Hillila and Marion Connections are completed to meet flow and pressure requirements before 2017
School	2022	No deficiencies	Flow and pressure requirements are met
Resort	2022	No deficiencies after improvements	Hillila and Marion Connections are complete and Hwy 101 pipe segment is replaced and upgraded to meet flow and pressure
School	2037	No deficiencies	Assumes all the improvements mentioned above are completed
Resort	2037	Residual pressure within system is below 20 psi	Pressure requirements are not met.
Resort	2037	No Deficiencies after improvements	Assumes all the improvements mentioned above are completed

The model results indicate completing the Hillila and Marion loops will allow the City to meet fire flow requirements, assuming the City is the only source of water for the fire event.

4.5.2.4 Fire Flow for Water Supply Scenario 2: City and Warrenton Sources

Fire events were reassessed in Scenario 2 using the City's reservoir as a primary source and Warrenton as an emergency source of water. It is assumed Warrenton can supply at least 1,000 gpm during fire events. During the scenarios listed in Table 4.6, main booster pumps are operating along with a constant source of water from the City of Warrenton. The high demand pump was not operated during the scenario. With the additional fire flow supplied by Warrenton, the Marion loop construction can be deferred until 2022.

Table 4.6: EPANET Results: Additional Emergency Fire Flow Supplied by Warrenton

Area	Demand Year	Deficiencies	Resolution
School	2017	No deficiencies	Main booster pumps only
Resort	2017	No deficiencies	Warrenton supplies 1,000 gpm emergency fire flow
School	2022	No deficiencies	Main booster pumps only
Resort	2022	No deficiencies	Warrenton supplies 1,000 gpm emergency fire flow and Marion Loop is constructed before 2022
School	2037	No deficiencies	Flow and pressure requirements are met
Resort	2037	No deficiencies	Warrenton supplies 1,000 gpm emergency fire flow and Marion Loop is constructed before 2022

4.5.3 Distribution System

Key components of the City's aged distribution infrastructure were identified working alongside City officials and the evaluation of EPANET 2 model results. The model results identified the flow restrictions within the system. The pipe segments described in the following sections are identified in Figure 4.2, attached at the end of the section.

4.5.3.1 Hydrants, Valves and Fittings

The City replaces hydrants, valves and fittings, as necessary. The hydrants, valves and fittings within the system are currently functional.

4.5.3.2 Hillila Road and Marion Avenue Loops

Waterline loops along Marion Avenue and Hillila Road do not provide adequate flow to maintain system pressures under a fire flow demand. Without additional fire flow supplied by Warrenton, Marion and Hillila loops should be constructed as soon as possible. Fire flow requirements are not currently met at the resort. Construction of the new loops on Hillila Rd and Marion Avenue will allow the City's system to meet residual pressure requirements during fire events at the Kelly House using only City-produced water.

If Warrenton water can reliably supply 1,000 gpm, the Marion Avenue loop addition can be deferred if it is constructed before 2022. After 2022, the improvements will be required to provide sufficient system pressure and fire flow at the Resort. Completion of the Hillila Loop will increase the residual pressure within the system during fire flow events but is not as critical as the Marion loop.

4.5.3.3 Highway 101 Segment

The water line on Hwy 101 between G Street and Sandy Ridge Rd is constructed of aging AC pipe that varies from 10-inch to 6-inch and 18-inch PVC C900 pipe. This line is undersized and believed to be in poor condition.

It should be upgraded to 18-inch PVC pipe before 2037 to meet capacity requirements. The increase in pipe size will provide sufficient pressure within the system during a fire at the resort if the City is relying solely on its own water supply.

If Warrenton water can reliably supply 1,000 gpm, the upgrade can be deferred until 2037. However, the City has commented that they frequently perform repairs on this pipe segment and the risk of failure for this pipe segment is high. In addition, the pipe segment is in a highly traversed area where a leak could wash out the highway causing damage, injury, and repairs at great expense. The cost to repair a leak and resulting damage in a highway can exceed the replacement cost, and this risk should be considered in prioritizing projects.

4.5.3.4 Ridge Path Pipe Segment

Replacement of this pipe segment was not identified through modeling as a critical repair within the next 20 years, but the City has stated that the segment frequently needs repairs after storms. The segment is predominately composed of AC pipe installed in the early 1960's. The water line is surrounded by roots which have the potential to damage the pipe as trees fall during storms.

4.5.3.5 Cottage Avenue Pipe Segment

The AC pipe segment located on Cottage Avenue was installed in the early 1960's and requires frequent repairs. The City has identified the segment as one that needs to be replaced in the next 20 years due to age and repair cost.

4.5.4 Water Meters

The City is engaged in reducing their high unaccounted water losses. The City has been replacing aging water meters throughout their system. The City has seen an increase in water consumption measured at residential units where new meters have been installed. Aged meters typically run slower and do not necessarily capture all the water flowing through the pipe. New meters record water consumption with higher accuracy. It is recommended that water meters be replaced every 10 to 20 years. The City estimates a large portion of water meters within the system are over 20 years old.

Section 5: Capital Improvement Plan (CIP) and Financial Plan Development

This section contains recommended improvements, a CIP and Financial Plan development.

5.1 Summary of Deficiencies & Recommended Improvements

This section contains an analysis of the City's water system deficiencies and recommended improvements. Budgetary cost estimates for the improvements are provided in 2016 dollars.

5.1.1 Water Source

The City will continue to purchase water from Warrenton through their wholesale agreement while reduced water rights for the wells are effective. It is recommended that the City negotiate rates as soon as possible that are similar to their present rates.

5.1.2 Treatment and WTP Pumps

5.1.2.1 Membrane Skids

The membranes in the WTP have a life expectancy between five to seven years. The City anticipates replacing the membranes in 2021 and every five years thereafter using the water reserve fund. The cost to replace all the membranes is $100,000 per replacement cycle. If the City installs a third skid, it is anticipated that the membrane life would be increased by 50%.

The City anticipates adding a third skid to their WTP. The third skid would be added after major water lines have been repaired within the City. The cost to add the third membrane skid is $650,000 in 2016 dollars. The need for a skid will be reevaluated in five and ten years and may be triggered sooner if the population growth exceeds the projected growth.

5.1.2.2 New WTP Booster Pump

The City would like to have a smaller redundant booster pump to run if Pump 1 (300 gpm pump) fails. There is no immediate need for the pump as the City has spare parts in-stock for Pump 1. Funding for the pump will be from the WTP upgrade fund. The cost to add an additional treated water pump is $50,000 in 2016 dollars and will likely be purchased in 2019. However, the City has adequate budget to purchase the pump earlier, if needed.

5.1.3 Reservoir

The reservoir cathodic protection anodes need to be replaced every 15 to 20 years. The City has reported that there has been no change in the performance of the cathodic protection anodes after three years of use. Replacement of the cathodic protection anodes is scheduled for 2037 and will be funded from the water reserve fund. The cost to replace the anodes is $13,000.

Additional storage capacity is not required if the City's population growth remains within the projected population. The City should re-evaluate the need for extra storage in 15 years if its population growth rate is greater than projected.

5.1.4 Fire Flow Pipeline Improvements

In collaboration with the City and the results of EPANET modeling, three water projects have been identified to maintain adequate water pressure throughout the system under fire flow demand: Marion loop construction, Hillila Loop construction, and Hwy 101 pipe replacement. The new water lines will also eliminate dead-ends and reduce stagnation of water within the system. Table 5.1 shows the estimated cost for the top priority pipeline improvements identified by the City in the next 20 years.

Table 5.1: Fire Flow Pipeline Improvements

Project Cost per year (based on FY 2015-2016)	Total Estimated Cost
Marion Loop Construction	$90,000
Hillila Loop Construction	$390,000
Highway 101 Pipe Replacement	$3,710,000

5.1.4.1 Marion Loop Construction

The City has completed the Marion Loop pipeline survey and intends to install 400 feet of 8-inch PVC pipe. The project is estimated to cost $90,000 and will be funded through the water reserve fund in 2017.

5.1.4.2 Hillila Loop Construction

The City plans to construct the Hillila Loop pipeline in the next twenty years, likely using 8-inch PVC pipe. The project is estimated to cost $390,000 and will be funded through the water reserve fund in 2022.

5.1.4.3 Highway 101

The City plans to replace approximately 9,950 linear feet of AC waterline along Hwy 101. The existing pipe varies from 6-inch to 10-inch AC pipe and will be upsized to 18-inch C900 PVC. Because the estimated cost is $3.7 million, we recommend the project be split into four smaller projects. Due to funding concerns, the project is projected to start in 2033. However, the cost to construct the pipeline may be significantly reduced if an opportune project such as Hwy 101 reconstruction were to occur.

5.1.5 Aging Pipe

As mentioned in Section 3 and 4, the City's aging distribution system is prone to leaks and major pipeline failures. Table 5.2 shows the cost to replace the top priority pipes identified by the City in the next 20 years.

Table 5.2: Aging Water Pipeline Replacement

Project Cost (based on FY 2015-2016)	Total Estimated Cost
Ridge Path Pipe Replacement	$960,000
Cottage Avenue Pipe Replacement	$680,000

5.1.5.1 Ridge Path

The pipeline along Ridge Path frequently requires major repairs after large storms. The City plans to replace the AC pipe along Ridge Path in fiscal year (FY) 2018 to reduce leaks. Approximately 4,200 feet of existing 6-inch AC pipe will be replaced with 8-inch C900 PVC pipe to meet future water and pressure requirements. The cost of pipeline replacement is $960,000 and we recommend the project be split into two smaller projects.

5.1.5.2 Cottage Avenue

The City plans to replace the 8-inch AC pipe along Cottage Avenue in FY 2019 to reduce leaks. Approximately 3,000 linear feet of 8-inch AC pipe will be replaced with 8-inch C900 PVC pipe. The cost of the pipeline replacement project is $680,000 and we recommended the project be split into two smaller projects.

5.1.6 Water Meter Replacement

The City is in the process of replacing aging water meters. The City will also install water meters for non-revenue water sources (City Hall, Fire Station, and the City Shop) to monitor water usage. Project costs for meter replacement over the next twenty years are shown below in Table 5.3.

Table 5.3: Water Meter Replacement

Project Cost per Year	Cost per Year
FY 2017-2018	$60,000
FY 2018-2019	$60,000
FY 2018-2019	$60,000
FY 2019-2020	$60,000
FY 2020-2021	$60,000

No additional funding is required to purchase and install the new water meters over the next five years. The City budgets an adequate amount of money for water meter replacements each year. However, the City has limited staff capable of installing the new water meters. The City is currently searching for qualified technicians to install the meters. Assuming a qualified candidate is hired, the City projects finishing the meter replacement before 2021. The City will test the new meters for accuracy every five years, per manufacturer's recommendation, and will replace meters when their accuracy becomes unacceptable.

Meter replacement will likely increase the City's water revenues and may be used to help fund the water line replacements. The City has seen an increase in revenue following the condominium meter replacement they completed in the past year. The new meters will reduce the City's unaccounted for water.

Upon completion of the meter replacement, the City is planning to perform an annual audit by comparing the water produced to the metered water, and potentially tracking unmetered uses. The audit is designed to identify unaccounted water and define losses as real or apparent. Based on the results of the audit, the City will undertake a leak detection program, as appropriate, to reduce real losses. The City may vary the pipeline CIP accordingly to reduce any significant water losses from the distribution system.

5.1.7 Hydrant, Valve and Fitting Replacement

The City repairs or replaces valves and hydrants, as necessary. The City maintains a separate budget for the repairs or replacements. The budget for hydrant, valve and fitting replacement in the FY 2015 to 2016, shown below in Table 5.4, was adequate.

Table 5.4: Hydrant, Valve and Fitting Replacement

Project Cost per year (based on FY 2015-2016)	Cost per year
FY 2015-2017	$5,614
Additional Funding Required	**$0**

The City exercises the valves and hydrants within their distribution system annually and replaces broken valves as soon as possible. The City reported that the hydrants are in good condition with only two hydrants requiring replacement.

5.2 CIP

The City's CIP is split into three sections: maintenance projects, distribution projects, and general improvements. Table 5.5 contains an overview of each CIP described in Section 5.1. Loans and grants will be used to supplement the water reserve fund and will allow the City to complete the distribution projects listed below. Table 5.6 contains a summary of the pertinent budget information regarding how the City will fund the CIP. Meter replacement, fittings and valves and reservoir maintenance were not included in Table 5.5 because the funding for those projects is not affected by the water reserve fund. Upon completion of the meter replacement, the City will be able to allocate the meter replacement fund for CIP distribution projects. Additional funding is discussed in Section 5.5. Costs shown below do not include inflation and contain a 30% contingency (excluding the water meter installation). Figure 5.1a and 5.1b includes the CIP table and location of repairs respectively.

Table 5.5: Capital Improvement Plan – by Scheduled Year

Project Description	2016 Project Cost[1]	Construction Year	Priority	Notes
Maintenance Projects				
Replace Reservoir Cathodic Protection Anodes	$13,000	2037	High	Project is funded using WTP Facility Equipment Maintenance fund
Membrane Replacement	$100,000	2022, 2027,2032,2037	High	Membrane Life expectancy 5 to 7 years
Meter Replacement	$60,000/year	2017-2021	Critical	High Priority, funding is already secured
Distribution System Improvements				
Marion Loop Construction	$90,000	2017	High, 3a	Survey for project site is complete
Hillila Loop Construction	$390,000	2019	High, 3a	
Highway 101 Pipe Replacement	$3,710,000	2033	Critical, 1	Repair may occur sooner provided an opportune opportunity arises
Ridge Path Pipe Replacement	$960,000	2018	High, 2	
Cottage Avenue Pipe Replacement	$680,000	2020	High, 3b	
General Improvements				
Third Treatment Skid	$650,000		Low	New skid is dependent on future demand, revisit in 5 years
New WTP Pump (300 gpm)	$50,000	As necessary	Low	Project will be funded using WTP Facility Equipment Maintenance fund

Notes

1. 2016 20-City Engineering News Record Construction Cost Index average 10,338

5.3 City's Budget Review

The CIP indicates the City will need to invest approximately $6.5 million into the water system (both treatment and distribution) over the next 20 years to meet health, safety and demand requirements. The City's pertinent water budget is split into the following groups:

- Water Treatment Facility Equipment Maintenance
- Water Meter Replacement
- Water Meter Repair
- WTP Upgrade Project
- Pipes and Fittings
- Hydrants
- Water Reserve Fund
- Public Works Reserve Fund
- System Operation and Repair

The City's budget for maintenance and repairs is shown below in Table 5.6. The City has been accumulating funds in their water reserve fund to fund large pipeline replacements and WTP improvements.

Table 5.6: Water System Maintenance and Repair Budget for 2015-2016

	FY 2015-2016		
Description	**Used**	**Budget**	**$ Surplus**
WTP Facility Equipment Maintenance	$21,175	$52,079	$30,904
Water Meter Replacement	$52,050	$60,000	$7,950
Meter Repair	$84	$500	$416
WTP Upgrade Project	$117,168	$267,000	$149,832
Pipe & Fittings	$1,114	$10,000	$8,886
Hydrants	$4,500	$10,000	$5,500
Transfer to Water Reserve	$100,000	$100,000	$0
Transfer to Public Works	$30,000	$30,000	$0

The City transfers a minimum of $100,000 to their Water Reserve and $30,000 to their Public Works Reserve from the Maintenance and Repair Budget. However, the City transfers whatever they don't use each year of their million-dollar budget to the Water Reserve. The total amount available, in reserve, is shown in Table 5.7. It is assumed that the City will be able to transfer at least $100,000 to their Water Reserve every year for the next 20 years.

Table 5.7: City's Current Reserve Fund

	Available Funds
Water Reserve	$996,500
Public Works Reserve	$132,195

Conservative estimates were used to predict the City's future expenditures. Assumptions were made to define the surplus funds that could be used for the CIP projects in the future. Listed below in Table 5.8 are the projected fund assumptions.

Table 5.8: Future Fund Allocation Assumptions

Fund	Future Expenditures	Surplus to Water Reserve Fund[1]
WTP Facility Equipment Maintenance	City spends 75% of budget every year and full budget every 3 years	$9,000
Water Meter Replacement	City spends 100% of budget and allocates funds toward the distribution projects upon completion	$47,000
Meter Repair	City spends 100% of budget every year	$0
WTP Upgrade Project	City spends 30% of budget every year and allocates funds for membrane replacement every 5 years	$164,000
Pipe & Fittings and Hydrants	City spends 50% of budget every year and full budget every 5 years	$9,000

Note:

These expenditures are conservative, and the City's actual expenditures are typically less.

1. 20-year average surplus.

5.4 Water Utility Rate Structure

The City has a uniform rate structure in place for all customer classes under Ordinance No. 852. Under this structure, each customer is charged a flat "meter" fee and "infrastructure" fee each month based on meter size. In addition to these flat fees, customers are charged a usage fee of $6.44 per 100 cubic feet (CF) over the minimum charge. Table 5.9 summarizes the current water utility rate structure.

Table 5.9: City of Gearhart Water Utility Rate Structure (within the City)

Meter Size	Monthly Minimum Charge	Allowance (CF)	Additional Fee for Water Usage Above Allowance
5/8" to 3/4"	$39	500	All Users $6.44 per 100 cubic feet of water used per month within the City
1”	$74	1,000	
1 1/2”	$160	1,000	
2”	$260	1,000	
3"	$486	1,000	
4”	$556	1,000	
6”	$884	1,000	

This rate structure meets the requirements of OAR 690-086 (Division 86) rules that require a contemporary rate structure that is based, at least in part, on the quantity of water metered at the service connections.

5.5 Financial Plan

The City can fund all the projects listed within this CIP over the next 20 years if they are putting adequate funds into the water reserve each year. The City funded the improvements internally, it will need to generate and transfer approximately $311,000 annually to the Water Reserve Fund if they want to maintain the current reserve balance or $262,000 if the Water Reserve Fund is used in its entirety. However, this means it will take the City nearly 20 years to raise enough funds for the large Highway pipe project. If the City cannot lower their unaccounted water, then we would recommend completing the Highway 101 pipeline replacement project. If this project is to be constructed sooner, then the City will need to obtain additional funding to complete the projects listed in their CIP. This section discusses existing and potential revenue sources for the City. The City needs approximately $6.5 million to complete the CIP and can raise funds using bonds, increasing water rates, system development charges, and/or using loans and grants.

5.5.1 General Obligation Bonds

The wells, water treatment plant, and reservoir were funded by general obligation bonds funded through property taxes. Two bond series were issued:

- 2011 series bonds for $4,687,610 to be paid off in 2031
- 2015 series bonds for $4,935,012 to be paid off in 2025

The City will not be seeking additional bonds to help fund the CIP projects listed.

5.5.2 Increase Water Rates or Property Taxes

The City can potentially increase water rates within the City to help fund the CIP. The City has 1,440 connections and a permanent population at 1,480 as of the 2015 PSU population study.

The City anticipates new condominium development within the next five years and may use new connection fees to construct the new water lines to the condominium. The City may also use the new connection fees to partially fund the pipeline along Hwy101 as the new condominiums will benefit from the water line improvements.

5.5.3 Loans and Grants

The City is not interested in using loans exclusively to fund the CIP but will consider using loans and grants to accommodate changes in the CIP schedule. However, the City has a high median income (within 10% of Oregon's median income) and will likely be approved for loans with minimal grants.

5.5.3.1 Safe Drinking Water Revolving Loan Fund

The Safe Drinking Water Revolving Loan Fund (SDWRLF) is administered by the Oregon Health Authority (OHA) and typically provides loans with annual interest rates at 80% of the local municipal bond rate or approximately 2.3%. The SDWRLF was established in the 1996 amendments to the SDWA and is a financial assistance program to help water systems to achieve the health protection objectives of SDWA. A project must solve an existing or potential health hazard or noncompliance issue under federal/state water quality standards to be eligible for funding under the SDWRLF program.

5.5.3.2 Rural Utilities Service Water and Wastewater Loans and Grants

The US Department of Agriculture's Rural Utilities Service (RUS) program provides funding for rural areas and towns with populations of up to 10,000. Assistance includes loans and grants. Funds may be used for installation, repair, improvements, or expansion of rural water distribution and treatment facilities. The costs of land acquisition and legal and engineering fees are eligible for funding if they are necessary to develop the facility. RUS program loans are commonly a "last resort" funding source because the cost of loan administration requirements is significant and can increase the cost of a construction project by more than 25%.

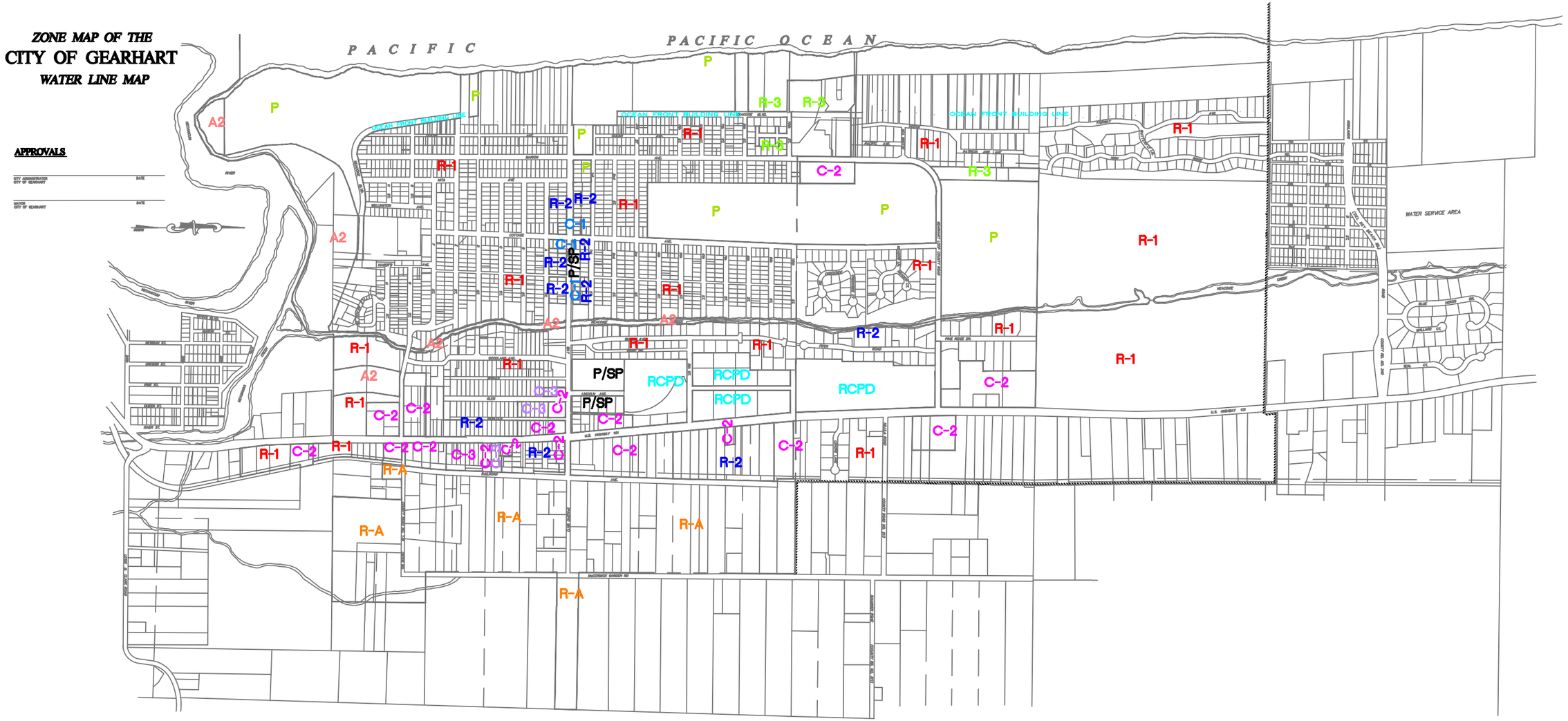
Figures

ZONE MAP OF THE CITY OF GEARHART
WATER LINE MAP

APPROVALS

CITY ADMINISTRATOR CITY OF GEARHART — DATE

MAYOR CITY OF GEARHART — DATE



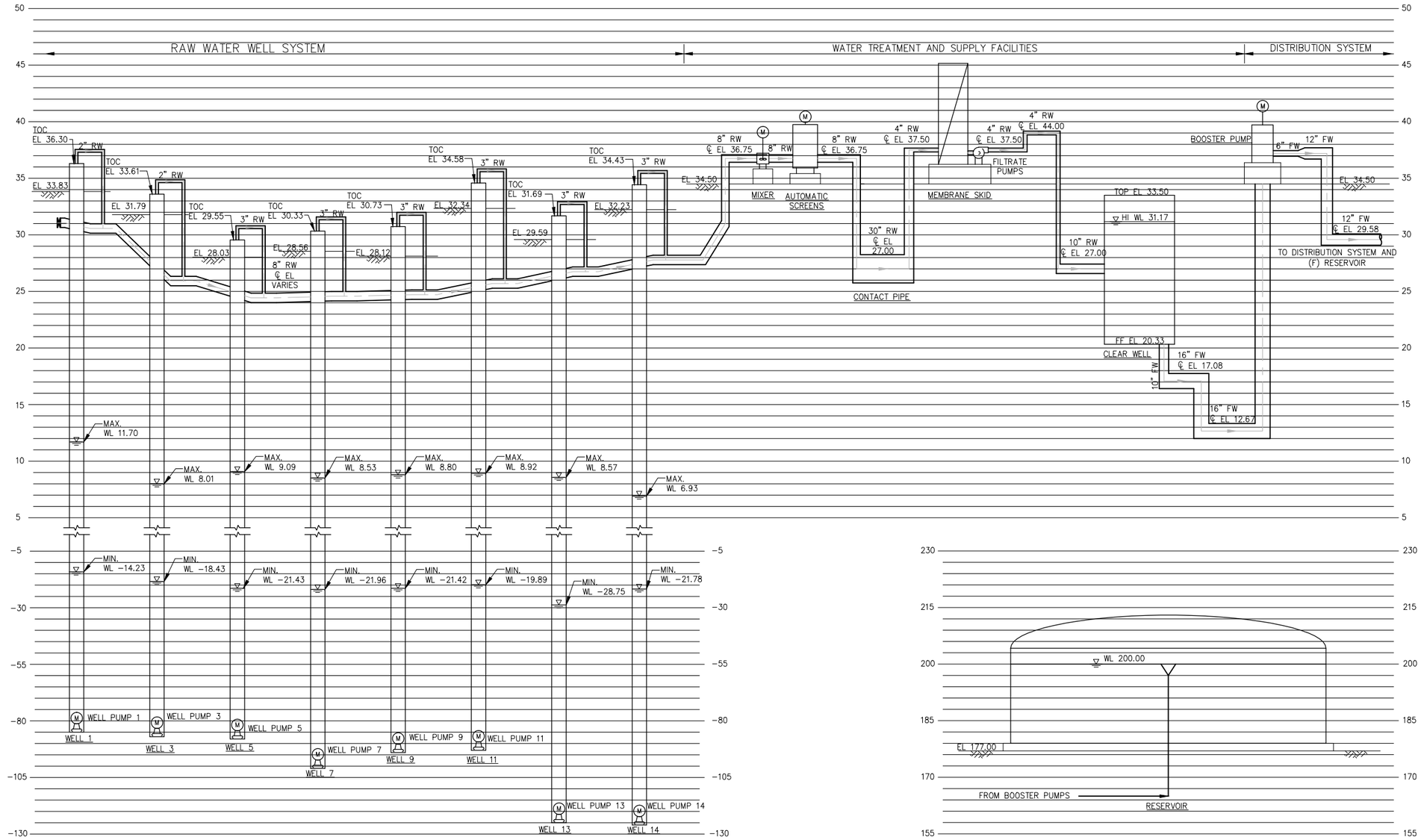
LEGEND

R-A	RURAL AGRICULTURE
R-1	RESIDENTIAL LOW DENSITY
R-2	RESIDENTIAL, MEDIUM DENSITY
R-3	RESIDENTIAL, HIGH DENSITY
RCPD	RESIDENTIAL-COMMERCIAL PLANNED DEVELOPMENT
C-1	COMMERCIAL NEIGHBORHOOD
C-2	COMMERCIAL GENERAL
C-3	COMMERCIAL, HIGHER DENSITY
A-2	AQUATIC CONSERVATION ZONE
P	PARKS AND OPEN SPACE ZONE
P/SP	PUBLIC/SEMI-PUBLIC ZONE

Kennedy/Jenks Consultants

CITY OF GEARHART
WATER MASTER PLAN
ZONING MAP

1676009.00



HYDRAULIC PROFILE BASED ON 900 GPM

(NO HORIZONTAL SCALE)

Kennedy/Jenks Consultants

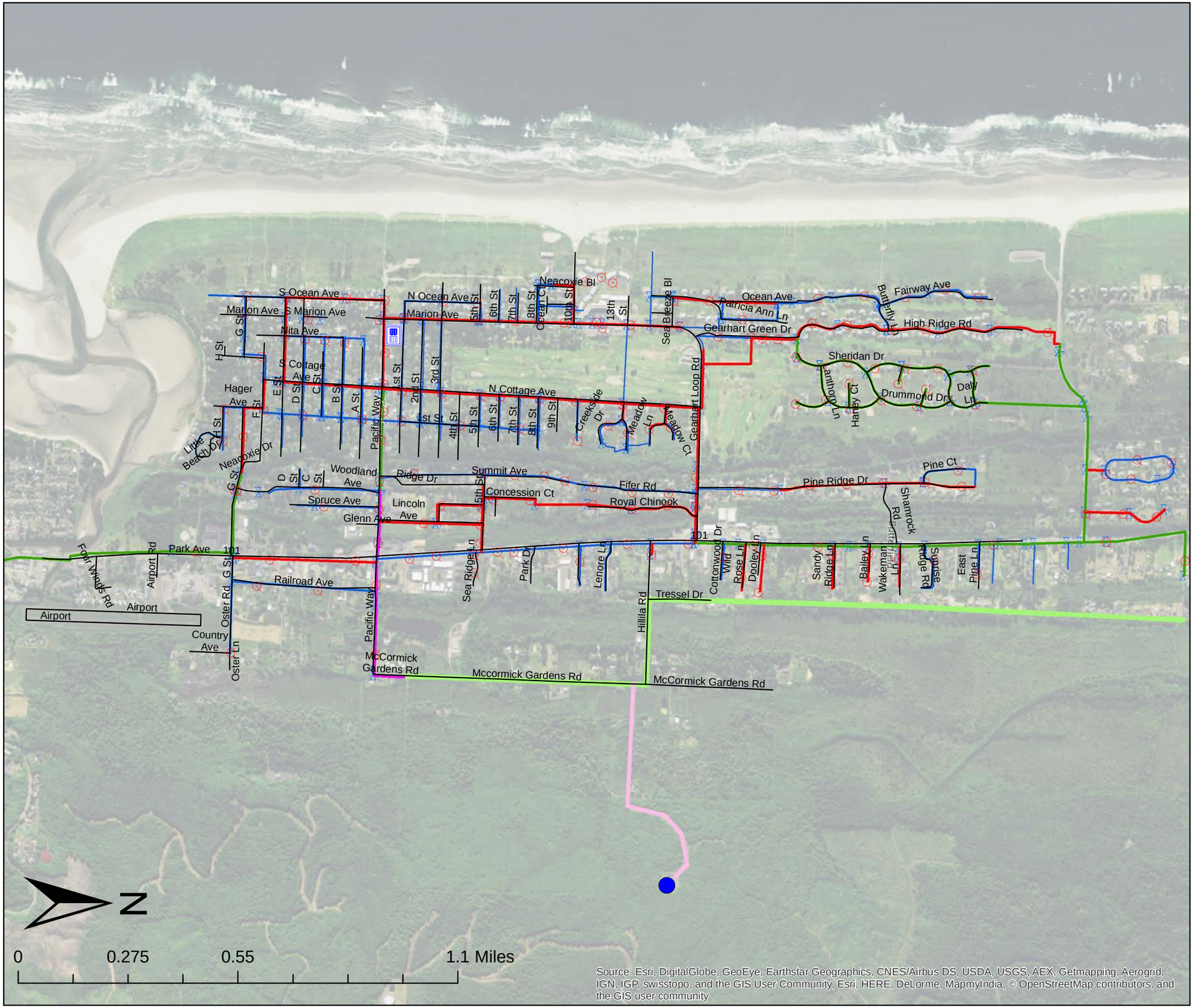
CITY OF GEARHART

WATER MASTER PLAN

HYDRAULIC PROFILE

1676009.00

FIGURE 3.2



Legend

- WATER TREATMENT FACILITY
- RESERVOIR
- VALVES
- HYDRANTS

EXISTING PIPES BY SIZE:

- 4-INCH WATER
- 6-INCH WATER
- 8-INCH WATER
- 10-INCH WATER
- 12-INCH WATER
- 14-INCH WATER
- 20-INCH WATER

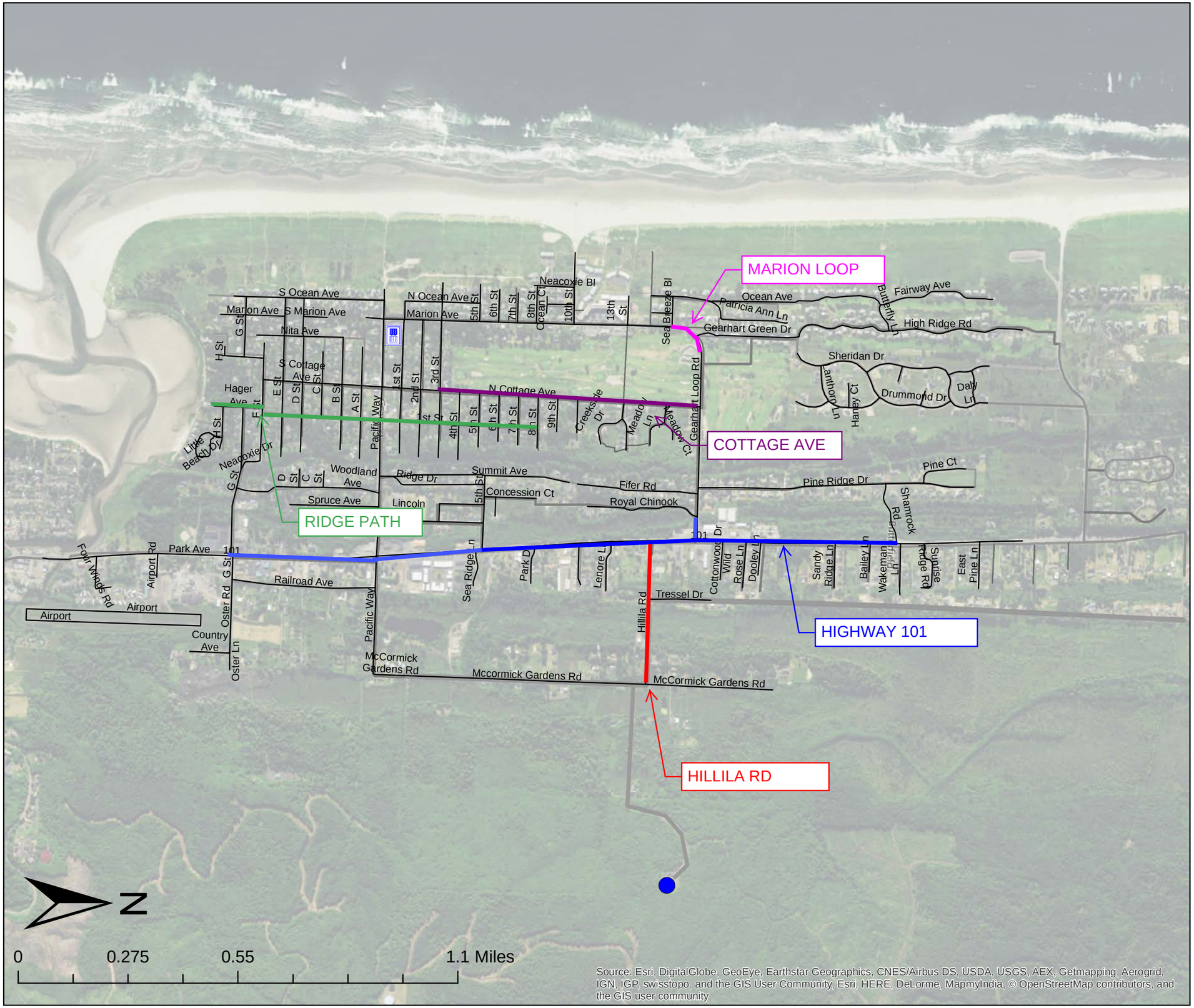
Kennedy/Jenks Consultants

CITY OF GEARHART

WATER MASTER PLAN

WATER DISTIBUTION SYSTEM

KJ 1676009.00
FIGURE 3.3



Legend

WATER TREATMENT FACILITY

RESERVOIR

Kennedy/Jenks Consultants

CITY OF GEARHART

WATER MASTER PLAN

DISTRIBUTION SYSTEM AREAS WITH DEFICIENCIES

FIGURE 4.2

Capital Improvement Project

Project Code	Project Description	Primary Funding Source	FY 2017-2018	FY 2018-2019	FY 2019-2020	FY 2020-2021	FY 2022-2023	FY 2032-2033	FY 2033-2034	FY 2036-2037	Total
	WTP Facility Equipment Maintenance	WTP Facility Equipment Maintenance Fund	$52,079	$52,079	$52,079	$52,079	$52,079	$52,079	$52,079	$52,079	$989,501
	WTP Facility Equipment Maintenance - spent		$39,059	$39,059	$52,079	$39,059	$52,079	$52,079	$39,059	$25,000	$806,185
M-1	Replace Reservoir Cathodic Protection Anodes									$13,000	$13,000
	Surplus WTP Facility Equipment Maintenance		$13,020	$13,020	$0	$13,020	$0	$0	$13,020	$14,079	$170,316
	Water Meter Replacement	Water Meter Replacement Fund	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$1,140,000
WATER METER	Water Meter Replacement - spent		$60,000	$60,000	$60,000	$60,000					$240,000
	Surplus Water Meter Replacement		$0	$0	$0	$0	$60,000	$60,000	$60,000	$60,000	$900,000
	Meter Repair	Meter Repair Fund	$500	$500	$500	$500	$500	$500	$500	$500	$9,500
	Meter Repair - spent		$500	$500	$500	$500	$500	$500	$500	$500	$9,500
	Surplus - Meter Repair		$0	$0	$0	$0	$0	$0	$0	$0	$0
	WTP Upgrade Project	WTP Upgrade Project Fund	$267,000	$267,000	$267,000	$267,000	$267,000	$267,000	$267,000	$267,000	$5,073,000
	WTP Upgrade Project - spent		$75,000	$75,000	$75,000	$75,000	$75,000	$117,168	$75,000	$117,168	$1,551,503
WTP-1	New WTP Pump (300 gpm)				$50,000						$50,000
WTP-2	Membrane Skid Replacement						$100,000	$100,000		$100,000	$400,000
	Surplus -WTP Upgrade Project		$192,000	$192,000	$142,000	$192,000	$92,000	$49,832	$192,000	$49,832	$3,071,497
	Pipe & Fittings and Hydrants	Pipe & Fittings and Hydrants Combined Fund	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$380,000
	Fittings and Hydrant Replacement - spent		$10,000	$10,000	$10,000	$10,000	$10,000	$20,000	$5,614	$10,000	$215,614
	Surplus - Pipe & Fittings and Hydrants		$10,000	$10,000	$10,000	$10,000	$10,000	$0	$14,386	$10,000	$164,386

Project Number	Distribution Projects										
CIP-1	Highway 101 Pipe Replacement	Water Reserve Fund							$3,710,000		$3,710,000
CIP-2	Ridge Path Pipe Replacement	Water Reserve Fund		$960,000							$960,000
CIP-3A	Marion Loop Construction	Water Reserve Fund	$90,000								$90,000
CIP-3B	Cottage Avenue Pipe Replacement	Water Reserve Fund				$680,000					$680,000
CIP-3C	Hillila Loop Construction	Water Reserve Fund			$390,000						$390,000
	Subtotal Distribution Projects		$90,000	$960,000	$390,000	$680,000	$0	$0	$3,710,000	$0	**$5,830,000**
	Water Reserved Fund Balance from Prior Year		$996,500	$1,221,520	$576,540	$438,540	$438,579	$3,522,530	$3,732,362	$1,138,787	
	Added to Water Reserve Fund		$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	**$1,900,000**
	Additional funding sources (from other budgets)		$215,020	$215,020	$152,000	$215,020	$162,000	$109,832	$279,405	$133,911	**$4,306,198**
	Deducted by Projects		-$90,000	-$960,000	-$390,000	-$680,000	$0	$0	-$3,710,000	$0	**-$5,830,000**
	Funds Remaining		$1,221,520	$576,540	$438,540	$73,559	$700,579	$3,732,362	$401,767	$1,372,698	**$376,198**

C. Water Distribution Pipe Replacement

Funding Source	**Water Reserve Fund**
Total funds available (as of FY 2016)	$996,500

Note:
Only years that either contain capital or maintenace cost are shown in CIP table.

Kennedy/Jenks Consultants

CITY OF GEARHART

WATER MASTER PLAN

CAPITAL IMPROVEMENT PROJECTS

KJ 1676009.00
FIGURE 5.1A

Legend

- WATER TREATMENT FACILITY
- RESERVOIR
- CIP-1 HWY 101 REPLACEMENT
- CIP-2 RIDGE PATH REPLACEMENT
- CIP-3A MARION LOOP CONSTRUCTION
- CIP-3B COTTAGE AVE REPLACEMENT
- CIP-3C HILLIA LOOP CONSTRUCTION
- M-1 RESERVIOR CATHODIC PROTECTION
- WTP-1 NEW WTP PUMP
- WTP-2 MEMBRANE SKID REPLACEMENT

Kennedy/Jenks Consultants

CITY OF GEARHART

WATER MASTER PLAN

CAPITAL IMPROVEMENT PROJECTS

KJ 1676009.00
FIGURE 5.1B

Appendix A

Water Analysis Data

City of Gearhart Daily Free Chlorine Log

MONTH March

at City shops (next to City Hall)

Date	Chlorine Residual (Free)
3-1-16	0.2
3-2-16	0.2
3-3-16	0.4
3-4-16	0.2
3-7-16	0.5
3-8-16	0.5
3-9-16	0.2
3-10-16	0.6
3-14-16	0.6
3-15-16	0.4
3-16-16	0.5
3-17-16	0.1
3-18-16	0.5
3-21-16	0.6
3-22-16	0.5
3-23-16	0.7
3-24-16	0.8
3-25-16	0.6
3-28-16	0.6
3-29-16	0.7
3-30-16	0.6
3-31-16	0.6

City of Gearhart Daily Free Chlorine Log

MONTH August

Date	Chlorine Residual
8-3-15	1.0
8-4-15	1.1
8-5-15	1.5
8-6-15	1.1
8-7-15	1.3
8-10-15	1.4
8-11-15	0.5
8-12-15	0.7
8-13-15	1.2
8-14-15	1.4
8-17-15	1.2
8-18-15	0.5
8-19-15	1.2
8-20-15	0.6
8-21-15	0.5
8-24-15	0.3
8-25-15	0.6
8-26-15	0.4
8-27-15	0.3
8-28-15	1.6
8-31-15	0.4

Appendix B

Production and Monitoring Well Location

Date Saved: 9/23/2014

Document Path: P:\0934 City of Gearhart\0934-001 Water Rights\Technical\Project Portal\GIS\2014_Report\0934_2014GIS_MAP01_blrjqc.mxd

PACIFIC OCEAN

N

SEE INSET

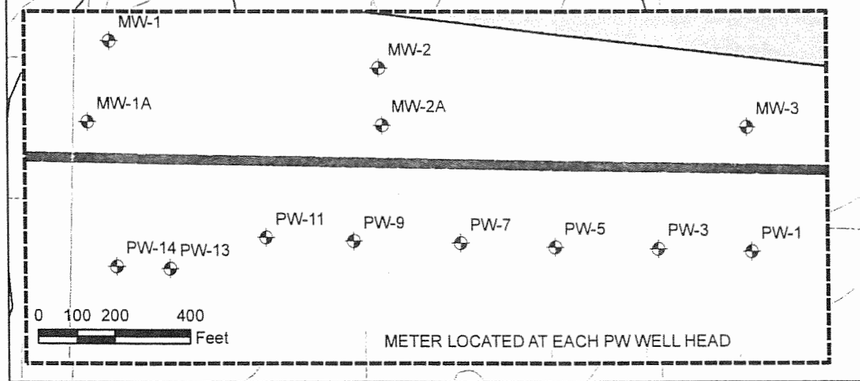
MW-1
MW-1A
MW-2
MW-2A
MW-3
PW-11
PW-5
PW-1
PW-14
PW-13
PW-9
PW-7
PW-3
MW-4
MW-5
MW-6
SW-MS1

Necanicum River
Neawanna Creek
Gearhart Golf Links
Neacoxie Creek
Mill Creek
Thompson Creek

16 15 10 9 4 3 10 4 3 33 34 33 28 27
15 10 11 14 10 11 3 2 3 2 34 35 34 35 27 26

T7N R10W
T6N R10W

INSET



CERTIFIED WATER RIGHT EXAMINER
79225
NANCY EAST-SMITH
JUNE 29, 2007
EXP 12/31/2015
STATE OF OREGON

WELL No.	Latitude	Longitude	North	West	¼ ¼	SECTION
PW-1	47.0445	-97.6590	1804 ft	1491 ft	NW SE	4
PW-3	47.0438	-97.6593	1543 ft	1486 ft	NW SE	4
PW-5	47.0431	-97.6597	1288 ft	1480 ft	SW SE	4
PW-7	47.0425	-97.6600	1027 ft	1479 ft	SW SE	4
PW-9	47.0417	-97.6604	763 ft	1475 ft	SW SE	4
PW-11	47.0411	-97.6607	510 ft	1471 ft	SW SE	4
PW-13	47.0404	-97.6607	243 ft	1374 ft	SW SE	4
PW-14	47.0400	-97.6609	112 ft	1375 ft	SW SE	4

Lat. And Long. Coordinates are NAD 83 Oregon Statewide Lambert (Intl feet).
¼ ¼ Locations from SE Corner of Section 4, T6N, R10W

THIS MAP IS NOT INTENDED TO PROVIDE LEGAL DIMENSIONS OR LOCATIONS OF PROPERTY OWNERSHIP LINES

APPLICATION G-16489/PERMIT G-16390

SECTION 3,4,9, & 10, T6N, R7W
SECTION 27,33, & 34, T7N, 10W
CLATSOP COUNTY, OREGON

LEGEND

- MONITORING WELL (MW)
- PRODUCTION WELL (PW)
- SURFACE WATER STATION - (SW-MS1)
- ROAD
- SURFACE WATER
- TOWNSHIP/RANGE/SECTION
- WATER SERVICE AREA
- WATER TREATMENT PLANT

SoundEarth Strategies
WWW.SOUNDEARTHINC.COM

DATE: 09/30/2014
DRAWN BY: ..... BLR/JQC
CHECKED BY: ..... CRH
GIS FILE: ..... 0934_2013GIS_PP

PROJECT NAME: ..... CITY OF GEARHART WATER SUPPLY
PROJECT NUMBER: 0934-001
APPLICATION/PERMIT NUMBER: ..... PERMIT G 16390/APPLICATION G 16489
CITY, STATE: ..... GEARHART, OREGON

REGION

0 1,320 2,640
SCALE IN FEET
DATUM - NVD88

MAP 1 OF 2
CLAIM OF BENEFICIAL USE MAP
FOR THE CITY OF GEARHART
AUGUST 21, 2014

WWW.SOUNDEARTHINC.COM

Date Saved: 9/23/2014

Document Path: P:\0934 City of Gearhart\0934-001 Water Rights\Technical\Project Portal\GIS\2014_Report\0934_2014GIS_MAP02_blrjqcblr2jqc.mxd

PACIFIC OCEAN

N

MW-1
MW-2
MW-1A
MW-2A
MW-3
PW-11
PW-9
PW-5
PW-1
PW-14
PW-13
PW-7
PW-3
MW-4
MW-5
MW-6
SW-MS1

Necanicum River

Neawanna Creek

Gearhart Golf Links

Neacoxie Creek

Mill Creek

SEASIDE INTER-TIE

SOUTH WARRENTON INTER-TIE

NORTH WARRENTON INTER TIE

9 10 4 3 33 34 4 3 33 34 28 27

10 11 3 2 34 35 3 2 34 35 27 26

T7N R10W
T6N R10W

CERTIFIED WATER RIGHT EXAMINER
79225
NANCY EAST-SMITH
JUNE 29, 2007
EXP 12/31/2015
STATE OF OREGON

APPLICATION G-16489/PERMIT G-16390
SECTION 3,4,9, & 10, T6N, R7W
SECTION 27,33, & 34, T7N, 10W
CLATSOP COUNTY, OREGON

THIS MAP IS NOT INTENDED TO PROVIDE LEGAL DIMENSIONS OR LOCATIONS OF PROPERTY OWNERSHIP LINES

PIPING LAYOUT BASED ON INFORMATION PROVIDED BY CITY OF GEARHART PUBLIC WORKS DEPARTMENT

LEGEND

- RESERVOIR (1-MILLION GALLON)
- 6" PIPES
- 8" PIPES
- 10" PIPES
- 12" PIPES
- 14" PIPES
- 20" PIPES
- ROAD
- TOWNSHIP/RANGE/SECTION
- MONITORING WELL (MW)
- PRODUCTION WELL (PW)
- SURFACE WATER STATION - (SW-MS1)
- WATER SERVICE AREA
- WATER TREATMENT PLANT
- SURFACE WATER

SoundEarth Strategies
WWW.SOUNDEARTHINC.COM

DATE: 09/30/2014
DRAWN BY: ..... BLR/JQC
CHECKED BY: ..... CRH
GIS FILE: ..... 0934_2014GIS_MAP2

PROJECT NAME: ..... CITY OF GEARHART WATER SUPPLY
PROJECT NUMBER: 0934-001
APPLICATION/PERMIT NUMBER: ..... PERMIT G 16390/APPLICATION G 16489
CITY, STATE: ..... GEARHART, OREGON

REGION Washington 5 Oregon

0 1,320 2,640
APPROXIMATE SCALE IN FEET
DATUM - NVD88

MAP 2 OF 2
CLAIM OF BENEFICIAL USE MAP
FOR THE CITY OF GEARHART
AUGUST 21, 2014

WWW.SOUNDEARTHINC.COM

Appendix C

Water Rights Permit

STATE OF OREGON

COUNTY OF CLATSOP

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

CITY OF GEARHART
PO BOX 2510
GEARHART, OR 97138

The specific limits and conditions of the use are listed below.

APPLICATION FILE NUMBER: G-16489

SOURCE OF WATER: WELL 1, WELL 2, WELL 3, WELL 4, WELL 5, WELL 6, WELL 7, WELL 8, WELL 9, WELL 10, WELL 11, WELL 12, WELL 13, AND WELL 14 IN NEACOXIE CREEK BASIN

PURPOSE OR USE: MUNICIPAL USE

MAXIMUM RATE: 2.18 CUBIC FEET PER SECOND (CFS), FURTHER LIMITED TO 0.443 CFS FROM JULY 1 THROUGH JULY 31, 0.289 CFS FROM AUGUST 1 THROUGH AUGUST 31, 0.410 CFS FROM SEPTEMBER 1 THROUGH SEPTEMBER 30, AND 0.485 CFS FROM OCTOBER 1 THROUGH OCTOBER 31

PERIOD OF USE: YEAR ROUND

DATE OF PRIORITY: JUNE 28, 2005

WELL LOCATIONS:

WELL 1 - SE ¼ SE ¼, SECTION 4, T6N, R10W, W.M.; 3658 FEET NORTH & 1136 FEET WEST FROM E ¼ CORNER, SECTION 9

WELL 2 - SE ¼ SE ¼, SECTION 4, T6N, R10W, W.M.; 3528 FEET NORTH & 1136 FEET WEST FROM E ¼ CORNER, SECTION 9

WELL 3 - SE ¼ SE ¼, SECTION 4, T6N, R10W, W.M.; 3398 FEET NORTH & 1136 FEET WEST FROM E ¼ CORNER, SECTION 9

WELL 4 - SE ¼ SE ¼, SECTION 4, T6N, R10W, W.M.; 3268 FEET NORTH & 1136 FEET WEST FROM E ¼ CORNER, SECTION 9

WELL 5 - SE ¼ SE ¼, SECTION 4, T6N, R10W, W.M.; 3138 FEET NORTH & 1136 FEET WEST FROM E ¼ CORNER, SECTION 9

WELL 6 - SE ¼ SE ¼, SECTION 4, T6N, R10W, W.M.; 3008 FEET NORTH & 1136 FEET WEST FROM E ¼ CORNER, SECTION 9

WELL LOCATIONS (CONTINUED):

WELL 7 - SE ¼ SE ¼, SECTION 4, T6N, R10W, W.M.; 2878 FEET NORTH & 1136 FEET WEST FROM E ¼ CORNER, SECTION 9

WELL 8 - SE ¼ SE ¼, SECTION 4, T6N, R10W, W.M.; 2819 FEET NORTH & 1136 FEET WEST FROM E ¼ CORNER, SECTION 9

WELL 9 - SE ¼ SE ¼, SECTION 4, T6N, R10W, W.M.; 2759 FEET NORTH & 1136 FEET WEST FROM E ¼ CORNER, SECTION 9

WELL 10 - NE ¼ NE ¼, SECTION 9, T6N, R10W, W.M.; 2699 FEET NORTH & 1136 FEET WEST FROM E ¼ CORNER, SECTION 9

WELL 11 - NE ¼ NE ¼, SECTION 9, T6N, R10W, W.M.; 2639 FEET NORTH & 1136 FEET WEST FROM E ¼ CORNER, SECTION 9

WELL 12 - NE ¼ NE ¼, SECTION 9, T6N, R10W, W.M.; 2577 FEET NORTH & 1096 FEET WEST FROM E ¼ CORNER, SECTION 9

WELL 13 - NE ¼ NE ¼, SECTION 9, T6N, R10W, W.M.; 2517 FEET NORTH & 1096 FEET WEST FROM E ¼ CORNER, SECTION 9

WELL 14 - NE ¼ NE ¼, SECTION 9, T6N, R10W, W.M.; 2457 FEET NORTH & 1096 FEET WEST FROM E ¼ CORNER, SECTION 9

THE PLACE OF USE IS LOCATED AS FOLLOWS: WITHIN THE SERVICE BOUNDARY OF THE CITY OF GEARHART

Measurement, recording and reporting conditions:

A. Before water use may begin under this permit, the permittee shall install a totalizing flow meter at each point of appropriation. The permittee shall maintain the meter(s) in good working order. The permittee shall keep a complete record of the amount of water used each month, and shall submit a report which includes the recorded water use measurements to the Department annually or more frequently as may be required by the Director. Further, the Director may require the permittee to report general water-use information, including the place and nature of use of water under the permit.

B. The permittee shall allow the watermaster access to the meter(s); provided however, where any meter is located within a private structure, the watermaster shall request access upon reasonable notice.

Prior to diversion and use of water under this permit, the City of Gearhart must resolve the deed restriction with Clatsop County and submit evidence to the Department of the resolution.

Within three years of permit issuance, the permittee shall submit a Water Management and Conservation Plan consistent with OAR Chapter 690, Division 86. The Director may approve an extension of this time line to complete the required Water Management and Conservation Plan.

The wells shall produce ground water only from the unconsolidated sand ground water reservoir.

CITY OF GEARHART MONITORING AND ACTION PLAN

This monitoring and action plan has been prepared consistent with provisions outlined by Oregon Water Resources Department (OWRD), input solicited from Oregon Department of Environmental Quality (DEQ), input solicited from Oregon Department of Fish and Wildlife (ODFW), and discussions held by these agencies in conjunction with the City of Gearhart.

This plan identifies the data collection requirements necessary to ensure sustainability of ground water and surface water resources. The plan may also undergo revision upon a demonstration that an alternative monitoring or action method, or discontinuance of one or more of the methods, can be made without reducing resource protections. Any modification to this plan will require agreement of the City of Gearhart, OWRD, DEQ, and ODFW.

The components of this plan, in conjunction with additional data gathered from baseline monitoring will address the objectives, target levels and concentrations as appropriate. *Following the 4/18/2007 meeting between Gearhart, Kennedy/Jenks, ODFW, DEQ, and OWRD, the monitoring components related to a pump-back mitigation strategy have been removed from this monitoring and action plan. The pump-back mitigation strategy will not be necessary for this permit due to a reduction in Gearhart's proposed groundwater withdrawal rate during the summer months. For clarity, the numbered items follow OWRD's numbered provisions from the 4/25/07 draft, and have been labeled as sections.*

SECTION 1 - Objective: Measure baseline conditions of the aquifer and Neacoxie Creek prior to wellfield usage in order to establish background water level and water quality data.

A minimum of one year of ground water data and surface water data (outlined below) shall be collected prior to ground water use from the proposed municipal wells. OWRD will allow up to 0.156 cfs (70 gallons per minute) to be used for construction purposes following issuance of a groundwater permit for Gearhart. Construction water may be used during the one-year of baseline data collection.

SECTION 2 - Objective: Monitor for landward migration of the fresh and saline interface.

Gearhart will install three monitoring wells (MW-1, MW-2, MW-3) in a north-south line between the Pacific Ocean and the proposed wellfield generally as shown in ***Figure 1***. All wells are expected to be located within publicly owned property. The wells shall be completed into the same waterbearing zone as the production wells (screened near the base of the dunal aquifer). The monitoring wells shall be located in the north-south direction such that the north, south, and central areas of influence on the aquifer from the production wells are monitored. Gearhart will continuously (or at no less frequently than two-hour intervals) measure water levels in each monitoring well. Water level data collection shall begin one year prior to any ground water withdrawal allowed by the permit *(except for construction purposes as indicated in item ONE above)*. Gearhart will regulate ground water withdrawal in the wellfield to maintain acceptable aquifer head conditions in the monitoring wells. Acceptable head is assumed to be 3.0 feet above a referenced sea level datum. This initial number and the relative vertical datum are open to revision based on observations following well construction.

Each monitoring well will be sampled quarterly for laboratory chloride and total dissolved solids (TDS) analyses. Water quality sample collection from these monitoring wells will begin one year prior to any ground water withdrawal under this permit *(except for construction purposes as indicated above)*. These four quarterly samples collected prior to wellfield use will establish the background chloride and TDS concentrations. Depending on spatial and seasonal variability, more than one background concentration may be established. Gearhart will also measure and record weekly the specific conductance of ground water from each production well, and sample each production well

quarterly for laboratory chloride and TDS analyses. If chloride or TDS concentrations from any monitoring or production well water samples increase by more than 20% above the established background concentration(s) for two consecutive quarterly sampling events, monthly water quality sample collection for all wells shall be implemented, and OWRD shall be notified. Gearhart will report data annually and upon reasonable request to OWRD.

SECTION 3 - Objective: Monitor for impact from wellfield pumping on shallow ground water elevations west and east of Neacoxie Creek.

Gearhart will install three monitoring wells (MW-4, MW-5, MW-6) in an east-west line near Neacoxie Creek east of the center of the wellfield, generally as shown in ***Figure 2***. All wells are expected to be located within public rights-of-way. One well will be located east of Neacoxie Creek with the intent to evaluate pumping influence that could potentially propagate beyond the stream. Gearhart will continuously (as above) measure water levels in each well. Gearhart will report data annually and upon reasonable request to OWRD.

SECTION 4 - Objective: Monitor water use from wellfield.

Gearhart will install and maintain totalizing flow meters on each municipal well. Gearhart will record monthly flow values for each well and report annually and upon reasonable request to OWRD.

SECTION 5 - Objective: Monitor potential impacts on Neacoxie Creek.

Gearhart will install and maintain a surface water monitoring station (SW-MS1) on Neacoxie Creek to include stream stage, temperature, and specific conductance, generally as shown in ***Figure 3***. Parameters shall be measured and recorded at least once every 15 minutes. Water quality sample collection and stream stage data collection from this monitoring station shall begin at least one year prior to ground water withdrawal under this permit *(except for construction purposes as indicated in Section One above)*. Installation, survey, and data collection will be to USGS standards (Rantz, S.E. and others, 1982. *Measurement and Computation of Streamflow:* Volume 1 & 2. U.S. Geological Survey Water Supply Paper 2175). This monitoring station shall be as close as possible to the ground water monitoring wells installed near Neacoxie Creek. Gearhart will report data annually and upon request to OWRD. OWRD will allow

up to 0.156 cfs (70 gallons per minute) total from any combination of wells to be used for construction purposes following issuance of a groundwater permit for Gearhart. Construction water may be used during the one-year of baseline data collection.
If surface water or ground water monitoring data indicate that the impact to Neacoxie Creek stage or quality from wellfield pumping is observed to be increasing beyond model-simulated levels, additional monitoring of surface water and ground water may be required.

SECTION 6 - Objective: Survey each well.

All observation sites shall be surveyed to a horizontal accuracy of +/- five feet. Reported coordinates shall include the datum and projection of the coordinate system. A water level measurement point shall be described for each well. The measurement point elevation shall be surveyed to a vertical accuracy of +/-0.1 feet and referenced to a height above land surface. Surface water sites shall be surveyed to USGS standards.

SECTION 7 - Objective: Use water level and water quality thresholds to implement a water system action plan to halt the landward migration of the fresh/saline ground water interface.

The Department may restrict ground water use based upon increases in ground water salinity or TDS or reductions in aquifer head. This Monitoring and Action Plan includes steps to be taken by the permittee that will halt, if observed, the landward migration of the fresh and saline interface. These steps, consistent with Gearhart's Water Management and Conservation Plan include:

- Voluntary water conservation and curtailment of water use
- Mandatory water conservation with reductions in water use
- Mandatory curtailment of irrigation
- Cessation of ground water use and bringing online backup sources of municipal water

The two primary thresholds are the freshwater head in the aquifer west of the wellfield and the ground water chloride and TDS concentrations west of, and at, the wellfield. A freshwater head of 3.0 feet above an agreed upon reference datum shall be

maintained at all times in the monitoring wells located west of the production wells. This number and the relative vertical datum are open to revision based on observations following well construction.

Dissolved chloride and TDS concentrations in ground water samples collected from the monitoring or production wells shall not increase above the established background concentrations (pre-wellfield development) by more than 20 percent. If the freshwater head at the monitoring wells declines below 3 feet relative to the reference datum, Action Plan operations shall be implemented and OWRD and DEQ shall be notified immediately. If a quarterly chloride or TDS concentration from any well increases by more than 20 percent over the established background concentrations, Action Plan operations shall be implemented and OWRD and DEQ shall be notified immediately. OWRD and Gearhart will agree on the established background chloride and TDS concentrations based on the results of the pre-development monitoring data.

SECTION 8 - Objective: Provide alternate source for Gearhart's municipal water in the event of saltwater intrusion or other persistent degradation of the drinking water aquifer.

Gearhart will maintain a physical connection to an alternate municipal water supplier and an alternate water supply plan for backup water supply sufficient to insure that provision is made for an adequate and safe supply of water which is available year round for water customers of Gearhart in the event that the permitted use is restricted due to saltwater intrusion into the freshwater aquifer, or other water quality or quantity problems. Any future Water Management and Conservation Plans submittal must include the most recent copy of the alternate water supply plan adopted by Gearhart.

SECTION 9 - All permit requirements of the Oregon Department of Environmental Quality shall be met and maintained, including, where utilized in the project, water quality of flow augmentation and backwash water, NPDES and/or WPCF permit compliance and associated water quality monitoring.

SECTION 10 - All measurements shall be made by qualified personnel. Qualified personnel include certified water rights examiners, registered professional geologists, registered professional engineers, or licensed well constructors or pump installers licensed by the Construction Contractors Board. Gearhart may work with OWRD to train the licensed water

treatment plant operator for data collection purposes. Measurements shall be submitted on a form provided by the Department or in an electronic form approved by the Department. All water-level measurements shall be made with equipment that is accurate to at least 0.3 percent. Measurements made with a pressure transducer or other automated measuring devices shall be calibrated to an e-tape or steel tape measurement at least once every two months. No air-line measurements will be accepted.

SECTION 11 - The Department requires the individual performing the measurements to:

A. Identify each well and measurement with an owner's well name and an OWRD well Log ID;
B. Measure and report water levels to the nearest hundredth of a foot as depth-to-water below ground surface;
C. Specify the method of measurement;
D. Specify the status (static, pumping, rising) of each measurement; and
E. Certify the accuracy of all measurements and calculations submitted to the Department.

SECTION 12 - Gearhart will submit to OWRD all monitoring data annually in a report prepared and stamped by registered professional geologist or a registered professional engineer. The report will include discussions and plots of water level and water quality trends, water use amounts, maps with well and monitoring locations, and amounts of water used for flow augmentation, if any. All of the water level, water use, and water chemistry data shall also be submitted electronically in Microsoft Excel or other delimited file format acceptable to the Department.

SECTION 13 - Gearhart will allow the Department access to all wells, meters, water level, water temperature, and water chemistry data. The Department may request access upon reasonable notice to representatives of the permittee.

SECTION 14 - Other standard permit conditions for ground water permits will also apply, and are attached to this monitoring and action plan for reference.

The water user shall measure and report annually to the Oregon Water Resources Department (OWRD) water levels for each production well in January, April, July, and October for each year. The Director may

require the user to measure and report additional water levels each year if more data are needed to evaluate the aquifer system.

STANDARD CONDITIONS

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

If the number, location, source, or construction of any well deviates from that proposed in the permit application or required by permit conditions, this permit may not be valid, unless the Department authorizes the change in writing.

If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this permit, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department approves or implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interferences.

The wells shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon. The works shall be equipped with a usable access port, and may also include an air line and pressure gauge adequate to determine water level elevation in the well at all times.

Where two or more water users agree among themselves as to the manner of rotation in the use of water and such agreement is placed in writing and filed by such water users with the watermaster, and such rotation system does not infringe upon such prior rights of any water user not a party to such rotation plan, the watermaster shall distribute the water according to such agreement.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

This permit is for the beneficial use of water without waste. The water user is advised that new regulations may require the use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

Completion of construction and complete application of the water to the use shall be made on or before five years from the date of permit issuance. If the water is not completely applied before this date, and the permittee wishes to continue development under the permit, the permittee must submit an application for extension of time, which may be approved based upon the merit of the application.

Within one year after complete application of water to the proposed use, the permittee shall submit a claim of beneficial use, which includes a map and report, prepared by a Certified Water Rights Examiner (CWRE).

Issued November 3, 2008

for Phillip C. Ward, Director
Water Resources Department

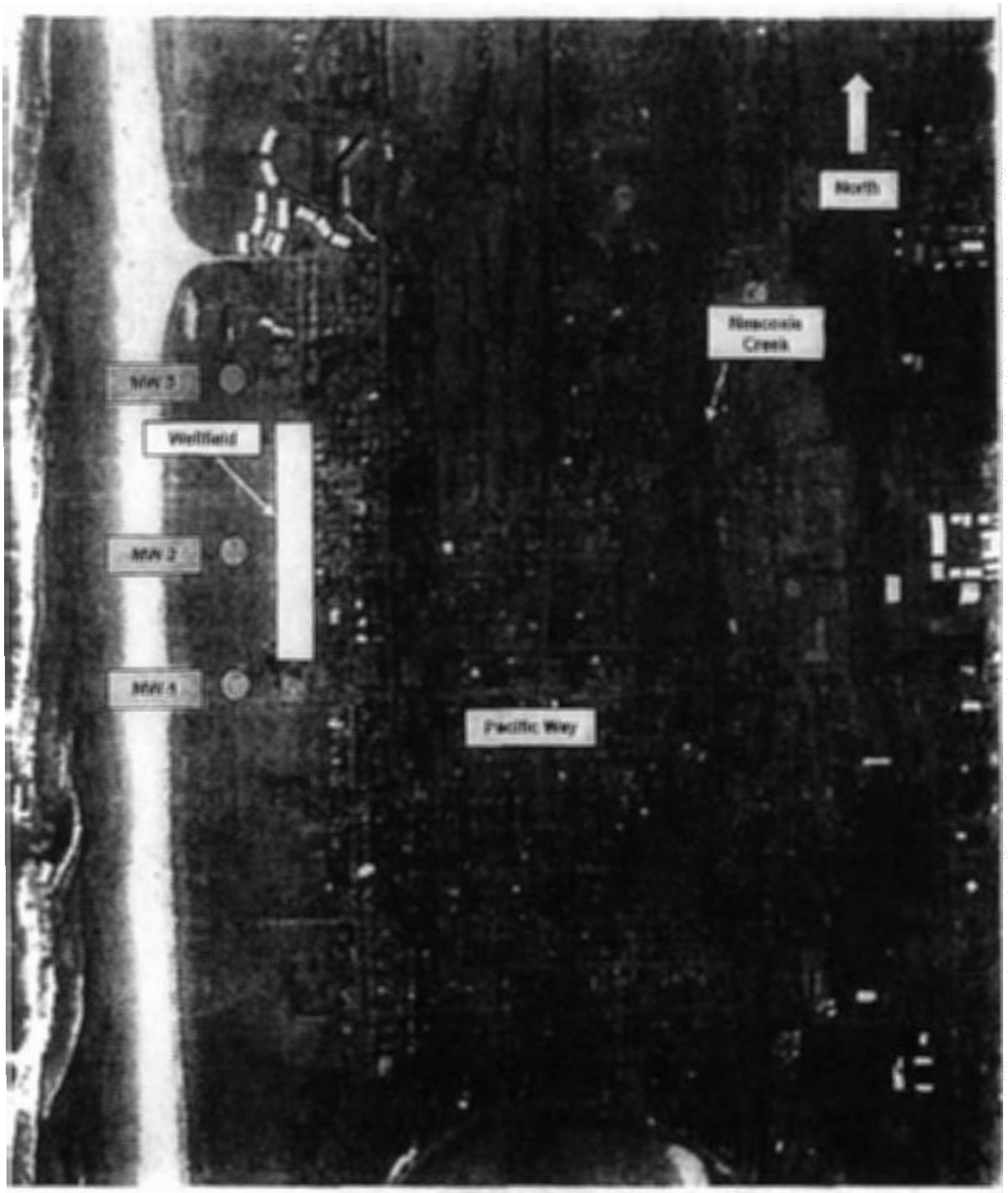


Figure 1 - Monitor for landward migration of fresh and saline interface (MW-1, MW-2, MW-3)

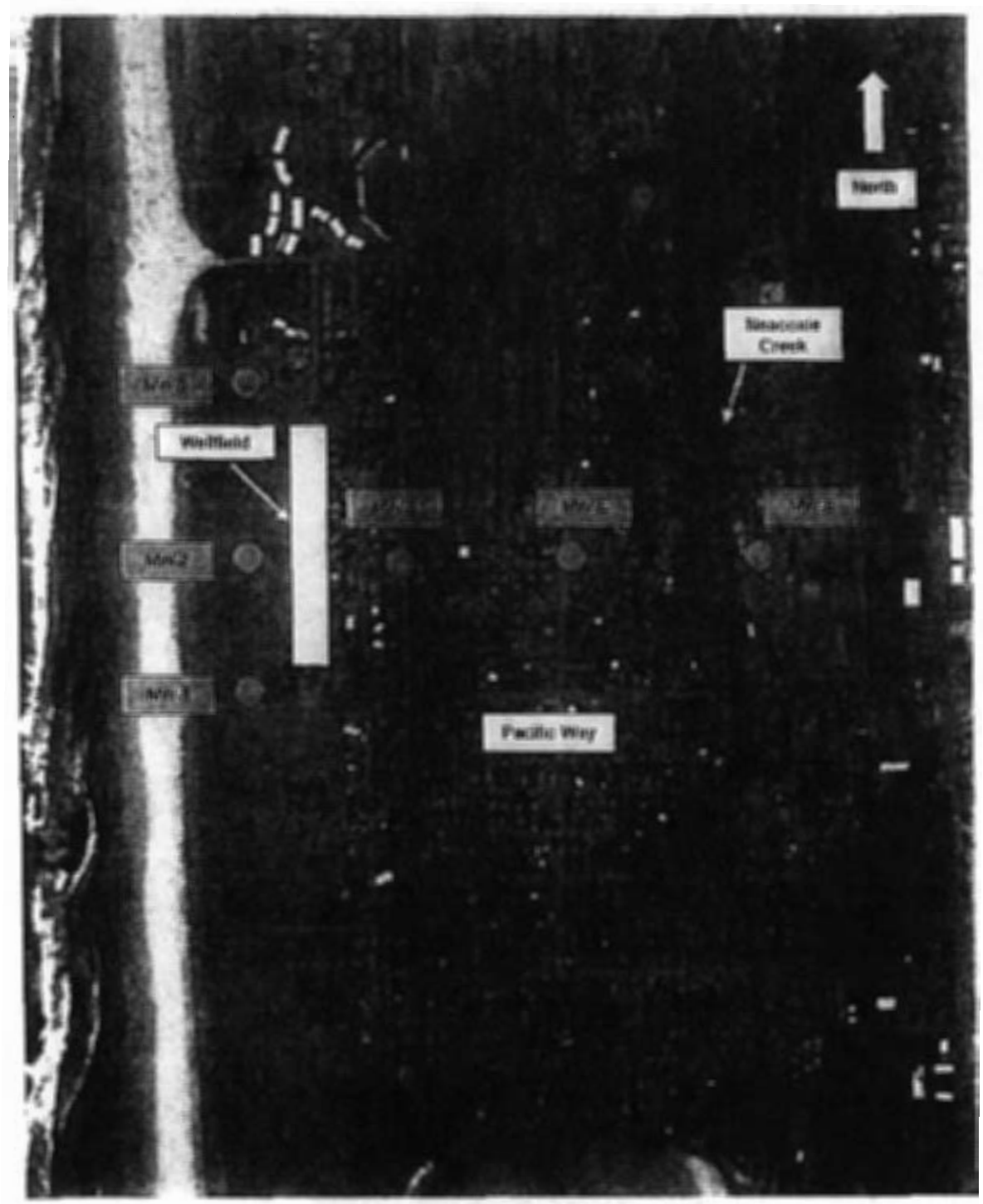


Figure 2 - Monitor for impact from wellfield pumping on shallow ground water elevations (MW-4, MW-5, MW-6)

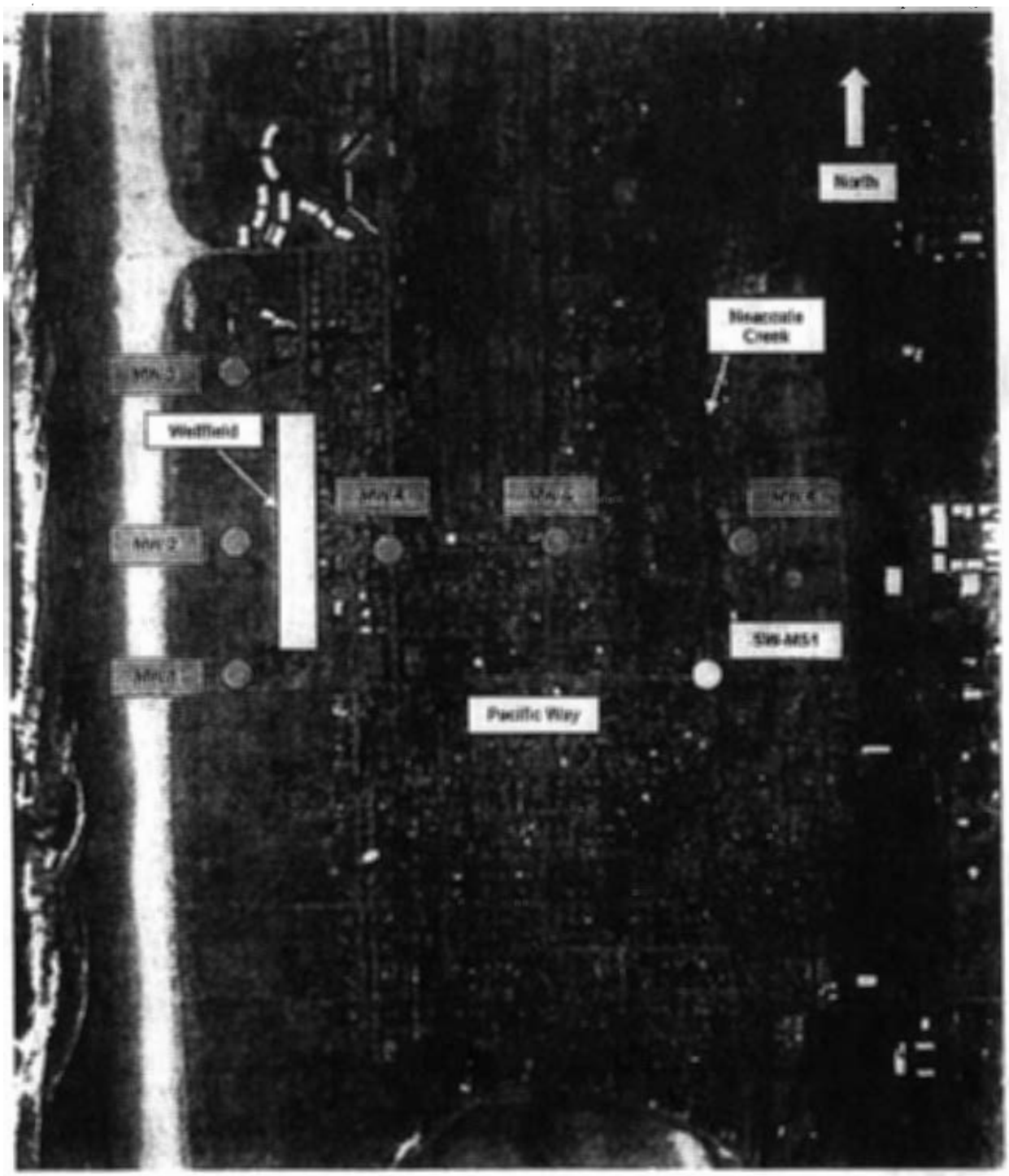
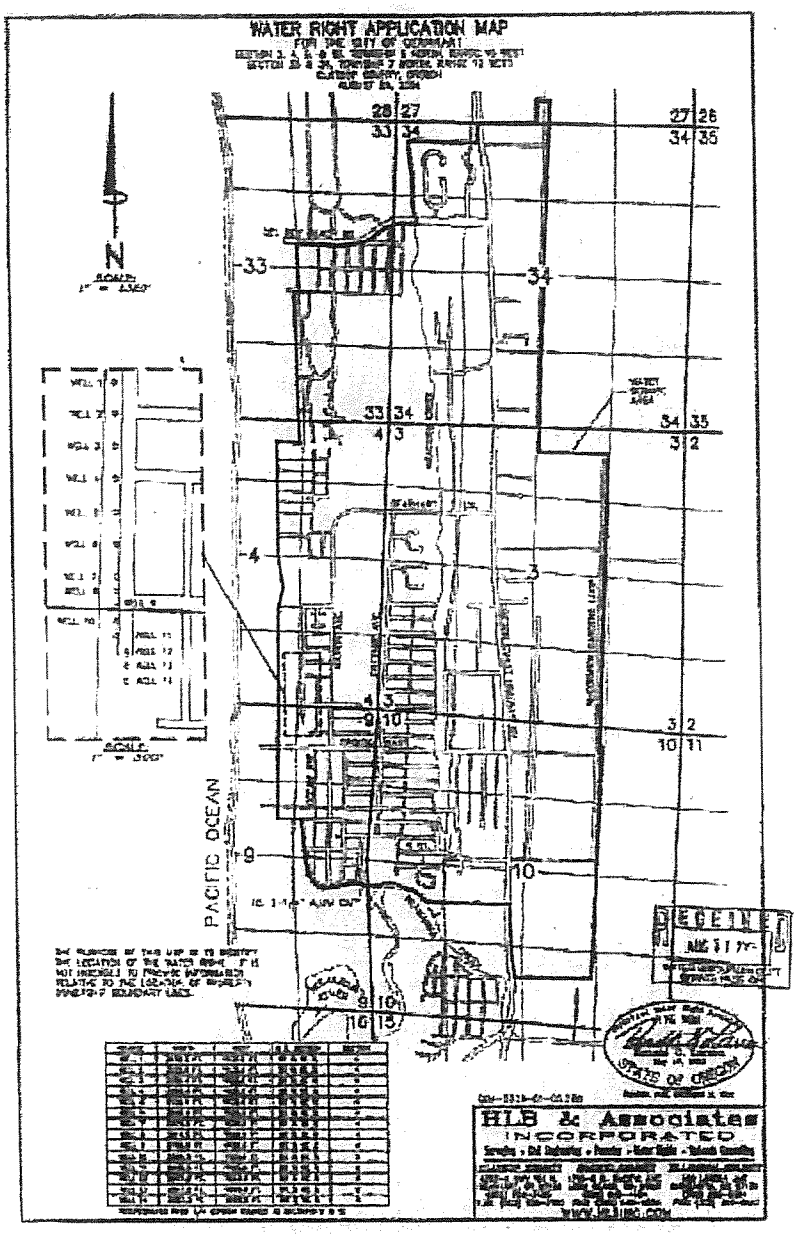


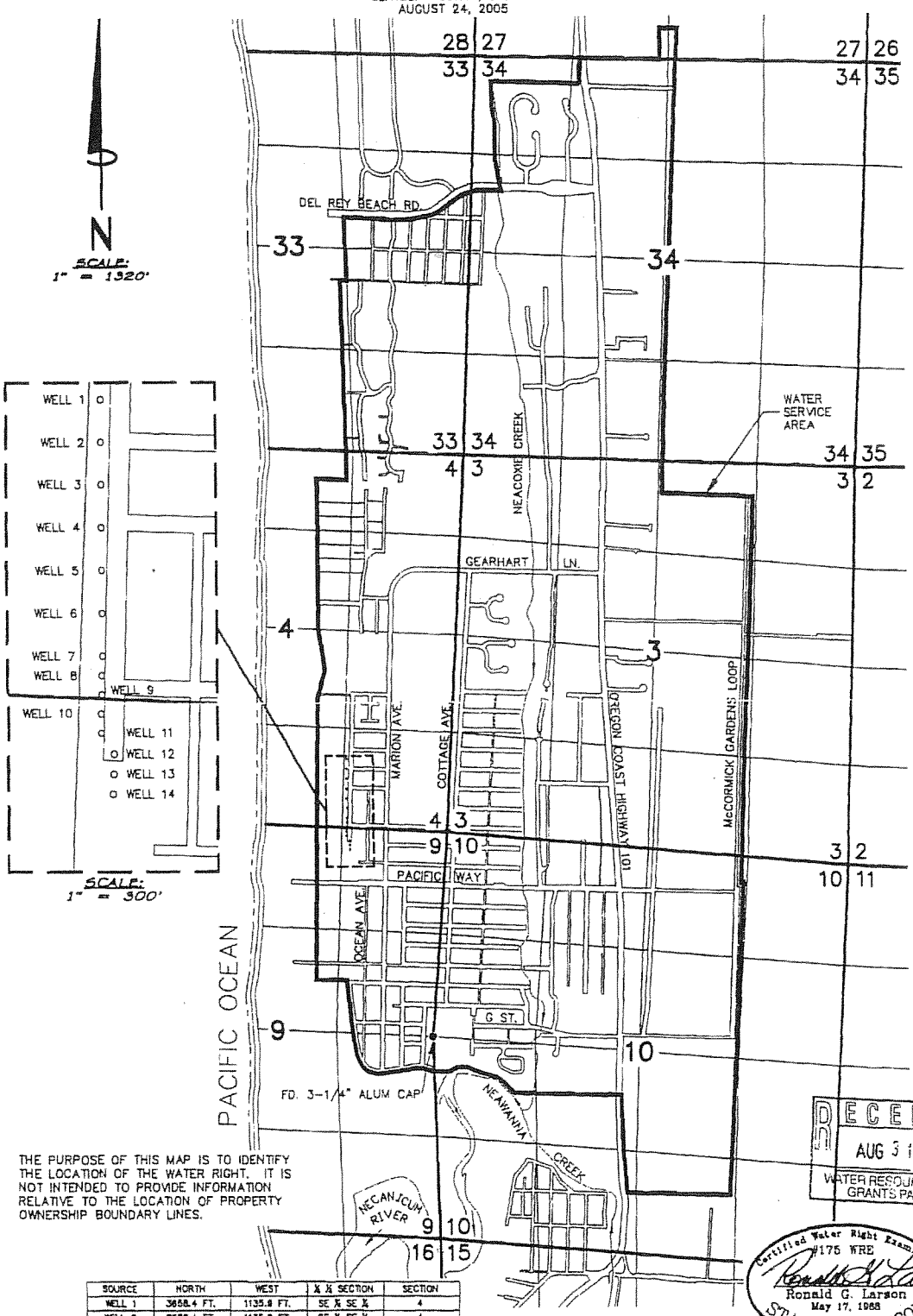
Figure 3 - Monitor potential Impacts on Neacoxie Creek (SW-MS1)


WATER RIGHT APPLICATION MAP
FOR THE CITY OF CORVALLIS
CENTER COUNTY, OREGON
PACIFIC OCEAN
N
RECEIVED
HLB & Associates
INCORPORATED
STATE OF OREGON

WATER RIGHT APPLICATION MAP

FOR THE CITY OF GEARHART

SECTION 3, 4, 9, & 10, TOWNSHIP 6 NORTH, RANGE 10 WEST
SECTION 33 & 34, TOWNSHIP 7 NORTH, RANGE 10 WEST
CLATSOP COUNTY, OREGON
AUGUST 24, 2005



THE PURPOSE OF THIS MAP IS TO IDENTIFY THE LOCATION OF THE WATER RIGHT. IT IS NOT INTENDED TO PROVIDE INFORMATION RELATIVE TO THE LOCATION OF PROPERTY OWNERSHIP BOUNDARY LINES.

SOURCE	NORTH	WEST	¼ ¼ SECTION	SECTION
WELL 1	3658.4 FT.	1135.9 FT.	SE ¼ SE ¼	4
WELL 2	3528.4 FT.	1135.9 FT.	SE ¼ SE ¼	4
WELL 3	3398.4 FT.	1135.9 FT.	SE ¼ SE ¼	4
WELL 4	3268.4 FT.	1135.9 FT.	SE ¼ SE ¼	4
WELL 5	3138.4 FT.	1135.9 FT.	SE ¼ SE ¼	4
WELL 6	3008.4 FT.	1135.9 FT.	SE ¼ SE ¼	4
WELL 7	2878.4 FT.	1135.9 FT.	SE ¼ SE ¼	4
WELL 8	2818.5 FT.	1135.9 FT.	SE ¼ SE ¼	4
WELL 9	2758.5 FT.	1135.9 FT.	SE ¼ SE ¼	4
WELL 10	2898.5 FT.	1135.9 FT.	NE ¼ NE ¼	9
WELL 11	2638.5 FT.	1135.9 FT.	NE ¼ NE ¼	9
WELL 12	2577.3 FT.	1098.0 FT.	NE ¼ NE ¼	9
WELL 13	2517.2 FT.	1098.0 FT.	NE ¼ NE ¼	9
WELL 14	2457.3 FT.	1098.0 FT.	NE ¼ NE ¼	9

*COORDINATES FROM 1/4 CORNER COMMON TO SECTIONS 9 & 10

RECEIVED
AUG 31
WATER RESOURCES DEPT
GRANTS PASS, OR

Certified Water Right Examiner
#175 WRE
Ronald G. Larson
May 17, 1988
STATE OF OREGON

RENEWAL DATE: DECEMBER 31, 2006

G04-0239-01-05.DWG

HLB & Associates
INCORPORATED
Surveying • Civil Engineering • Planning • Water Rights • Wetlands Consulting

CLATSOP COUNTY	PACIFIC COUNTY	TILLAMOOK COUNTY
4253-A HWY 101 N.	1715-B N. PACIFIC AVE.	180 LANEDA AVE
GEARHART, OR 97138	LONG BEACH, WA 98631	MANZANITA, OR 97130
(503) 738-3425	(360) 642-4454	(503) 368-5394
FAX: (503) 738-7455	FAX: (360) 642-4054	FAX: (503) 368-5847

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Appendix D

City of Gearhart & Warrenton Water Agreement

"Making a difference through excellence of service"

CITY OF WARRENTON

January 26, 2012

Chad Sweet
City of Gearhart
P.O. Box 2510
698 Pacific Way
Gearhart, OR 97138

RE: Memorandum of Understanding Providing Short Term Water Service Between the Cities of Warrenton and Gearhart

Dear Chad:

Enclosed please find two originals of the Memorandum of Understanding for the Short Term Water Service Between our cities.

Please have the Memorandum signed and mail back to us; retain the executed copy is for your records.

If you have any questions, please feel free to give me a call.

Sincerely,

Linda Engbretson

Linda Engbretson
City Recorder/Asst. to the City Manager

Encl.

P.O. Box 250 WARRENTON, OR 97146-0250
503/861-2233 FAX: 503/861-2351

MEMORANDUM OF UNDERSTANDING

PROVIDING SHORT TERM WATER SERVICE BETWEEN

THE CITIES OF

WARRENTON AND GEARHART

The City of Warrenton has provided water service to the City of Gearhart since 1948 beginning with a surplus water agreement. In 1984 a twenty year agreement for domestic water was approved by the two cities. That agreement expired in 2004 and Warrenton has been providing water to Gearhart at the same "Gearhart Rate". Gearhart is developing a domestic groundwater system which will eliminate the need for domestic water delivery from Warrenton other than for emergency purposes after August 2012. The city of Gearhart shall notify the City of Warrenton 90 days prior to reduction of domestic water delivery and shall provide an estimate for the required amount for summer delivery for the months of June, July and August 2012.

The City of Warrenton agrees to continue to supply water at the same rate as currently exists for Gearhart. This agreement may be extended with approval by both governing bodies.

Separate and apart from this Memorandum of Understanding, the two cities anticipate negotiating an agreement providing emergency water for both communities on a long term basis.

Karl R. Hellberg, Mayor of Warrenton — Date 1/25/12

Kent Smith, Mayor of Gearhart — Date

AGREEMENT FOR PEAKING AND EMERGENCY WATER SUPPLY

THIS AGREEMENT ("Agreement") for Peaking and Emergency Water Supply is dated effective this _____ day of _____, 2009, between the CITY OF GEARHART ("Gearhart") and the CITY OF WARRENTON ("Warrenton"), sometimes collectively referred to as the "parties" or to any one singly as a "party."

RECITALS

A. Warrenton operates its own, independent water system (the "Warrenton System").

B. Warrenton has been supplying the water requirements of Gearhart from Warrenton water system under Water Supply Agreement dated August 4, 1993 ("Water Supply Agreement") and under earlier water supply agreements dated June 18, 1984 and June 3, 1964.

C. Gearhart has recently obtained a permit from the Oregon Water Resources Department for the development of a well field to supply its citizens with water when the well field becomes fully operational (the "Gearhart System").

D. Gearhart envisions that once it is providing a reliable supply of water to its citizens from Gearhart System, Gearhart's dependency on Warrenton for its water needs will be substantially reduced, and that the need to continue purchasing water under the Water Supply Agreement will cease.

E. After Gearhart System becomes fully operational, however, there is the possibility that Gearhart may need access to additional sources of water in the peak demand months from July through the end of October, or in the event limitations on its groundwater supply, for whatever reasons, require supplemental source augmentation.

F. Warrenton has agreed to provide a peaking surplus water supply to Gearhart, subject to the terms and conditions of this Agreement, to help Gearhart meet the potential water supply needs of its customers during periods of peak water usage, and for emergencies.

G. Warrenton and Gearhart intend that, though this Agreement will be in place, the Water Supply Agreement dated August 4, 1993, will continue as the basis for providing water to Gearhart until the time when Gearhart System is fully operational, as set forth below.

H. This Agreement is intended to provide the framework for a long-term supplemental water supply for Gearhart for its peaking and emergency needs, subject to the availability of water from the Warrenton System.

AGREEMENT

In consideration of their mutual covenants, the payment for the water provided for herein, and other good and valuable consideration, the receipt of which is hereby acknowledged, Warrenton and Gearhart agree to the following:

1. **Definitions.** The following definitions will apply to this Agreement:

1.1 *Available Water*. The quantity of water from the Warrenton System, determined by Warrenton, which at any given time is in excess of the amount of water then needed by the citizens of Warrenton.

1.2 *Connections*. The points, shown in Exhibit A attached hereto and made a part hereof, where Gearhart's pipes connect with the Warrenton System.

1.3 *Effective Date*. The date on which the last signatory of this Agreement has executed and delivered this Agreement.

1.4 *Effective Date for Water Delivery*. The date, commencing on the Gearhart System Start Date, on which this Agreement becomes effective for the delivery of water, under Sections 2 through 11 hereunder.

1.5 *Emergency Need*. A condition, determined by Gearhart, when the public welfare of the citizens of Gearhart requires access to Warrenton Supplemental Source due to a Gearhart System Limitation occurring outside the Peaking Period.

1.6 *Force Majeure*. Any cause beyond a party's control and without its fault or negligence. Such causes may include, but are not necessarily limited to, acts of God or the public enemy, acts of the federal, state, or local governments (other than the party in question), fires, floods, epidemics, volcanic eruptions, quarantine restriction, strikes, freight embargoes, and unusually severe weather or emergency that causes interruption of supply. An event of Force Majeure shall be limited to the time during which such event occurs.

1.7 *Gearhart Request for Service*. A written notice from Gearhart to Warrenton, pursuant to a reasonable protocol to be established between them, that states Gearhart's need for Available Water during the Peaking Period or during a time of Emergency Need, and estimating the approximate quantity and duration of need for Available Water.

1.8 *Gearhart System*. The groundwater supply being developed by Gearhart pursuant to Oregon Water Resources Department Permit G-16390 issued to Gearhart, and its related infrastructure.

1.9 *Gearhart System Start Date*. The date, determined by Gearhart, on which Gearhart notifies Warrenton in writing that the Gearhart System is fully operational and capable of supplying all or substantially all of the water needs of the citizens of Gearhart.

1.10 *Gearhart System Limitation*. A limitation due to any cause on the ability of the Gearhart System to supply all water required at any given time by the citizens of Gearhart.

1.11 *Master Meters*. Water meters at each of the Connections previously installed by Gearhart.

1.12 *Peaking Period*. July 1st through October 31st of each year, during the term of this Agreement.

1.13 *Warrenton Supplemental Source*. Water from Warrenton System.

1.14 *Warrenton System*. Warrenton's existing water supply system and related infrastructure.

1.15 *Warrenton System Limitation*. A limitation due to any cause on the ability of the Warrenton System to supply all water required at any given time by the citizens of Warrenton.

1.16 *Water Supply Agreement*. That certain Water Supply Agreement dated August 4, 1993 between Gearhart and Warrenton.

2. **Warrenton's Obligation to Supply Water**. Pursuant to a Gearhart Request for Service, and except during a Warrenton System Limitation, Warrenton shall furnish an uninterrupted supply of Available Water to Gearhart at the rate provided below during the Peaking Period and at other times during an Emergency Need.

3. **Gearhart's Right to Withdraw Water from Warrenton System.** Gearhart may withdraw Available Water supplied by Warrenton under this Agreement at the Connections, which shall remain in place.

4. **Rates.** Available Water supplied to Gearhart under this Agreement shall be sold at the in-City rates as set forth in Warrenton's Resolution No. ____ and Gearhart's Resolution No. _____, and as such rates may be revised by mutual agreement of Warrenton and Gearhart from time to time.

5. **Measurement of Water Use.** Each Connection is presently equipped with a Master Meter as shown in Exhibit "A". The Master Meters will be used to measure the volume of Available Water sold by Warrenton to Gearhart. Warrenton shall read the Master Meters each month for the purpose of computing its bill to Gearhart. Warrenton shall notify Gearhart not less than twenty four hours before a meter reading. Representatives of the Gearhart may be present at the meter readings.

5.1 **Failure of Master Meter(s).** If a Master Meter at any time fails accurately to measure the water passage through though it, the charge for water used during the time such Master Meter is out of order shall be based upon the average consumption as shown by the Master Meter when in proper operating condition during a comparable period of service.

5.2 **Meter Records**. Warrenton shall freely share all of Warrenton's Master Meter measurement and maintenance records with Gearhart upon Gearhart's request for same.

6. **Billing for Water.** Warrenton shall bill Gearhart on a monthly basis based exclusively on the meter readings of the quantity of water used by Gearhart during the previous month times the applicable Warrenton rate per unity quantity for such water set forth in this Agreement.

7. **Payment for Water**. Gearhart shall pay Warrenton for all water passing through Warrenton's transmission lines and measured at the Master Meters. Gearhart shall pay for the water received within thirty (30) days of receiving Warrenton's bill.

8. **Maintenance of Master Meters**. Warrenton shall keep the Master Meters in continued good repair and shall test and calibrate the Master Meters annually. The cost of maintaining, testing and calibrating the mater meters is the responsibility of Warrenton.

9. **Other Maintenance**. The parties shall be responsible for maintaining and repairing their own respective water supply and distribution systems and shall not have any responsibility or liability to the other for same.

10. **Other Costs**. All costs incurred with respect to performance under this Agreement shall be paid by the party that incurred the cost, unless otherwise agreed by both parties in writing.

11. **Limitation of Liability.** Neither party shall be deemed responsible or liable to the other on account of either a Gearhart System Limitation or a Warrenton System Limitation. Warrenton shall not be liable for Warrenton's failure to supply Available Water to Gearhart under this Agreement due to an event of Force Majeure.

12. **Laws**. Both parties shall comply with all ordinances, rules and regulations of the other governing the use of water.

13. **Assignment**. Neither party shall assign this Agreement, in whole or in part, or any other right or obligation under this Agreement, without the prior written approval of the other.

14. **Breach of Agreement**.

14.1 Definition of Breach: A party shall breach this Agreement if it fails to perform any substantial obligation under this Agreement. A party shall not breach this agreement, however, if its failure to

perform a substantial obligation under the Agreement is caused by an event of Force Majeure.

14.2 Remedies for Breach.

14.2.1 In the event of a breach of this Agreement by one party, the other party shall be entitled to any remedies that are available to it at law or in equity, provided it first gives notice and opportunity to cure to the other party as specified below.

14.2.2 Without limitation to the foregoing, the non-breaching party shall be entitled to termination of this Agreement provided the procedures set forth in Section 15.2 are followed.

14.3 Notification. The party alleging a breach of this Agreement shall give the other party written notice of the breach, specifying the nature of the alleged breach.

14.4 Opportunity to Cure. The breach shall give rise to the remedies for breach in this Agreement unless the following occurs:

14.4.1 The party receiving the notice has entirely cured the breach within 10 days of receipt of the notice, and so notifies the other part in writing within the 10 day period; or,

14.4.2 If cure within the 10 day period is not reasonably possible, the party against whom the breach is alleged has taken the following actions within the 10 day period:

14.4.2.1 Initiated such cure;

14.4.2.2 Notified the other party in writing of its intent to pursue such cure in good faith and with due diligence until the breach is entirely cured;

14.4.2.3 Has in such notice specified a reasonable completion date for completion such cure; and,

14.4.2.4 Has completed cure within the completion date specified in the above notice.

14.5 Non-Waiver: Neither party shall be deemed to have waived any breach of this Agreement by the other except by an express waiver in writing. Any express written waiver as to one breach shall not be deemed in a waiver of any other breach not expressly identified, even though the other breach may be of the same nature that waived

15. **Early Termination.**

15.1 Mutual Agreement. The parties may terminate this Agreement at any time by mutual written agreement.

15.2 For Breach of Agreement. Either party may terminate this Agreement in the event of a breach of the Agreement by the other which remains uncured after following the procedures set forth in Section 14 of this Agreement.

16. **Arbitration.**

16.1 Arbitration of Disputes. Any dispute over an interpretation of this Agreement and which is not settled by mutual agreement of the parties within 60 days of notification in writing by either party shall be submitted to an arbitrator mutually agreed upon by the parties. If the parties cannot agree on an arbitrator within 10 days after the expiration of the 60-day period, then the arbitrator shall be appointed as soon as practicable by _____ of the _____ County Circuit Court. The arbitrator shall be selected within 30 days from the expiration of the 60-day period following notification of the dispute. The arbitration shall be as speedy as is reasonably possible. The arbitrator shall render a decision within 45 days of the arbitrator's first meeting with the parties. Insofar as they legally may be bound, the parties agree to be bound by the decision of the arbitrator. The parties shall each pay one half of the arbitrator's compensation and shall bear their own costs and attorney's fees.

16.2 Continued Performance Pending Dispute Resolution. Notwithstanding the existence of any dispute over the interpretation of this Agreement, whether or not the same is in arbitration, both parties shall continue to perform their obligations under this Agreement pending resolution of the dispute.

16.3 Exclusion for Arbitration. Notwithstanding the foregoing provisions of this Section 16, a breach of this Agreement under Section 14 shall not be deemed a "dispute" subject to arbitration. No party currently in breach of this Agreement may demand arbitration.

17. **Notices**. Any notice under this Agreement must be in writing, and shall be sufficient as notice if (a) delivered personally to the following addressee; or (b) if deposited in the United States Mail, postage prepaid certified mail, return receipt requested, addressed as provided below; (b) sent via fax to the number provided below; or (c) sent vial email to the email address provided below; or in all such cases to such other address/fax number/email address as the receiving party hereafter shall specify by written notice. Notification is deemed effective upon date of delivery if by delivery, on the date of transmission if by email or fax, and upon receipt if by U.S. Mail. Addressees are stated below, and are valid unless changed by written notice to the other party:

If to Warrenton:

[contact person & address, fax and email]

If to Gearhart

[contact person & address, fax and email]

18. **Representations and Warranties**. Neither party makes any representations or warranties under or related to this Agreement.

19. **Effective Date and Term**. The Effective Date of this Agreement shall be the date of execution and delivery of the Agreement by the last of the parties to sign this Agreement, as indicated in the signature block at the end of the Agreement. The Effective Date shall be filled in on the first page of this Agreement. The Effective Date for Water Delivery shall be as defined in Section 1 of this Agreement.

20. **Term**. The term of this Agreement shall be ten (10) years from the Effective Date for Water Delivery unless terminated or amended in accordance with the provisions of this Agreement.

21. **Ratification of Water Supply Agreement**. Until the Effective Date for Water Delivery, the parties shall continue performance under the Water Supply Agreement, which agreement is hereby ratified and confirmed. The Water Supply Agreement shall be deemed terminated after the Effective Date for Water Delivery.

22. **Amendments**. The parties may amend or supplement this Agreement only by written agreement between them.

23. **Entire Agreement**. This Agreement is the entire agreement of the parties on the subject matter hereof.

24. **No Third-Party Beneficiaries**. No third-party beneficiaries are intended by this agreement. No persons other than the parties hereto may enforce this Agreement.

25. **Governing Law.** This Agreement shall be governed and construed under the laws of the State of Oregon.

IN WITNESS WHEREOF, the parties have executed this Agreement on the respective dates provided below after their signature.

CITY OF GEARHART

By: _____
Print name: _____
Its: _____
Date: _____, 200__

CITY OF WARRENTON

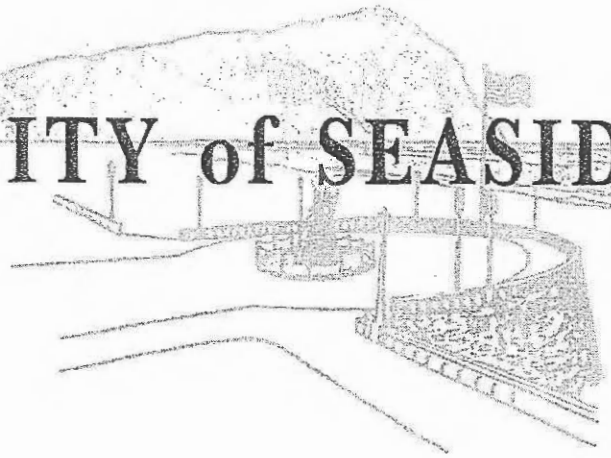
By: _____
Print name: _____
Its: _____
Date: _____, 200___

Appendix E

City of Gearhart & Seaside Water Agreement

CITY of SEASIDE

OREGON'S
FAMOUS
ALL-YEAR
RESORT



989 BROADWAY
SEASIDE, OREGON 97138
(503) 738-5511

January 25, 2012

Chad Sweet, City Administrator
CITY OF GEARHART
PO Box 2510
Gearhart, OR 97138

Dear Chad,

Enclosed you will find the two amended copies of the agreement between the City of Seaside and City of Gearhart for peaking and emergency water supply. If approved by you please sign the agreements and return one copy to the City of Seaside, 989 Broadway, Seaside, OR 97138, attention Kim Jordan. Please include with the agreement Exhibit A (page 1 section 1.2) for our records.

If you have any questions please feel free to contact me at 738-5511.

Sincerely,

Kim Jordan

Kim Jordan
Administrative Assistant

AGREEMENT FOR PEAKING AND EMERGENCY WATER SUPPLY

THIS AGREEMENT ("Agreement") for Peaking and Emergency Water Supply is dated effective this 10 day of January, 2012, between the CITY OF GEARHART ("Gearhart") and the CITY OF SEASIDE ("Seaside"), sometimes collectively referred to as the "parties" or to any one singly as a "party."

RECITALS

A. Seaside is a municipality adjacent to Gearhart and operates its own, independent water system (the "Seaside System").

B. Gearhart has recently obtained a permit from the Oregon Water Resources Department for the development of a well field to supply its citizens with water when the well field becomes fully operational (the "Gearhart System").

C. After Gearhart System becomes fully operational, there is the possibility that Gearhart may need access to additional sources of water in the peak demand months from July through the end of October, or in the event limitations on its groundwater supply, for whatever reasons, require supplemental source augmentation.

D. Seaside has agreed to provide a peaking surplus water supply to Gearhart, subject to the terms and conditions of this Agreement, to help Gearhart meet the potential water supply needs of its customers during periods of peak water usage, and for emergencies.

E. This Agreement is intended to provide the framework for a long-term supplemental water supply for Gearhart for its peaking and emergency needs, subject to the availability of water from the Seaside system.

AGREEMENT

In consideration of their mutual covenants, the payment for the water provided for herein, and other good and valuable consideration, the receipt of which is hereby acknowledged, Seaside and Gearhart agree to the following:

1. **Definitions**. The following definitions will apply to this Agreement:

   1.1 Available Water. The quantity of water from the Seaside System, determined by Seaside, which at any given time is in excess of the amount of water then needed by the citizens of Seaside.

   1.2 Connection. The point, shown in Exhibit A attached hereto and made a part hereof, where Gearhart's pipe connects or may connect with the Seaside System.

1.3 Effective Date. The date on which the last signatory of this Agreement has executed and delivered this Agreement.

1.4 Effective Date for Water Delivery. The date, commencing on the Gearhart System Start Date, on which this Agreement becomes effective for the delivery of water, under Sections 2 through 11hereunder.

1.5 Emergency Need. A condition, determined by Gearhart, when the public welfare of the citizens of Gearhart requires access to Seaside Supplemental Source due to a Gearhart System Limitation occurring outside the Peaking Period.

1.6 Force Majeure. Any cause beyond a party's control and without its fault or negligence. Such causes may include, but are not necessarily limited to, acts of God or the public enemy, acts of the federal, state, or local governments (other than the party in question), fires, floods, epidemics, volcanic eruptions, quarantine restriction, strikes, freight embargoes, and unusually severe weather or emergency that causes interruption of supply. An event of Force Majeure shall be limited to the time during which such event occurs.

1.7 Gearhart Request for service. A written notice from Gearhart to Seaside, pursuant to a reasonable protocol to be established between them, that states Gearhart's need for Available Water during the Peaking Period or during a time of Emergency Need, and estimating the approximate quantity and duration of need for Available Water.

1.8 Gearhart System. The groundwater supply being developed by Gearhart pursuant to Oregon Water Resources Department Permit G-16390 issued to Gearhart, and its related infrastructure.

1.9 Gearhart System Start Date. The date, determined by Gearhart, on which Gearhart notifies Seaside in writing that the Gearhart System is fully operational and capable of supplying all or substantially all of the water needs of the citizens

1.10 Gearhart System Limitation. A limitation due to any cause on the ability of the Gearhart System to supply all water required at any given time by the citizens of Gearhart.

1.11 Master Meter. A water meter at or near the connection to be installed by Gearhart.

1.12 Peaking Period. July 1st through October 31st of each year, during the term of this Agreement.

1.13 Seaside Supplemental Source. Water from Seaside System.

1.14 Seaside System. Seaside's existing water supply system and related infrastructure.

1.15 Seaside System Limitation. A limitation due to any cause on the ability of the Seaside System to supply all water required at any given time by the citizens of Seaside.

2. **Seaside's Obligation to Supply Water**. Pursuant to a Gearhart Request for Services, and except during a Seaside System Limitation, Seaside shall furnish an uninterrupted supply of Available Water to Gearhart at the rate provided below during the Peaking Period and at other times during an Emergency Need.

3. **Gearhart's Right to Withdraw Water from Seaside System**. Gearhart may withdraw Available Water supplied by Seaside under this Agreement at the Connection, which shall remain in place.

4. **Rates**. Available Water supplied to Gearhart under this Agreement shall be sold at the in-City rates as set forth in Seaside's Resolution No. 3737 and Gearhart's Resolution No. _____, and as such rates may be revised by revised by mutual agreement of Seaside and Gearhart from time to time.

5. **Measurement of Water Use**. The Connection will be equipped with a Master Meter to be installed by Gearhart at its cost prior to the Effective Date for Water Delivery. The Master Meter will be used to measure the volume of Available Water sold by Seaside to Gearhart. Seaside shall read the Master Meter each month for the purpose of computing its bill to Gearhart. Seaside shall notify Gearhart not less than twenty four hours before a meter reading. Representatives of Gearhart may be present at the meter readings.

5.1 **Failure of the Master Meter**. If the Master Meter at any time fails to accurately measure the water passage through though it, the charge for water used during the time the Master Meter is out of order shall be based upon the average consumption as shown by the Master Meter when in proper operating condition during a comparable period of service.

5.2 **Meter Records**. Seaside shall freely share all of Seaside's Master Meter measurement records with Gearhart upon Gearhart's request for same.

6. **Billing for Water**. Seaside shall bill Gearhart on a monthly basis based exclusively on the meter readings of the quantity of water used by Gearhart during the previous month times the applicable Seaside rate per unit quantity for such water set forth in this Agreement.

7. **Payment for Water**. Gearhart shall pay Seaside for all water passing through Seaside's transmission lines and measured at the Master Meter. Gearhart shall pay for the water received within thirty (30) days of receiving Seaside's bill.

8. **Maintenance of Master Meters**. Gearhart shall keep the Master Meter in continued good repair and shall test and calibrate the Master Meter annually. The cost of maintaining, testing, and calibrating the Master Meter is the responsibility of Gearhart.

9. **Other Maintenance**. The parties shall be responsible for maintaining and repairing their own respective water supply and distribution systems and shall not have any responsibility or liability to the other for same.

10. **Other Costs**. All costs incurred with respect to performance under this Agreement shall be paid by the party that incurred the cost, unless otherwise agreed by both parties in writing.

11. **Limitation of Liability**. Neither party shall be deemed responsible or liable to the other on account of either a Gearhart System Limitation or a Seaside System Limitation. Seaside shall not be liable for Seaside's failure to supply Available Water to Gearhart under this Agreement due to an event of Force Majeure.

12. **Laws**. Both parties shall comply with all ordinances, rules, and regulations of the other governing use of water.

13. **Assignment**. Neither party shall assign this Agreement, in whole or in part, or any other right or obligation under this Agreement, without the prior written approval of the other.

14. **Breach of Agreement**.

    14.1 Definition of Breach: A party shall breach this Agreement if it fails to perform any substantial obligation under this Agreement. A party shall not breach this Agreement, however, if its failure to perform a substantial obligation under the Agreement is caused by an event of Force Majeure.

    14.2 Remedies for Breach.

        14.2.1 In the event of a breach of this Agreement by one party, the other party shall be entitled to any remedies that are available to it at law or in equity, provided it first gives notice and opportunity to cure to the other party as specified below.

14.2.2 Without limitation to the foregoing, the non-breaching party shall be entitled to termination of this Agreement provided the procedures set forth in Section 15.2 are followed.

14.3 Notification. The party alleging a breach of this Agreement shall give the other party written notice of the breach, specifying the nature of the alleged breach.

14.4 Opportunity to Cure. The breach shall give rise to the remedies for breach in this Agreement unless the following occurs:

14.4.1 The party receiving the notice has entirely cured the breach within 10 days of receipt of the notice, and so notifies the other party in writing within the 10 day period; or,

14.4.2 If cure within the l 0 day period is not reasonably possible, the party against whom the breach is alleged has taken the following actions within the l0 day period:

14.4.2.1 Initiated such cure;

14.4.2.2 Notified the other party in writing of its intent to pursue such cure in good faith and with due diligence until the breach is entirely cured;

14.4.2.3 Has in such notice specified a reasonable completion date for completion such cure; and,

14'4'2.4 Has completed cure within the completion date specified in the above notice.

14.5 Non-Waiver: Neither party shall be deemed to have waived any breach of this Agreement by the other except by an express waiver in writing. Any express written waiver as to one breach shall not be deemed in a waiver of any other breach not expressly identified, even though the other breach may be of the same nature that waived

15. **Early Termination.**

15.1 Mutual Agreement. The parties may terminate this Agreement at any time by mutual written agreement.

15.2 For Breach of Agreement. Either party may terminate this Agreement in the event of a breach of the Agreement by the other which remains uncured after following the procedures set forth in Section l4 of this Agreement.

16. **Arbitration.**

16.1 Arbitration of Disputes. Any dispute over an interpretation of this Agreement and which is not settled by mutual agreement of the parties within 60 days of notification in writing by either party shall be submitted to an arbitrator mutually agreed upon by the parties. If the parties cannot agree on an arbitrator within 10 days after the expiration of the 60-day period, then the arbitrator shall be appointed as soon as practicable by the presiding judge of the Clatsop County Circuit court. The arbitrator shall be selected within 30 days from the expiration of the 60-day period following notification of the dispute. The arbitration shall be as speedy as is reasonably possible. The arbitrator shall render a decision within 45 days of the arbitrator's first meeting with the parties. Insofar as they legally may be bound, the parties agree to be bound by the decision of the arbitrator. The parties shall each pay one half of the arbitrator's compensation and shall bear their own costs and attorney's fees.

16.2 Continued Performance Pending Dispute Resolution. Notwithstanding the existence of any dispute over the interpretation of this Agreement, whether or not the same is in arbitration, both parties shall continue to perform their obligations under this Agreement pending resolution of the dispute.

16.3 Exclusion for Arbitration. Notwithstanding the foregoing provisions of this Section 16, a breach of this Agreement under Section l4 shall not be deemed a "dispute", subject to arbitration, No party currently in breach of this Agreement may demand arbitration.

17. **Notices**. Any notice under this Agreement must be in writing, and shall be sufficient as notice if (a) delivered personally to the following addressee; or (b) if deposited in the United States Mail, postage prepaid certified mail, return receipt requested, addressed as provided below; (c) sent via fax to the number provided below; or (d) sent via email to the email to the email address provided below;

or in all such cases to such other address/fax/number/email address as the receiving party hereafter shall specify by written notice. Notification is deemed effective upon date of delivery if by delivery, on the date of transmission if by email or fax, and upon receipt if by U.S. Mail. Addressees are stated below, and are valid unless changed by written notice to the other party:

If to Seaside:

Mark J. Winstanley
989 Broadway, Seaside, Oregon 97138
Phone - (503) 738-5511
Fax – (503) 738-5514
mwinstanley@cityofseaside.us

If to Gearhart:

Chad Sweet
698 Pacific Way (PO Box 2510) Gearhart, Oregon, 97138
Phone – (503) 738-5501
Fax – (503) 738-9385
citymgr@ci.gearhart.or.us

18. **Representations and Warranties.** Neither party makes any representations or warranties under or related to this Agreement.

19. **Effective Date and Term.** The Effective Date of this Agreement shall be the date of execution and delivery of the Agreement by the last of the parties to sign this Agreement, as indicated in the signature block at the end of the Agreement. The Effective Date shall be filled in on the first page of this Agreement. The Effective Date for Water Delivery shall be as defined in Section 1 of this Agreement.

20. **Term.** The term of this Agreement shall be ten (10) years from the Effective Date for Water Delivery unless terminated or amended in accordance with the provisions of this Agreement.

21. **Amendments.** The parties may amend or supplement this Agreement only by written agreement between them.

22. **Entire Agreement.** This Agreement is the entire agreement of the parties on the subject matter hereof.

23. **No Third-Party Beneficiaries.** No third-party beneficiaries are intended by this Agreement, No persons other than the parties hereto may enforce this Agreement.

24. **Governing Law**. This Agreement shall be governed and construed under the laws of the State of Oregon.

IN WITNESS WHEREOF, the parties have executed this Agreement on the respective dates provided below after signature.

CITY OF GEARHART
By: Kent A Smith

Print name: Kent A. Smith

Date: 2-21-12

CITY OF SEASIDE
By: Don Larson

Print name: Don Larson

Date: January 10, 2012

RESOLUTION #3737

A RESOLUTION OF THE CITY OF SEASIDE, OREGON, INCREASING WATER ACCESS/DEMAND CHARGES.

THE SEASIDE CITY COUNCIL RESOLVES AS FOLLOWS:

That in accordance with Sections 52.61 and 52.62 of the Seaside Code of Ordinances, the following fees for water access/demand and consumption charges are adopted:

SECTION 1. ACCESS/DEMAND CHARGE. The Access/demand charges are hereby established, determined and declared to be as follows:

The access/demand charge is based on meter size. All water customers connected to the city water system shall pay an access/demand monthly charge as follows:

5/8"-3/4" meter	~~$18.00~~	$19.33
1" meter	~~$23.99~~	$25.76
1 ½" meter	~~$31.44~~	$33.76
2" meter	~~$47.63~~	$51.15
3" meter	~~$79.41~~	$85.28
4" meter	~~$134.11~~	$144.02
6" meter	~~$254.09~~	$272.86

SECTION 2. CONSUMPTION CHARGE. The Consumption Charge is established, determined and declared to be as follows:

In addition to the above base charge, each customer shall pay ~~$2.34~~ $2.51 for each 100 cubic feet (750 gallons) of water used above 400 cubic feet per bi-monthly billing period.

SECTION 3. EFFECTIVE DATE. The rate increases will become effective June 15, 2011, and will first be reflected in the August 2011 billing.

PASSED by the City Council of the City of Seaside this 13 day of June, 2011.

SUBMITTED to the Mayor and **APPROVED** by the Mayor on this 14 day of June, 2011.

DON LARSON, MAYOR

ATTEST:

Mark J. Winstanley, City Manager

SEASIDE, OREGON
UTILITY RATE LIST
Effective 6/15/2011

WATER RATES

Rate Code	Description	Minimum Billing	Rate After Base Cons. 4 CF
10	In City Access Demand	38.66	2.51
11	In City H20 5/8"	38.66	2.51
12	In City H20 3/4"	38.66	2.51
13	In City H20 1"	51.52	2.51
14	In City H20 1.5"	67.52	2.51
15	In City H20 2"	102.30	2.51
16	In City H20 3"	170.56	2.51
17	In City H20 4"	288.04	2.51
18	In City H20 6"	545.72	2.51
20	Out City H20--1 Fam Dem	77.32	5.02
21	Out City H20 5/8"	77.32	5.02
22	Out City H20 3/4"	77.32	5.02
23	Out City H20 1"	103.04	5.02
24	Out City H20 1.5"	135.04	5.02
25	Out City H20 2"	204.60	5.02
26	Out City H20 3"	341.12	5.02
27	Out City H20 4"	576.08	5.02
28	Out City H20 6"	1091.44	5.02

SEWER RATES

Rate Code	Description	Minimum Billing	Rate After Base Cons. 14 CF
1	Residential Sewer Access	62.46	
2	Sewer Connection Access	31.23	
10	Sewer Charge Commercial	62.46	4.17
20	Flat Sewer Fee--Commercial	31.23	
99	Flat Sewer Charge	62.46	

MEMO

January 9, 2012

From: Neal Wallace
To: The Honorable Mayor and City Council
Re: City of Gearhart Water Use Agreement

The City of Gearhart holds groundwater rights in the Clatsop Plains Basin to supply raw water to their new treatment plant. Initially the maximum well capacity will be limited seasonally to ensure that the well field does not impact the surface water level of Neacoxie Creek. It is anticipated that the well field will not have a negative impact on the Neacoxie and that pumping rates will be increased in future years.

In the meantime, Oregon Water Resources Department is requiring Gearhart to have a backup source of water to provide the expected shortfall between July 1st and October 31st. The projected maximum shortfall per month is:

July	6.7 million gallons
August	9.7 million gallons
September	7.0 million gallons
October	5.8 million gallons

During August, the shortfall based on peak daily demand would be approximately 300,000 gallons per day. The City of Seaside is able to provide this water to the City of Gearhart based on normal water levels in the Necanicum. It is acknowledged that the agreement is based on the City's ability to provide the water. The rate of $2.51 per 100 cubic feet has been agreed to by both cities.

RESOLUTION NO. 909

A RESOLUTION TO PURCHASE WATER

WHEREAS, the City of Gearhart may need access to additional sources of water in the peak demand months from July through the end of Oct., or in the event limitations on its groundwater supply, for whatever reasons require supplemental source augmentation; and

WHEREAS, the City of Gearhart shall purchase water from the City of Seaside at the rate of $2.51 for each 100 cubic feet, set forth in City of Seaside's resolution #3737.

NOW, THEREFORE, BE IT RESOLVED by the Gearhart City Council, hereby adopts this resolution for purchasing water.:

This resolution is effective immediately upon passage.

PASSED: This 15th day of Feb. 2012.

Kent Smith

Mayor Kent Smith

ATTEST:

Chad Sweet, City Administrator

RESOLUTION NO. 909

A RESOLUTION TO PURCHASE WATER

WHEREAS, the City of Gearhart may need access to additional sources of water in the peak demand months from July through the end of Oct., or in the event limitations on its groundwater supply, for whatever reasons require supplemental source augmentation; and

WHEREAS, the City of Gearhart shall purchase water from the City of Seaside at the rate of $2.51 for each 100 cubic feet, set forth in City of Seaside's resolution #3737.

NOW, THEREFORE, BE IT RESOLVED by the Gearhart City Council, hereby adopts this resolution for purchasing water.:

This resolution is effective immediately upon passage.

PASSED: This 1st day of Feb. 2012.

Mayor Kent Smith

ATTEST:

Chad Sweet, City Administrator