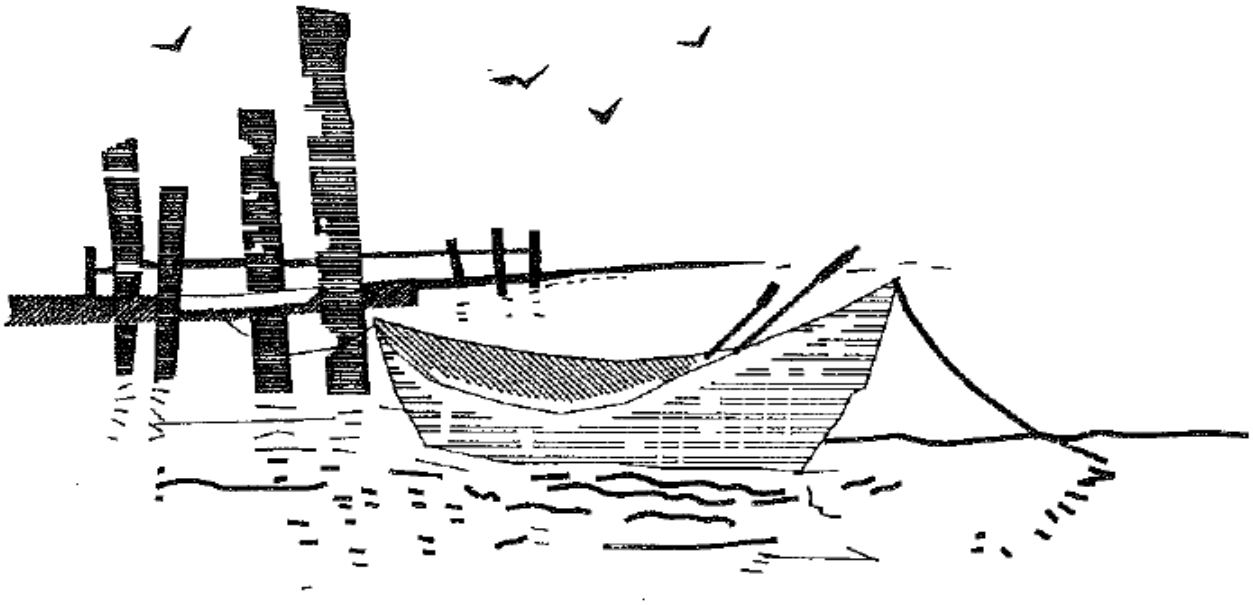
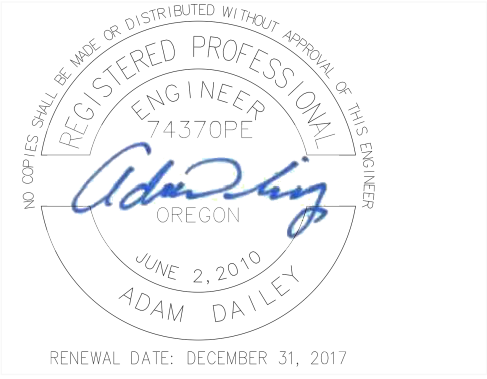
City of Nehalem

Water Management and Conservation Plan

November 2015
(Revised 3-29-2017)





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INDEX

Tables

Appendices

Executive Summary

The City of Nehalem presents its 2015 Water Management and Conservation Plan (WMCP) to the Oregon Water Resources Department (OWRD) and interested parties. The City of Nehalem believes this WMCP outlines a plan to effectively manage its present water rights and provide a means for developing a comprehensive strategy for meeting its municipal water supply needs over the next 20 years. Moreover, this plan attempts to enhance management techniques of the state's water resources, including an increased effort to improve the efficiency of the water system, thereby meeting the intent of the regulations defined under the new Division 86 rules.

E.1 Meeting the WMCP Criteria

Approval of this WMCP is contingent upon City of Nehalem meeting the criteria outlined under OAR 690-086-0130. The City of Nehalem has prepared a concise statement addressing each of the review criteria cited in that regulation.

Inclusion of specific elements under 690-086-125: The current plans includes specific sections that address: a description of the City of Nehalem's water supply system and history, an updated conservation plan, a curtailment plan, and a 20-year supply strategy, as well as a list of affected local governments to whom the plan has been made available and a proposed schedule for an update in 2025.

Projections of future water need: The City of Nehalem is projecting to need only a limited increase in water over the next 20 years. Presently, the City of Nehalem uses about 106,430 gpd on an average annual day, with a peak demand of about 199,000 gpd. By 2034, this demand increases 24,734 gpd to 131,164 gpd for an average annual day. The 2034 peak day is also expected to increase modestly to 245,246 gpd (depending on the results of the City of Nehalem's planned conservation). These projections are consistent with the City of Nehalem's planning data for increases in population and employment and have been reviewed for consistency with comprehensive plans developed by the Tillamook County Planning Department and a Draft Housing Need Analysis for Nehalem UGB.

Water Conservation Measures under OAR 690-086-0150: The City of Nehalem has developed a conservation program targeted at reducing peak day demand. That program is designed to incorporate each of the elements noted under OAR 690-086-0150 (4) and address the City of Nehalem's goal of keeping unaccounted water to less than 10 percent for the year 2034. A summary of the actions and related benchmarks for the conservation program are outlined in Table E-1:

Table E.1
City of Nehalem
5-Year Conservation Benchmarks

Benchmark	Date Initiated	Frequency
On-Going Efforts		
Visual inspection of reservoirs	-	Annually
Leak detection visits	-	Continuous*
Rain Gauge	-	Daily
Initiate revolving meter (< 2") replacement	June 2010	Annually
Testing of meters > 2"	July 2008	5 yrs.
Distribute conservation brochures	July 2008	Annually
New Programs		
Improved water auditing (monitor non-revenue use)	By 2018	Annually
Test and Calibrate Master Meters	By 2018	5 yrs.
Replace existing AC pipe	By 2020	

*Active leak detection is performed several times a month, specifically after meter readings, freezing events or unusually high usage during non-peak hours.

Identification of Resource Issues: The water source includes several streamflow-dependent species listed as sensitive, threatened, or endangered, see Appendix D. None of the City's surface water sources are listed by the Oregon Department of Environmental Quality as being water quality limited.

Curtailment Plan: A curtailment was developed for the City of Nehalem as part of this WCMP. The curtailment plan was prepared pursuant to ORS 536.780 and consistent with OAR 690-019-0090. The curtailment plan element represents one tool that is available to the City of Nehalem to meet a water emergency. The curtailment plan includes stages of alert, triggers for each stage, and curtailment actions that will satisfactorily promote conservation practices.

Use beyond permit extension: As part of this submittal, the City of Nehalem has developed a schedule for using water under its Bob's Creek water rights to serve its anticipated 20-year demand. The City of Nehalem will not be looking for any new rights but will seek to make optimal use of its existing permits. By year 2035, the City of Nehalem will divert as much as 128,240 gpd on an average daily basis and utilize as much as 242,000 gpd on a peak day – thereby utilizing between 4-7% of its present inventory of water rights totaling 3,878,474 gpd.

Based on the projections of water needed, the City of Nehalem will not need any OWRD authorization to increase diversions from the current maximum rate 3,878,474 gpd. The City of Nehalem projects that the 2035 peak month demand will be about 5,114,000 gallons.

E.2 Proposed Schedule for Updating Plan

Following the administrative rules, the City of Nehalem proposes to submit a progress report on or before October 2020 (five years) to review noted benchmarking and water use progress. Since the City of Nehalem does not anticipate the need for any new source of water over the next 20-years, the City proposes to submit an updated WMCP at the end of the 10-year period in 2025.

We recommend that the Water Management and Conservation Plan be updated shortly after the completion of any update to the Water Master Plan. We also recommend that an update be completed if and when an interconnection to the City of Manzanita is completed or when the City begins the process of taking water from one of its other sources.

The following elements required in the Division 86 Rules are included in this document:

Table E.2
Cross-References Between WMCP Sections and Division 86 Requirements

Item	OAR Reference	Section No.
WMCP Plan Elements		
Notice to affected local government(s)	690-086-0125(5)	1.6
Proposed WMCP update schedule	690-086-0125(6)	1.3
Additional time to implement conservation benchmarks	690-086-0125(7)	N/A
Water Supplier Description		
Supplier's source(s)	690-086-0140(1)	2.2
Current service area & population served	690-086-0140(2)	2.1
Assessment of adequacy and reliability of existing water supplies	690-086-0140(3)	2.2.3
Present and historic water use	690-086-0140(4)	2.3
Water rights inventory table and environmental resource issues	690-086-0140(5)	2.2.2
Customers served and water use summary	690-086-0140(6)	2.3-2.4
Interconnections with other systems	690-086-0140(7)	2.2.1
System schematic	690-086-0140(8)	Apx. B
Quantification of system leakage	690-086-0140(9)	2.7.1
Water Conservation Element		
Progress report on implementation of conservation measures	690-086-0150(1)	--
Water use measurement and reporting program	690-086-0150(2)	3.2-3.3
Currently implemented conservation measures	690-086-0150(3)	3.4
Annual water audit	690-086-0150(4) (a)	3.5.1
Full metering of system	690-086-0150(4) (b)	3.3
Meter testing and maintenance program	690-086-0150(4) (c)	3.5.2
Rate structure	690-086-0150(4) (d)	3.3

Table E-2 (cont'd)
Cross-References Between WMCP Sections and
Division 86 Requirements

Item	OAR Reference	Section No.
Water Conservation Element (cont'd)	690-086-0150(4) (e)	3.5.3
Leak detection program	690-086-0150(4) (f)	3.5.4
Public education program	690-086-0150(5)	N/A
System leakage reduction program <15%	690-086-0150(6)(a)	N/A
System leakage reduction program <10%	690-086-0150(6)(b)	N/A
Technical and financial assistance programs	690-086-0150(6)(c)	N/A
Retrofit/replacement of inefficient fixtures	690-086-0150(6)(d)	N/A
Rate Structure and billing practices to encourage conservation	690-086-0150(6)(e)	N/A
Reuse, recycling, and non-potable opportunities	690-086-0150(6)(f)	N/A
Other proposed conservation measures		
Water Curtailment Element	690-086-160(1)	4.0
Water supply assessment and description of past deficiencies	690-086-160(2)	4.3
Stages of alert	690-086-160(3)	--
Triggers for each stage of alert	690-086-160(4)	4.3
Curtailment actions		
Water Supply Element	690-086-170(1)	5.1
Future service area and population projections	690-086-170(2)	5.3.2
Schedule to fully exercise each permit (i.e., certification)	690-086-170(3)	5.2
Demand forecast	690-086-170(4)	5.3
Comparison of projected need and available sources	690-086-170(5)&(8)	N/A
Analysis of alternative sources	690-086-170(6)	N/A
Maximum rate and monthly volume quantification	690-086-170(7)	N/A
Mitigation actions under state and federal laws	690-086-130(7)(a)	N/A
Greenlight Water Request – Conservation measures schedule and cost effectiveness	690-086-130(7)(b)	N/A
Greenlight Water Request – Justification that selected source is most feasible and appropriate	690-086-130(7)(c)	N/A
Greenlight Water Request – Mitigation requirements		

Section 1

Overview

1.1 Introduction

This plan is prepared to meet the requirements of Oregon Administrative Rules (OAR) Chapter 690 Division 86. No extension of time (for implementation of existing water rights) and no new water rights needs are described in this WMCP. A 20-year planning period, beginning in 2015, has been analyzed for the City of Nehalem water system in this WMCP.

The City previously submitted a WMCP in 2008 in response to a financial award from the Safe Drinking Water Revolving Loan Fund. A new Water Master Plan has been submitted this year, triggering an update to the City's WMCP.

The plan is being submitted to the Oregon Water Resources Department (OWRD) for review. It will be adopted by the City Council and administered by the Public Works Superintendent after approval by OWRD.

1.2 Overview of Existing System and Community

The City of Nehalem is generally located on the north side of the Nehalem Bay, and West of the Nehalem River. The Urban Growth Boundary (UGB) extends across the north fork of the Nehalem River at McDonald Road and includes dead-end roads that connect to McDonald Road. The UGB lies within the following sections: Sections 23, 26, 27, 28, 34, and 35 of Township 3 North, Range 10 West, of the Willamette Meridian. This area is bordered on the West by the city limits of the City of Manzanita, on the South by the Nehalem Bay, on the North by forest lands, and on the East by the Nehalem River and rural residential areas outside of the UGB. The Boundaries are shown on the attached map of the City and its UGB.

This area encompasses approximately 1,587 acres: 336 acres within city limits, and an additional 1,256 acres within the Urban Growth Boundary (UGB). Approximately 155 connections (21 percent) of the 743 current connections are within the city limits of Nehalem.

The City of Nehalem water system had 726 connections within its service area as of 2014. The accounts can be further broken down by type:

Table 1.1
City of Nehalem
Connections Type

Type	Percentage of Overall Use
Residential (City)	17.6%
Residential (Rural)	67.9%
Commercial (City)	2.9%
Commercial (Rural)	9.3%
Bulk Customers	2.3%

The City has been granted 6.0 cfs of surface water rights for municipal use from a combination of four creeks. Seasonal flows fall below the limits of the water rights during summer months. Only one of the rights has been fully certificated with three remaining in permit status.

1.3 Proposed Progress Report and Update Schedule

Following the administrative rules, the City proposes to submit a progress report on or before July 2020 (five years) to review noted benchmarking and water use progress. The City of Nehalem does not anticipate the need for any new source of water over the next 20-years. Therefore, the City is not planning to submit an updated WMCP until the required 10-year period in 2025.

1.4 Summary of Data Sources

The data in this report was obtained from City records, showing use, creek diversion, and connections. Population information was collected from census data. This data was used to prepare the Water Master Plan.

1.5 Document Organization

This WMCP is organized in a manner consistent with the Division 86 Rules. Section 2 describes the water supply system, including key demographic information, water consumption, and the type of infrastructure present in the water system. Section 3 identifies the conservation measures the City has implemented and proposed new measures. Section 4 describes the tools available to the City in the event of a water emergency, including a water curtailment plan. Section 5 uses the information presented in Section 2 to forecast future demand, compares that demand to present water rights, and assesses the need for additional source water diversions.

1.6 Affected Governments

The following are the local public agencies and governments that are affected by the operations of the City of Nehalem Water system.

Nehalem Bay Wastewater Agency (NBWA) – the NBWA provides and maintains sanitary sewer service inside the City of Nehalem and its UGB. Metered water service is provided to the main office building of NBWA and to sewer lift stations located within the UGB. NBWA acquires additional water from the City for maintenance purposes. These volumes are then reported to the City.

Tillamook County – the County provides and maintains some public roads and storm drainage facilities within the City limits. More importantly, the County provides and maintains virtually all public roads and storm drainage facilities within the City's UGB. Tillamook County is also the local land use authority for land use planning in the City of Nehalem's UGB. The City and the County have an Inter-Governmental Agreement related to land use planning within the City's UGB.

Oregon Department of Transportation – ODOT operates and maintains Highway 101, the Oregon Coast Highway, which bisects the City of Nehalem.

Neah-Kah-Nie School District, Nehalem Grade School – the NKN School District owns and operates the Nehalem Grade School within the City Limits of the City of Nehalem. The school population is approximately 170 students and 30 staff.

North Coast Recreation District – the NCRD is a designated Emergency Shelter and Assembly area where residents of the City of Nehalem and the vicinity will assemble and seek temporary shelter during an emergency. This connection was activated during a water main break.

City of Manzanita – this City is the closest municipality to the City of Nehalem and also operates its own municipal water supply system. A permanent connection has been made with the City of Manzanita water through an interconnection for emergency use. In addition, the City is connected to the City of Manzanita's raw water main from Anderson Creek.

Notification letters dated September 30, 2015 were distributed to the agencies, by the City of Nehalem, to determine if the WMCP was consistent with their comprehensive land use plans, as applicable. The only agency to respond was Oregon Department of Transportation and comments from their staff are included below;

From Bill Johnston, AICP, Transportation Planner

- The land use assessment included in the plan does not identify a need to expand the City's Urban Growth Boundary in order to accommodate forecasted population growth (which would result in increased demand for water). If the UGB was expanded, the City's Transportation Plan would need to be amended to show how transportation infrastructure would be provided.

From Richard Kearns, ODOT Region 2 Permit Specialist

- If there are any upgrades or new connections as a result of the Water Management and Conservation Plan that lie within ODOT right of way, a permit from ODOT will be required to perform such operations.

Section 2

Municipal Supplier Description
The attached schematic map shows sources, storage, pump, pressure reducing valves, and water pressure areas.

2.1 Service Area and Population

2.1.1 Service Area

The area under study is the entire area currently within the City of Nehalem Urban Growth Boundary. This area is generally located on the north side of the Nehalem Bay, and West of the Nehalem River. The Urban Growth Boundary (UGB) extends across the north fork of the Nehalem River at McDonald Road and includes dead-end roads that connect to McDonald Road. The UGB lies within the following sections: Township 3 North, Range 10 West, Sections 23, 26, 27, 28, 34, and 35 of the Willamette Meridian. This area is bordered on the West by the city limits of the City of Manzanita, on the South by the Nehalem Bay and the City of Wheeler, on the North by forest lands, and on the East by the Nehalem River and rural residential areas outside of the UGB. The boundaries of the UGB are shown on the attached map of the City in Appendix B.

The study area encompasses approximately 1,587 acre: 331 acres within city limits, and an additional 1,256 acres within the Urban Growth Boundary (UGB). Approximately 199 connections (27 percent) of 726 current connections are within the city limits of Nehalem. The City recently annexed 18 acres into the City.

2.1.2 Current Population Estimates

Population estimates, for Nehalem City limits only, are available from census data. Population for the service area between the City limits and the UGB are estimated using a factor of 1.35 people per connection as assumed in the Nehalem Water Master Plan, 2015. As of the end of 2014, the Nehalem service area has 726 connections on record. The population estimate varies dramatically based upon the seasonal population of the area; however, the best estimate of the 2014 maximum population for the water service connections is approximately 980 people. Alternatively, based upon an estimated average of 2.34 persons per household, the estimated population would be approximately 1700 people if every residence were occupied, according to census data. That number is likely unrealistic based on local data including the population estimates from the Draft Housing Need Analysis – Nehalem, 2007 and water service connection data. For the purposes of this plan, the number of service connections provides a much more reliable growth figure for the City of Nehalem area. For a summary of water service connection history, see Table 2.1 below.

The estimated vacancy rate for the Nehalem UGB is approximately 32%. Weekday (and winter) vacancy rates can be expected to be higher. Occupancy of vacation rentals houses, and to a lesser degree, second homes, typically exceeds house capacities and are well above the average occupancy during popular weekends (e.g. Independence Day and Labor Day). This would result in the demand exceeding

the typical demand. The actual usage and occupancy rates of houses at these peak times are undocumented.

In 2006 the Nehalem UGB consisted of 462 Single Family Homes, 19 (3-4) Multifamily Homes and 101 Manufactured Homes.

Table 2.1
City of Nehalem
Yearly Number of Connections

Year	Connections
2008	697
2009	709
2010	713
2011	721
2012	726
2013	727
2014	726

2.2 Source of Supply

2.2.1 Summary of Existing Sources

The City currently has water rights on four creeks; known as Bob's Creek, Coal Creek, Unnamed Tributary to Coal Creek, and West Fork Coal Creek. The City of Nehalem currently utilizes only Bob's Creek for its water supply. The watershed covers approximately 367 acres of actively managed forest lands, owned almost entirely by the City. The only entrance into the watershed is gated and locked. The gate is on private forest land owned by Stimpson Timber Company.

The intake structure consists of a concrete dam and impound reservoir. The dam is 23 feet long and 42" high. The impound basin upstream is a widened out area in the stream bed that is about 50 feet wide by 100 feet long, providing a settling area of 5,000 square feet. At the west end of the dam is an intake box that is 3 feet square with a screen over the pipeline inlet.

The City supplies water to the service area in two pressure zones. One is the Lower Level System and the second one the High Level System. Pressure to the High Level System is accomplished by a booster pump station located on 13th Street between Hwy 101 and Tohls Street and services residences on Hugo Street, 13th Street, and Thompson Road. The small 2 horsepower, centrifugal pump is capable of 75 gallons per minute of flow (gpm maximum) at 110 feet of Total Dynamic Head (maximum).

The City does not have any exchange agreements, intergovernmental cooperation agreements, or water supply or delivery contracts for the purposes of supplying potable residential water to other entities. There is one permanent interconnection with the City of Manzanita water supply system for emergency use only.

The City does have an agreement to use raw water from the City of Manzanita's Anderson Creek source. The Agreement states "...the City of Nehalem shall at all times be entitled to a continuous release of 11.1 gallons per minute through the special direct ¾ inch interconnection for that purpose". In addition, the agreement also states, "Nehalem will have the right to take surplus water through the 4 inch connection at any time it wishes, except during periods when the City of Manzanita determines that a shortage exists…"

2.2.2 Water Rights Held

The existing water rights for the City are listed in the attached table in Appendix D.

2.2.3 Adequacy and Reliability of Supply Sources

Bob's Creek is currently the only source of water that the City draws from. Research of the low flow conditions for Bob's Creek has been completed many times in the past for previous Water Master Plans for the City. It has been determined that a low flow summertime supply could reasonably be estimated at 220,000 gallons per day. There are no requirements for minimum instream flow for fish habitat in Bob's Creek. None of the City's surface water sources are listed by the Oregon Department of Environmental Quality as being water quality limited.

In addition to Bob's Creek the City also has Water Rights to Coal Creek, Unnamed Tributary to Coal Creek, and West Fork Coal Creek. These sources have been researched in the past and minimum available stream flows have been proposed and are listed below in Table 2.2. The City has been granted an extension of time to develop these sources until October 1, 2051 with restrictions on withdrawal rates based on available stream flow in order to maintain fish persistence within the associated basins. These sources are likely to be developed individually unless an emergency situation compromises the existing Bob's Creek source.

Several streamflow-dependent species listed as sensitive, threatened, or endangered are listed in Appendix D.

A final order has been issued for an Extension of Time on Permit S-45008, which subjects the undeveloped portion of this permit (4.0 cfs) to fish persistence flows. This permit for surface water is a back-up supply for the City in case of an emergency where the primary Bob's Creek source becomes unavailable. Under these circumstances, the City would request emergency approval from the Watermaster to temporarily divert water under this permit. The City does not anticipate developing this permit in the next 20 years as a primary source.

Should the City decide to use water under Permit S-45008 as a primary source in the future, the City must apply to OWRD for 'greenlight water' or the undeveloped portion of the extended permit. At that time, the City will be required to update the Water Management and Conservation Plan to determine the reduced or curtailed diversion of water from the PODs due to fish persistence conditions. ODFW provides the City with Fish Persistence Target Flows at each of the three PODs, and has developed equations for determining the allowable diversion flow. The flow is based on target flow, the undeveloped portion of the extended permit flow, and the actual flow at the PODs. The latter would be coordinated with the Watermaster to measure flows at each POD. As previously stated, the City does not anticipate applying for greenlight water under this permit in the next 20 years.

Table 2.2
City of Nehalem
Minimum Available Stream Flow

Source	Minimum Available Stream Flow (gallons per day)
Bob's Creek	220,000
Coal Creek	819,000
Unnamed Tributary to Coal Creek	168,000
West Fork Coal Creek	490,000

The minimum available stream flow quantities account for senior water rights, water rights required for in-stream habitat and low summer flows where applicable.

2.3 Summary of Recent Use

2.3.1 Average Usage

Planning for future water demands has been based on the following set of consumption statistics drawn from current meter records. The following are several generally accepted water use definitions that are commonly used in evaluating water consumption statistics for any water District.

Annual Use, expressed in gallons, is taken directly from the master meter records. This figure includes all domestic consumption, losses and water used in firefighting. Annual use is important in assessing the adequacy of the water sources.

Average Daily Demand (ADD), expressed in gallons per day, is also taken directly from the master meter records and includes water uses and all water losses, but not fire flows. The average daily demand is one of several factors that are used in determining the storage requirements for the City. ADD = Annual Use divided by 365.

Maximum Monthly Demand (MMD), expressed in gallons, is the highest monthly meter reading for a year. This figure is useful in determining the seasonal peaking factors and designing the system for peak flows.

Average Day of Maximum Month (AD-MM), expressed in gallons per day, will also be used for estimating peak flows. AD-MM = MMD divided by 30.

Maximum Daily Demand (MDD), or Peak Day Demand, expressed in gallons per day, is assumed to be 5% of the maximum monthly demand. This value of 5 percent is a generally accepted value commonly used in estimating the maximum daily demand when actual peak daily flow records are not available. In order to evaluate the MDD, a Peaking Factor is calculated as MDD (Peak Day) divided by ADD. Typically, Peaking Factors are in the range of 2.0 to 3.0. Daily flow records are available and were used to determine the maximum daily demand.

Table 2.3
City of Nehalem
Current Water Use Statistics

Year	Annual Use (MG)	ADD (mgd)	MMD (MG)	AD-MM (mgd)	MDD (mgd)	% of Avg. Day
2009	39.7	0.109	5.25	0.169	0.221	203%
2010	36.7	0.100	4.76	0.154	0.221	221%
2011	37.6	0.103	4.70	0.152	0.188	183%
2012	40.8	0.112	4.92	0.159	0.240	214%
2013	38.4	0.106	4.88	0.157	0.199	188%
2014	32.3	0.088	4.15	0.138	0.196	223%
Average	**37.6**	**0.103**	**4.78**	**0.155**	**0.211**	**205%**
Max	**40.8**	**0.112**	**5.25**	**0.169**	**0.240**	**223%**

Daily use has averaged 103,000 gallons over the 6 years from 2009 to 2014; with a maximum daily demand of about 211,000 gallons. The minimum available stream flow of Bob's Creek is 220,000 gallons per day plus the minimum raw water available from Manzanita of 16,000 gallons gives a total minimum flow of 236,000 gallons per day (below the measured maximum daily demand). With the addition of 1.5 Million Gallon of storage, the City has enough water at low flow to meet the current peak daily demand. Peak daily demand only occurs for short periods, such as a three-day weekend in the summer, because of the high percentage of second homes in the City of Nehalem. The City of Nehalem reports the maximum instantaneous rate of water diverted is approximately 280 gallons per minute, or 0.62 cubic feet per second, as measured by the totalizer flow meter, when the dam is full.

2.4 Water Customers Served

The City of Nehalem's water service area includes three mobile home/trailer parks, two farms, commercial accounts and residential developments located to the Northeast and West of the City.

As of December 2014, the City of Nehalem had 726 connections within its service area. The accounts can be further broken down by type:

Table 2.4
City of Nehalem
Account Types

Type of Use	Percentage of Overall Use	Number of Accounts
Residential (City)	17.6%	160
Residential (Outside City Limits)	67.9%	508
Commercial (City)	2.9%	36
Commercial (Outside City Limits)	9.3%	18
Bulk User	2.3%	4

The average daily (system) demand for this service area for the years 2002 through 2007 was 153,920 gpd. Between 2009 and 2014, the average demand was 103,000 gpd. Table 2.3 shows the daily demands for the system since 2009.

Populations vary seasonally with a vacancy rate that is approximately 32 percent throughout the year, with the greatest number of occupancies in the July through September months. This coincides with the highest water use per connection and lowest source output. This vacancy rate is taken from the Draft Housing Need Analysis – Nehalem.

In general, a large percentage of the developed lots in the City of Nehalem area use native vegetation for landscaping. Landscaping and development in general is best described as rural rather than urban. Large lawns are the minority due to the large percentage of second homes and recreational homes in the City of Nehalem area.

2.5 Facilities Description

2.5.1 Source/Treatment

When the new water reservoir was constructed, the treatment system was also improved. All treatment is now completed prior to storage. The current treatment method includes two separate clarifiers; a media filter system, a cartridge filter, and the injection of hypochlorite.

The standard treatment of raw water coming from Bob's Creek includes:

1. Raw water runs through the clarifier to reduce turbidity
2. The water then runs through media filters and cartridge filters
3. Hypochlorite is injected into water (chlorine)
4. Treated water flows into storage reservoir, ready for distribution

2.5.2 Transmission/Distribution

As of May of 2008, the distribution system included a total of roughly 96,861 linear feet of pipe. This included about 40 feet of AC pipe, 66,321 feet of PVC pipe and 18,540 feet of HDPE pipe. The remaining pipe includes short sections of steel pipe and copper tubing. The total linear feet of each pipe size and type is shown in Table 2.5.

Table 2.5
City of Nehalem
Distribution/Transmission Pipe Inventory

Material	Dia. (in)	Footage (ft)	Percentage of Total
PVC	4	13,750	16.2%
AC	4	40	0.05%
HDPE	4	570	0.7%
PVC	6	27,241	32.1%
HDPE	6	7,420	8.7%
PVC	8	19,700	23.2%
HDPE	8	9,850	11.6%
PVC	10	80	0.1%
HDPE	10	700	0.8%
PVC	12	5,550	6.5%
Total		**96,861**	**100%**

2.5.3 Finished Water Storage

A new 1.5 million gallon reservoir was constructed in 2000. The reservoir site is located on a small ridge above the City of Nehalem, at an approximate elevation of 220 feet. The new reservoir is constructed of glass-fused steel and is covered. The high water level in the new reservoir is 252 feet.

The old reservoirs that previously served the City have been adapted for use as clarifiers in the treatment of raw water. The water being stored in the new reservoir is now potable water. This is a significant improvement, allowing for maintenance or other work to be completed on the treatment system while still providing potable water to the customers.

The reservoir now complies with OAR 333-61-050 (7) which requires that the potable water supply be covered with a roof.

The new reservoir satisfies the current and projected storage needs for the City. The City will have adequate storage for a combination of two days of projected peak demand for the year 2034 and for fighting a fire (180,000 gallons). With the typical low flow available from Bob's Creek, the reservoir could maintain the projected peak demand (270,704 gallons) for a period of nearly one month. The reservoir level then will continue to drop since the projected peak demand is larger than the low source flow. In addition, the City also has additional storage capacity in the settlement basin and old reservoir.

Table 2.6
City of Nehalem
Water Storage Summary

System	Tank	Capacity (gallons)	Surface Elevation (feet)
Raw Water	Settlement Basin	120,000	220 +/-
Raw Water	Reservoir (old)	180,000	220 +/-
Treated Water	Reservoir (new)	1,500,000	252 +/-
	Total	**1,800,000**	

2.5.4 Pump Stations

There is currently only one pump site in the City used for the High Level System. The High Level System relies on a booster pump station located on 13th Street between Hwy 101 and Tohls Street and services residences on Hugo Street, 13th Street, and Thompson Road. The small 2 horsepower, centrifugal pump is capable of 75 gallons per minute of flow (gpm maximum) at 110 feet of Total Dynamic Head (maximum).

2.6 Interconnections

The City does not have any exchange agreements, intergovernmental cooperation agreements, or water supply or delivery contracts for the purposes of supplying finished residential water to other entities. There is a permanent interconnection with the City of Manzanita water supply systems for emergency use only.

2.7 System Efficiency

The system efficiency was calculated by subtracting metered water usage from the master meter readings. Master meter records for the five water years 2006 through 2014 indicate the total water production during that time. The total water use, as measured by the master meters, for the summer

months is generally more than twice the use for the rest of the year. This is to be expected due to the increased occupancy rates and increased per capita use during summer months. Table 2.7 shows a summary of the City's water system efficiency.

The negative value of the loss for 2009 – 2014 indicates that the volume of water used by customers exceeded the volume of water provided, and treated, that left the reservoir. Possibilities for the apparent exceedance include inaccurate master meter readings, inaccurate service meter readings, or a supplemental treated source. The City has not used a supplemental source. Calibration and testing of the master meters is not currently an initiated benchmark. Recommendations for calibration and testing are described in section 3. Once implemented, this benchmark is expected to help provide more accurate meter readings to estimate efficiencies. Another potential source of reporting inefficiency is the coordination of timing of the master meter reading and service meter readings. At times, the City has seen a gap of several days between master and service meter readings which can lead to inaccurate efficiency results. The City is aware of this and is evaluating their meter reading schedules to decrease the inaccuracy.

Table 2.7
City of Nehalem
Unmetered Usage Volume as a Percent of Production

Year	Percent
2006	19.95%
2007	15.72%
2008	11.66%
2009	1.62%
2010	-2.06%
2011	1.51%
2012	7.78%
2013	-0.33%
2014	-19.45%

2.7.1 Water Losses

The installation of meters by the City of Nehalem allows the water losses to be measured accurately. The difference between the master meter readings and the total of the service connection meter readings represents the total amount of water lost in the system. Since lost water is lost money in terms of chemical treatment and pumping costs, it is important that these losses be minimized. If large losses begin to occur, it would require earlier development of a new source and larger storage tanks.

There is no record of estimated water lost resulting from system breaks, or firefighting. NBWA acquires and reports the use of maintenance water to the City. The City then accounts for these volumes manually. All other unaccounted for water is measured as leakage.

As shown in table 2.7, the water losses have been drastically reduced as a majority of the older pipes were replaced with PVC and HDPE pipe. Between 2004 and 2007 the City replaced over 40,000 feet of its old water system, and the losses have dropped well below 10%.

Section 3

Water Conservation Element

Conservation in Nehalem is considered most important during the summer months, when usage is high and source flows are low. The remainder of the year, the City has more than adequate water to supply the needs of its customers. With a large majority of the system being gravity-fed, the only cost to the City is increased water treatment.

Day-to-day conservation of indoor water use will help to reduce treatment costs, as well as reduce the load on the local sewer agency. With system leakage less than 10%, the City is not required to implement Enhanced Conservation Measures under OAR 690-086-0150(5).

Owners of second homes are unlikely to see much direct benefit from conservation due to their low occupancy rate. The cost of heavy water use for one weekend is offset by nearly zero water use the remainder of the month.

3.1 Previous Efforts

The 1996 Master Plan detailed a major project of replacing older pipes in the City. This project is complete and the City will work on enlarging and replacing the remaining older pipes as funds become available.

3.2 Water Use and Reporting

Each customer in the City is required to have a meter on the service line. Customers include residential, commercial, and bulk users. Meters are read and reported on a monthly basis by the System Operator for billing purposes and general recording use. One of the benchmarks for the 2008 WMCP was to improve the water auditing program and include monitoring of non-revenue use. Significant non-revenue sources for the City include the Fire Department and wastewater treatment plant including line flushing, blow-offs, and fire hydrants. The City only flushes water lines in the winter months when there is an abundance of water and low water usage. The water used for such flushing should be estimated and recorded in the daily water use records by the City staff. The benchmark priority of the City has been to complete upgrades to the City's water distribution system. The auditing benchmark has been initiated but not completed. The City is coordinating with the various unmetered use sources to establish a reporting procedure to get the auditing benchmark completed by 2018 and provide annual auditing thereafter. Even if not metered or precisely measured, knowing of unmetered use will help to explain anomalous system meter readings.

3.3 Rate Structure and Metering

The City charges a flat rate for a base amount of water to each customer based on an Equivalent Residential Unit (ERU) basis assigned to each customer class with additional charges for each 1,000 gallons or portion thereof of overage. Each ERU is allotted 4,000 gallons per month for $36.60 inside city limits and $44.60 for rural customers with a reduced wholesale rate of $16.80 per ERU for farms,

swimming pools, and recreation centers. Each customer is charged $4.20 per 1,000 gallons of overage regardless of customer class or location. Bulk users are charged $9.15 per 1,000 gallons inside city limits and $11.15 per 1,000 gallons outside city limits. Because of the number of second homes, visitors could freely use water for a weekend or a week, using the whole month's allotment, with the knowledge that any heavy usage would be offset by their absence the remainder of the month. The City could charge for each and every gallon used or lower the base monthly gallons. This would be ideal for the type of customer being served.

A rate structure could be implemented that would increase the cost of water based on usage. In addition to an initial flat rate charge, each gallon of water used is also charged for, and the charges could increase by a percentage for water usage over a certain gallons per month period.

All services are metered and all collected water is metered. The City complies with the requirements of OAR 690, Division 85.

All services are metered and regularly monitored. These meter readings are compared with the master meter located on the distribution main at the plant to monitor all water released to the system. The source is also metered as it enters the treatment plant.

3.4 Additional Conservation Measures

The City was awarded a loan for the "The City of Nehalem Water System Reconstruction Project". The loan was part of the Safe Drinking Water Revolving Fund funded by the Environmental Protection Agency, the State of Oregon Economic and Community Development Department, and the City of Nehalem Water Fund. This project involved the upgrade of the City's water distribution system by replacing approximately 80% of the City's in-place system. The City expected its water losses to drop below 10% once work was completed. As of 2013, the water leakage is substantially lower than 10%. In addition to this effort the City continues to visually inspect its reservoir for leaks and visually check individual meters on a monthly basis. Table 3.1 below summarizes the City's ongoing and future conservation benchmarks.

3.5 Planned Conservation Measures

The City's available water rights currently meet annual average and peak period demands. Capacity limits based on operational elements are approaching the maximum summertime demands. For this reason, the City will focus its conservation measures on peak demand reduction and those elements of the customer base most affected by related activities. Historically, about half the annual consumption occurs during the months of June, July, August and September. Such peaking is typical in the Northwest, especially for residential customers.

The City plans to continue to monitor water diversion versus water use. Leakage is expected to reduce as old pipes are replaced. As part of the replacement project, several distribution lines that are currently dead-end lines will be looped.

3.5.1 Water Auditing

Master meters are in place to measure flow into and out of the storage facility. These quantities are then compared to commercial and residential meter readings to determine the amount of leakage and unauthorized use. The City Manager prepares an annual water audit and annual use report to the City Council.

Due to the very small size of the Nehalem UGB, virtually every excavation and construction project in the community is of general knowledge. All of the local excavating contractors are in close communication with the City staff. Therefore, unmetered and unauthorized uses are very infrequent and detected almost immediately.

3.5.2 Meter Testing and Maintenance

Meters are regularly inspected as part of reading and serviced as problems or errors are seen to occur. The master meters should be checked for accuracy and calibrated on a regular basis. A maximum of 5 years between calibration and checking of the master water meters is recommended. This process is included to be implemented as a conservation benchmark, see Table 3.1. Testing of water service meters is currently done by replacing a few each year and sending the removed meters to be tested and re-calibrated. A sampling of a few service meters tested each year is an effective and simple way to help verify that service readings are accurate. Initial costs for this program consisted of purchasing a few new meters to begin replacing existing meters.

3.5.3 Leak Detection and Repair

The City staff monitors total water use on a daily basis and aggressively looks for water leaks that appear as abnormally high water use during non-peak use times, or after a freezing event. Generally, water leaks are repaired on an immediate basis with the assistance of local excavating contractors that work for the City on an on-call basis.

3.5.4 Public Education

A Newsletter is sent to all water users. On at least an annual basis, the newsletter includes information regarding water conservation methods and the importance of conserving water in the City, especially during the late summer months. With water conservation being most important during the summer, the information is typically provided in the early summer. By specifically providing the information before the high use period, the City hopes to encourage conservation through the summer.

Links to OWRD's Saving Water Inside and Saving Water Outside informational sheets are posted on the homepage of the City's website under the heading "Please Use Water Wisely". Emphasis to the seasonal importance of water conservation in the summer is indicated by the subheading to the link stating "Water levels are low. Please help conserve water!" The OWRD worksheets include suggested methods for residents and visitors to use to reduce the water use associated with various domestic activities.

Table 3.1
City of Nehalem
5-Year Conservation Benchmarks

Benchmark	Date Initiated	Frequency
On-Going Efforts		
Visual inspection of reservoirs	-	Annually
Leak detection visits	-	Continuous*
Rain Gauge	-	Daily
Initiate revolving meter (< 2”) replacement	June 2010	Annually
Testing of meters > 2”	July 2008	5 yrs.
Distribute conservation brochures	July 2008	Annually
New Programs		
Improved water auditing (monitor non-revenue use)	By 2018	Annually
Test and Calibrate Master Meters	By 2018	5 yrs.
Replace existing AC pipe	By 2020	

*Active leak detection is performed several times a month, specifically after meter readings, freezing events or unusually high usage during non-peak hours.

Section 4

Curtailment Plan Elements

The City of Nehalem's water supply is entirely surface water from Bob's Creek. There have been no records of past water shortages.

This curtailment plan can be used in lieu of an actual ordinance. An ordinance would allow the City Manager authority to promulgate a water supply emergency and enact the water curtailment plan. In the event that a stage three water emergency is determined, the ordinance would allow for the policing of customer activities and the issuance of citations (warnings and fines) to encourage customers to abide by the curtailment plan measures.

4.1 Tools at the City's Disposal

The City presently has three tools at its disposal to decrease or eliminate the effects of a water emergency and ensure an adequate supply of water for its customers. First, it has 1.5 million gallons of usable storage; however this volume fluctuates over the course of the day depending upon demand. It cannot be assumed that the reservoirs will be full in the event of a water shortage. Second, Nehalem has an emergency intertie location with the City of Manzanita which can supply some water to the City of Nehalem water supply line, upon request, to offset base demand.

It is anticipated that a water shortage experienced by Nehalem will not be experienced simultaneously by the City of Manzanita. There is a remote possibility the intertie may not be an available source of supply in the event of an emergency. The City has developed a water curtailment plan, the third tool available to answer a water supply emergency.

4.2 Water Emergency Response

The City is prepared to implement water rationing if an emergency limits the normal water supply. The City can implement "informal" water rationing during the latter part of summer, as dry conditions can limit the amount of water available from the surface water source when the customer demand is at its highest yearly levels.

The City has never found it necessary to implement any stage past stage 1. The possibility always exists that severe actions may be necessary to ensure that an adequate supply of potable water exists for the majority of our customers. The biggest key to successful rationing is to keep the public well informed on the water supply situation, and to plan ahead.

4.3 Curtailment Plan

Table 4.1 describes the City's proposed curtailment plan. Included within the plan are three stages of alert, stage triggers, and the curtailment actions to be taken.

Table 4.1
City of Nehalem
Proposed Curtailment Plan

Stage	Triggers (Bob's Creek)	Curtailment Actions
1 (Mild)	- Flow goes below 230 GPM - Demand exceeds 180,000 GPD for 3 consecutive days - Capacity of the system reaches 60%	- Notice posted to all customers to be "water wise," and begin conserving water - Ask customers to discontinue or limit outdoor watering, car and driveway washing, etc. - Stop Internal City water use that is non-essential, such as hydrant flushing, Issue notice to local media.
2 (Moderate)	- Flow goes below 200 GPM - Demand exceeds 200,000 GPD for 3 consecutive days - Capacity of the system reaches 85%	- Send postcard notifications to customers. - Post signs at community locations. - Post notice on website
3 (Critical)	- Flow goes below 185 GPM - Demand exceeds 220,000 GPD for 3 consecutive days - Capacity of the system reaches 90%	- All outdoor watering is prohibited. - Implement restrictions on outdoor water use. - Enforce with fines and discontinuation of service

4.4 Staff Responsibilities

The following staff will have responsibilities for the following tasks in the event the water curtailment plan is enacted:

City Manager – Dale Shafer, responsible for Media Relations

City Manager's Office: All direct and indirect media outreach efforts

Law Enforcement Officer – Erik Harth

Police Department: Enforce curtailment measures

Water Department Superintendent – Don Davidson

Water Department: Work with businesses to reduce consumption. Coordinate with public school, public swimming pool and other high volume water users to ensure activities are commensurate with curtailment plan.

Section 5

Municipal Water Supply Element

5.1 Future Service Area

With the completion of the new Manzanita water supply, the City has removed the Tideland Water Co-Op and Nehalem Bay Wastewater Agency Sewer Lagoons from its service system. It is unlikely that any new customers will be serviced outside the City of Nehalem UGB.

The Revised Draft Housing Needs Analysis determined that City will have a surplus of approximately 121.4 acres within the UGB with a total available supply of 148.6 acres by the year 2027. These figures are shown on Table 5.1.

Table 5.1
City of Nehalem
2027 - UGB Land Supply Needs (in Acres)

Zone	Supply	Need	Surplus/(Gap)
MR	2.2	0.5	1.7
RL	19.8	4.6	15.3
RM	5.8	1.4	4.4
R1	15.7	3.7	12.0
R2	42.8	6.4	36.4
R3	13.0	6.9	6.1
RT	46.6	3.2	43.4
C	2.8	0.5	2.2
Total	**148.6**	**27.2**	**121.4**

5.2 Future Availability and Consumption

5.2.1 Connections

Due to the changing nature of the community, we expect most increases in the number of connections will come as a result of new residential building in the area rather than from population growth within the community. Fewer families with children are moving into the Nehalem community. The local school district continues to see a decline in student population. Considering the subdivisions currently under development, we project new connections will include a combination of second homes, such as Nehalem Point, but also more full time residential homes located to the North and West of the city limits.

Growth will most likely be dependent upon the amount of undeveloped land that is available for development based on topography, geologic hazards, and the preferences of owners and developers. The concept of "Ultimate Buildout" has long been used as a planning guide in the area. It is difficult to accurately determine what the ultimate buildout will be because there are many factors involved such as roads, topography, and owners' preference. Most realistic estimations put the ultimate buildout around 2,000 total water service connections. It is highly unlikely that this figure will be reached in the planning period.

The growth rate for the City of Nehalem UGB is forecasted as approximately 1% per year over the next 20 years. The seasonal occupancy is projected to increase slightly over the next 20 years from 32% to 40%. Average households are expected to remain approximately the same (2.34 persons per household).

This projected rate of growth will result in a design system demand in the year 2034 of 892 connections.

5.2.2 Demand

The total consumption for the service area will grow with the increased population. A progressive rate structure that emphasizes conservation and an overall conservation plan will help to lessen the total increase in consumption.

Estimated current (2014) resident population is approximately 980: 280 persons in Nehalem, and 700 additional persons in the water service area. Because of the vacancy rate of 32%, at times the actual population served is less than the census figures estimate indicate. Previous population projections used a general planning figure of 1% average annual growth rate. The 1% figure is used in the 2015 Master Plan and matches the recent growth of new connections and estimated population numbers.

Water use however has reduced by almost 50% over the last 10 years, but appears to be stabilizing. Therefore, daily demand forecasts are projected using a 1% average annual growth rate (see table 5.2)

Table 5.2
City of Nehalem
Daily Demand Forecast Summary

Parameter	Year			
	2020	2025	2030	2034
Annual (MG)	34.332	36.083	37.924	39.858
Maximum Month (MG)	4.405	4.630	4.866	5.114
3-Day Maximum (mgd)	0.171	0.180	0.189	0.198
7-Day Maximum (mgd)	0.175	0.184	0.193	0.203
14-Day Maximum (mgd)	0.153	0.161	0.169	0.177
Peak Day (mgd)	0.208	0.219	0.230	0.242

5.2.3 Supply

Current water rights exceed the low flows in Bob's Creek. When the highest demand occurs during summer holidays, the creek can produce less than the water rights permits to be drawn. During higher winter flows from the source, the customer demand lessens.

The occasions to draw the full amount produced from Bob's Creek include Labor Day and Independence Day each year. Other popular summer weekends also see heavy use that coincides with low production from Bob's Creek. Water demand is relieved at the end of the holiday weekend when renters and owners of second homes within the UGB return to their primary residence in other cities.

5.3 Long-Range Supply Plan

5.3.1 Capacity Assessment

With the low flow of Bob's Creek being 220,000 gallons per day plus 16,000 gallons per day from the Manzanita raw water connection, the city has a minimum flow of 236,000 gallons per day. This is below the projected maximum daily demand of 242,000 in the year 2035. This shortage can be accommodated by drawing water from the 1.5 MG reservoir. During a three day holiday weekend and a coinciding low flow of Bob's Creek, the storage tank could drain approximately 10,000 gallons per day. If the average day – maximum month is 191,000 gallons per day it should only take approximately one day to refill the 1.5 MG reservoir.

The City does not propose to expand or initiate any new diversion of water. No water beyond the existing supply is necessary to meet the projected future demands.

5.3.2 Schedule of Beneficial Use

The City does not currently have a need to increase its current water rights. The City has multiple options for additional water including: a new groundwater source near the North Fork of the Nehalem River, perfecting its current water rights and drawing additional water from the City of Manzanita's raw water from Anderson Creek. The City has retained the water rights for use of the remaining 4.0 cfs as a backup supply source for emergency purposes but does not propose to perfect them at this time.

APPENDIX A

DIVISION 86

WATER MANAGEMENT AND CONSERVATION PLANS

690-086-0010

Purpose

(1) The Water Resources Commission has adopted a statewide policy on Conservation and Efficient Water Use (OAR 690-410-0060). The policy requires major water users and suppliers to prepare water management and conservation plans. These rules provide a process to ensure the efficient use of the state's water resources and to facilitate water supply planning consistent with water supplier and Department capabilities. The Commission shall evaluate implementation of these rules within three years and every three years thereafter.

(2) Many regions of Oregon face periodic and increasingly frequent water shortages during summer periods. Urbanization is resulting in a continually expanding need for municipal water supplies. In addition, many communities are faced with the need to reduce their impacts on the resource in response to state or federal listings of stream-flow dependant species as sensitive, threatened or endangered, water quality problem, and other flow issues. It is increasingly important to the state's economy to maintain adequate stream flows to support aquatic life, provide recreational opportunities and maintain water quality. The continued implementation of conservation measures can help restore streamflows, stabilize water supplies and provide for future needs for economic development and growth.

(3) Pursuant to ORS 540.610(3) the use of water at a rate or duty which is less than the maximum amount allowed under a water right that is achieved through improved water management practices is not a forfeiture under certain circumstances. However, conserved water may only be used on additional acres or for other purposes not included in the original right after allocation of conserved water under ORS 537.455 to 537.500 or under other specific statutory authorizations.

(4) Effective water management requires an evaluation of the adequacy of water supplies to meet current and future needs, identification of planned modifications in water systems, and development of new water supplies. However, the approval of a water management and conservation plan shall not substitute for compliance with Statewide Planning Goals or any other comprehensive land use planning requirement or constitute approval of applications for water rights, water reservations, water storage facilities, transfers, permit amendments, or extensions of time for permits.

(5) Water management and conservation plans will provide information important in water resources planning and management. In addition, the plans may provide support for applications for water use permits and water right transfers, permit amendments, and requests for extensions of permits, approvals of exchanges, and reservations of water. Due regard shall be given to any relevant approved water management and conservation plans during Department consideration of these applications and requests.

(6) Regional cooperation will improve water management and help to facilitate implementation of conservation measures. Water suppliers required under OAR 690-086-0010 to 690-086-0920 to prepare water management and conservation plans, and any other suppliers or users, may jointly submit a single plan that addresses the suppliers' conservation opportunities and water development needs.

(7) A water management and conservation plan that has been approved under these rules may, at the option of the water supplier, be used to satisfy a condition requiring preparation of a conservation plan in an emergency use permit issued pursuant to OAR 690-019-0040 and a requirement for submittal of a curtailment plan in times of a declared or likely drought under an order issued pursuant to ORS 536.780 and OAR 690-019-0090.

(8) Many water use permits that have been issued to water suppliers include conditions requiring preparation of water conservation, long-term water supply, and other water management plans. These rules provide standards for the preparation of such plans. Unless other more specific or stringent requirements are included in a permit, water management and conservation plans that have been approved under OAR 690-086-0915 shall be deemed to meet the permit condition.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02

Definitions

690-086-0020

General Definitions

As used in OAR 690-086-0010 to 690-086-0920:

(1) "Affected local governments" means any local government as defined in OAR 690-005-0015, within whose jurisdiction the diversion, conveyance, or use of water is established or proposed within the context of the water management and conservation plan.

(2) "Commission" means the Water Resources Commission.

(3) "Conservation" has the meaning provided in OAR 690-400-0010.

NOTE: OAR 690-400-0010(5) defines conservation as eliminating waste or otherwise improving efficiency in the use of water while satisfying beneficial uses by modifying the technology or method for diverting, transporting, applying or recovering the water; by changing management of water use; or by implementing other measures.

(4) "Department" means the Water Resources Department.

(5) "Director" means the Director of the Water Resources Department or designee.

(6) "Waste" has the meaning provided in OAR 690-400-0010.

NOTE: OAR 690-400-0010(16) defines waste as the continued use of more water than is needed to satisfy the specific beneficial uses for which a right was granted. The need for water shall be based on using the technology and management practices that provide for the efficient use of water considering:

(a) The economic feasibility of use of the technology and management practices by the water user;

(b) The environmental impacts of making modifications;

(c) The available proven technology;

(d) The time needed to make modifications;

(e) Local variations in soil type and weather; and

(f) Relevant water management plans and subbasin conservation plans.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02

690-086-0030

Definitions for Municipal Water Suppliers

As used in OAR 690-086-0100 to 690-086-0170 and 690-086-0900 to 690-086-0920:

(1) "Authorized water uses" means all water uses known and approved by a municipal water supplier. These uses include all metered uses and any other approved uses such as fire-fighting, fire training, system operation needs, reuse, or miscellaneous uses.

(2) "Benchmark" means the specific incremental activities that a municipal water supplier plans to have completed in implementing conservation measures.

(3) "Extended permit" means a municipal or quasi-municipal water use permit conditioned by an extension order under OAR chapter 690, division 315 or 320 to provide that diversion of water beyond the maximum rate diverted under the permit or previous extension(s) shall only be authorized upon issuance of a final order approving a water management and conservation plan.

(4) "Low water use landscaping" means conserving water through designing landscapes for low water use, irrigating efficiently, improving soil and planting low water use plants.

(5) "Metering" means using water meters or other continuous recording devices to measure and to maintain a record of all water diverted and delivered.

(6) "Municipal water supplier" means a publicly or privately owned water distribution system that delivers potable water for community needs, either to individual customers or another distribution system, or that delivers water primarily for commercial or industrial uses.

(7) "System leak detection" means a program to monitor leakage throughout the transmission and distribution systems of a municipal water supplier.

(8) "System leakage" means all water that is lost from a municipal water supply system, not including major breaks that are expeditiously repaired, and un-metered authorized or unauthorized uses.

(9) "Water audit" means an analysis of a municipal water supply system that includes a thorough accounting of all water into and out of the system to identify system leakage and

metered or estimated use for authorized and unauthorized water uses. The audit also includes an analysis of the water supplier's own water use to identify alternatives to increase efficiency.

(10) "Water curtailment element" means a program to accomplish a specific reduction in the amount of water used or lost within a specific time in response to an emergency or other short-term shortage.

(11) "Water service connections" means water supply connections to the water delivery system, including the water supplier's own connections, but does not include connections for uses such as fire hydrants, fire sprinkler systems with flow alarms or detector-checks, water line blow-offs and drains, stand-by emergency interties, valve controlled drinking fountains or other similar intermittently used equipment or facilities.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02, Renumbered from 690-086-0110

690-086-0040

Definitions for Agricultural Water Suppliers

As used in OAR 690-086-0210 to 690-086-0920:

(1) "Agricultural water supplier" means any public or private organization, including but not limited to an irrigation district formed under ORS Chapter 545, a drainage district formed under ORS Chapter 547, a water improvement district formed under ORS Chapter 552, a water control district formed under ORS Chapter 553, a corporation organized under ORS Chapter 554, an unincorporated private association or a ditch company, the primary purpose of which is to supply water to others for agricultural uses.

(2) "Agricultural water measurement" means using measuring devices, including but not limited to weirs, flumes, submerged orifices, gaging stations, and meters, to quantify the rate of flow and the volume of water in a water delivery system.

(3) "Water allocation/curtailment element" means a program to equitably allocate, under existing priorities, a reduced water supply among the water right holders dependent on the supply in response to an emergency or other short-term shortage.

Stat. Auth.: ORS 536.027, 537.211 and 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02, Renumbered from 690-086-0210

Municipal Water Management and Conservation Plans

690-086-0100

Applicability

(1) Municipal water suppliers are encouraged to prepare water management and conservation plans, but are not required to do so unless a plan is prescribed by a condition of a water use permit; a permit extension; or another order or rule of the Commission.

(2) Water management and conservation plans submitted in order to comply with a permit extension order issued after November 1, 2002, are subject to the requirements of these rules.

(3) Until November 1, 2003, water management and conservation plans submitted for purposes other than to comply with a permit extension order issued after the effective date of these rules shall be reviewed under OAR chapter 690, division 86 adopted by the Commission in 1994, unless the water supplier requests the Department to apply the standards in these rules. After November 1, 2003, all new and updated water management and conservation plans are subject to these rules.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 4 2002, f. & cert. ef. 11-1-02

690-086-0110 [Renumbered to 690-086-0030]

690-086-0120

General Provisions

(1) Each municipal water supplier required to submit a water management and conservation plan shall exercise diligence in implementing the approved plan and shall update and resubmit a plan consistent with the requirements of these rules as prescribed during plan approval.

(2) Benchmarks and implementation schedules for conservation measures and other water supply development activities may be modified through the subsequent approval of an updated plan.

(3) Progress reports submitted by municipal water suppliers will be used in determining whether five-year benchmarks are being met, whether the Department will authorize additional diversion of water under extended permits, and/or if schedule changes proposed in updated plans are reasonable and appropriate.

(4) Progress reports submitted by municipal water suppliers shall include:

(a) A list of the benchmarks established under OAR 690-086-0150 and a description of the progress of the municipal water supplier in implementing the associated conservation or other measure;

(b) Average monthly and daily diversions under each right held by the water supplier for the previous five years;

(c) A description of the results of the annual water audit required under OAR 690-086-0150(4)(a); and

(d) A comparison of quantities of water used in each sector as identified and described in OAR 690-086-0140(6) with the quantities of water used in each sector for the previous five years.

(5) Upon receipt of a progress report the Department shall give public notice in the weekly notice published by the Department and provide an opportunity for written public comment. The Department shall provide copies of any comments received to the municipal water supplier.

(6) A master plan prepared under the requirements of the Department of Human Resources Health Division or the water supply element of a public facilities plan prepared under the requirements of the Department of Land Conservation and Development which substantially meets the requirements of OAR 690-086-0125 to 690-086-0170 may be submitted to meet the requirements of these rules.

(7) In the development of a water management and conservation plan, each municipal water supplier shall consult with the planning departments or appropriate officials of affected local governments to obtain information related to demand projections in comprehensive land use plans early in the development of the plan.

(8) At least 30 days prior to submitting a draft plan to the Department, a municipal water supplier shall make the draft plan available for review by each affected local government along with a request for comments relating to consistency with the local government's comprehensive land use plan.

(9) Each municipal water supplier preparing a water management and conservation plan is encouraged to develop and implement a program to involve the supplier's customers in the preparation of the plan. Recommendations include making the plan available for public inspection and conducting public meetings to provide information and gather input on the plan.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02

690-086-0125

Municipal Water Supplier Plan Elements

A water management and conservation plan submitted by a municipal water supplier shall include:

(1) A municipal water supplier description as described under OAR 690-086-0140;

(2) A municipal water conservation element as described under OAR 690-086-0150;

(3) A municipal water curtailment element as described under OAR 690-086-0160;

(4) A municipal water supply element as described under OAR 690-086-0170;

(5) A list of the affected local governments to whom the draft plan was made available pursuant to OAR 690-086-0120(6) and a copy of any comments on the plan provided by the local governments;

(6) A proposed date for submittal of an updated plan within no more than 10 years based on the proposed schedule for implementation of conservation measures, any relevant schedules for other community planning activities, and the rate of growth or other changes expected by the water supplier; or an explanation of why submittal of an updated plan is unnecessary and should not be required by the Department; and

(7) If the municipal water supplier is requesting additional time to implement metering as required under OAR 690-086-0150(4)(b) or a benchmark established in a previously approved

plan, documentation showing additional time is necessary to avoid unreasonable and excessive costs.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 4 2002, f. & cert. ef. 11-1-02

690-086-0130

Criteria for Approval of a Plan Submitted by a Municipal Water Supplier

In order to approve a plan by a municipal water supplier under OAR 690-086-0915, the Department must find that:

(1) The plan includes each of the required elements under OAR 690-086-0125;

(2) The projections of future water need in the water management and conservation plan are reasonable and consistent with available land use plans and the municipal water supplier has demonstrated a need for the quantity of water to be diverted during the next 20 years under each permit held by the supplier;

(3) For each of the water conservation measures required under OAR 690-086-0150(4) and, as applicable, 690-086-0150(5), the plan includes a reasonable and appropriate schedule with five year benchmarks for implementation of conservation activities;

(4) If applicable, for each of the water conservation measures required under OAR 690-086-0150(6), the plan includes:

(a) A reasonable and appropriate schedule with five year benchmarks for implementation of conservation activities; or

(b) Documentation to demonstrate that implementation of the measure is neither feasible nor appropriate to ensure efficient use of water and the prevention of waste and the supplier has used a suitable methodology in evaluating the measure;

(5) The identification of resource issues under OAR 690-086-0140(5)(i) is accurate and complete;

(6) The water curtailment element required under OAR 690-086-0160 satisfactorily promotes water curtailment practices and the coordination of usage regulation, taking into account state water law and local conditions, or is substantially the same as a curtailment plan prepared pursuant to ORS 536.780 and OAR 690-019-0090 and approved by the Department within the previous five years;

(7) If during the next 20 years the maximum rate of water diverted under an extended permit will be greater than the maximum rate authorized for diversion under the extension or previously approved water management and conservation plan;

(a)The plan includes a schedule for development of any conservation measures that would provide water at a cost that is equal to or lower than the cost of other identified sources, unless the supplier has provided sufficient justification for the factors used in selecting other sources for development or the supplier serves a population of less than 1,000;

(b) Increased use from the source is the most feasible and appropriate water supply alternative available to the supplier; and

(c) If mitigation is legally required to address limitations or restrictions on the development of permits for which resource issues are identified under OAR 690-086-0140(5)(i), the plan contains documentation that the supplier is complying with the mitigation requirements. The Department may consult with federal and state agencies in making this determination; and

(8) After January 1, 2042, for review of water management and conservation plans that propose to increase the maximum rate of water diverted under an extended permit that the additional diversion of water will not impair or be detrimental to the public interest.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 4 2002, f. & cert. ef. 11-1-02

690-086-0140

Municipal Water Supplier Description

The water supplier description element shall include at least the following information:

(1) A description of the supplier's source(s) of water; including diversion, storage and regulation facilities; exchange agreements; intergovernmental cooperation agreements; and water supply or delivery contracts;

(2) A delineation of the current service areas and an estimate of the population served and a description of the methodology(ies) used to make the estimate;

(3) An assessment of the adequacy and reliability of the existing water supply considering potential limitations on continued or expanded use under existing water rights resulting from existing and potential future restrictions on the community's water supply;

(4) A quantification of the water delivered by the water supplier that identifies current and available historic average annual water use, peak seasonal use, and average and peak day use;

(5) A tabular list of water rights held by the municipal water supplier that includes the following information:

(a) Application, permit, transfer, and certificate numbers (as applicable);

(b) Priority date(s);

(c) Source(s) of water;

(d) Type(s) of beneficial uses specified in the right;

(e) Maximum instantaneous and annual quantity of water allowed under each right;

(f) Maximum instantaneous and annual quantity of water diverted under each right to date;

(g) Average monthly and daily diversions under each right for the previous year, and if available for the previous five years;

(h) Currently authorized date for completion of development under each right; and

(i) Identification of any streamflow-dependent species listed by a state or federal agency as sensitive, threatened or endangered that are present in the source, any listing of the source as water quality limited and the water quality parameters for which the source was listed, and any designation of the source as being in a critical ground water area.

(6) A description of customers served including other water suppliers and the estimated numbers; general water use characteristics of residences, commercial and industrial facilities, and any other uses; and a comparison of the quantities of water used in each sector with the quantities reported in the water supplier's previously submitted water management and conservation plan and progress reports;

(7) Identification and description of interconnections with other municipal supply systems;

(8) A schematic of the system that shows the sources of water, storage facilities, treatment facilities, major transmission and distribution lines, pump stations, interconnections with other municipal supply systems, and the existing and planned future service area; and

(9) A quantification and description of system leakage that includes any available information regarding the locations of significant losses.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02

690-086-0150

Municipal Water Conservation Element

The water conservation element shall include at least the following:

(1) A progress report on the conservation measures scheduled for implementation in a water management and conservation plan previously approved by the Department, if any;

(2) A description of the water supplier's water use measurement and reporting program and a statement that the program complies with the measurement standards in OAR chapter 690, division 85, that a time extension or waiver has been granted, or that the standards are not applicable;

(3) A description of other conservation measures, if any, currently implemented by the water supplier, including any measures required under water supply contracts;

(4) A description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of each of the following conservation measures that are required of all municipal water suppliers:

(a) An annual water audit that includes a systematic and documented methodology for estimating any un-metered authorized and unauthorized uses;

(b) If the system is not fully metered, a program to install meters on all un-metered water service connections. The program shall start immediately after the plan is approved and shall identify the number of meters to be installed each year with full metering completed within five years of approval of the water management and conservation plan;

(c) A meter testing and maintenance program;

(d) A rate structure under which customers' bills are based, at least in part, on the quantity of water metered at the service connections;

(e) If the annual water audit indicates that system leakage exceeds 10 percent, a regularly scheduled and systematic program to detect leaks in the transmission and distribution system using methods and technology appropriate to the size and capabilities of the municipal water supplier; and

(f) A public education program to encourage efficient water use and the use of low water use landscaping that includes regular communication of the supplier's water conservation activities and schedule to customers;

(5) If the municipal water supplier proposes to expand or initiate diversion of water under an extended permit for which resource issues have been identified under OAR 690-086-0140(5)(i), a description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of a system-wide leak repair or line replacement program to reduce system leakage to no more than 15 percent or sufficient information to demonstrate that system leakage currently is no more than 15 percent.

(6) If the municipal water supplier serves a population greater than 1,000 and proposes to expand or initiate diversion of water under an extended permit for which resource issues have been identified under OAR 690-086-0140(5)(i), or if the municipal water supplier serves a population greater than 7,500, a description of the specific activities, along with a schedule that establishes five-year benchmarks, for implementation of each of the following measures; or documentation showing that implementation of the measures is neither feasible nor appropriate for ensuring the efficient use of water and the prevention of waste:

(a) A system-wide leak repair program or line replacement to reduce system leakage to 15 percent, and if the reduction of system leakage to 15 percent is found to be feasible and appropriate, to reduce system leakage to 10 percent;

(b) Technical and financial assistance programs to encourage and aid residential, commercial and industrial customers in implementation of conservation measures;

(c) Supplier financed retrofitting or replacement of existing inefficient water using fixtures, including distribution of residential conservation kits and rebates for customer investments in water conservation;

(d) Adoption of rate structures, billing schedules, and other associated programs that support and encourage water conservation;

(e) Water reuse, recycling, and non-potable water opportunities; and

(f) Any other conservation measures identified by the water supplier that would improve water use efficiency.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02, Renumbered from 690-086-0140(2)

690-086-0160

Municipal Water Curtailment Element

The water curtailment element shall include at least the following:

(1) A description of the type, frequency and magnitude of supply deficiencies within the past 10 years and current capacity limitation. The description shall include an assessment of the ability of the water supplier to maintain delivery during long-term drought or other source shortages caused by a natural disaster, source contamination, legal restrictions on water use, or other circumstances;

(2) A list of three or more stages of alert for potential shortage or water service difficulties. The stages shall range from a potential or mild alert, increasing through a serious situation to a critical emergency;

(3) A description of pre-determined levels of severity of shortage or water service difficulties that will trigger the curtailment actions under each stage of alert to provide the greatest assurance of maintaining potable supplies for human consumption; and

(4) A list of specific standby water use curtailment actions for each stage of alert ranging from notice to the public of a potential alert, increasing through limiting nonessential water use, to rationing and/or loss of service at the critical alert stage.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02, Renumbered from 690-086-0140(3)

690-086-0170

Municipal Water Supply Element

The water supply element shall include at least the following:

(1) A delineation of the current and future service areas consistent with state land use law that includes available data on population projections and anticipated development consistent with relevant acknowledged comprehensive land use plans and urban service agreements or other relevant growth projections;

(2) An estimated schedule that identifies when the water supplier expects to fully exercise each of the water rights and water use permits currently held by the supplier;

(3) Based on the information provided in section (1) of this rule, an estimate of the water supplier's water demand projections for 10 and 20 years, and at the option of the municipal water supplier, longer periods;

(4) A comparison of the projected water needs and the sources of water currently available to the municipal water supplier and to any other suppliers to be served considering the reliability of existing sources;

(5) If any expansion or initial diversion of water allocated under existing permits is necessary to meet the needs shown in section (3) of this rule, an analysis of alternative sources of water that considers availability, reliability, feasibility and likely environmental impacts. The analysis shall consider the extent to which the projected water needs can be satisfied through:

(a) Implementation of conservation measures identified under OAR 690-086-0150;

(b) Interconnection with other municipal supply systems and cooperative regional water management; and

(c) Any other conservation measures that would provide water at a cost that is equal to or lower than the cost of other identified sources.

(6) If any expansion or initial diversion of water allocated under existing permits is necessary to meet the needs shown in section (3) of this rule, a quantification of the maximum rate and monthly volume of water to be diverted under each of the permits;

(7) For any expansion or initial diversion of water under existing permits, a description of mitigation actions the water supplier is taking to comply with legal requirements including but not limited to the Endangered Species Act, Clean Water Act, Safe Drinking Water Act; and

(8) If acquisition of new water rights will be necessary within the next 20 years to meet the needs shown in section (3) of this rule, an analysis of alternative sources of the additional water that considers availability, reliability, feasibility and likely environmental impacts and a schedule for development of the new sources of water. The analysis shall consider the extent to which the need for new water rights can be eliminated through:

(a) Implementation of conservation measures identified under OAR 690-086-0150;

(b) Interconnection with other municipal supply systems and cooperative regional water management; and

(c) Any other conservation measures that would provide water at a cost that is equal to or lower than the cost of other identified sources.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02, Renumbered from 690-086-0140(4)

Agricultural Water Supplier Water Management and Conservation Plans

690-086-0210 [Renumbered to 690-086-0040]

690-086-0220

General Provisions

(1) Certain agricultural water suppliers must have approved conservation plans to transfer water rights within the boundaries of the districts to other land within the districts (ORS 540.572 to 540.578). These rules provide the standards for those conservation plans.

(2) Each agricultural water supplier required to submit a water management and conservation plan shall exercise diligence in implementing the approved plan and shall update and resubmit a plan consistent with the requirements of OAR 690, division 86 as prescribed during plan approval.

(3) Any agricultural water supplier participating in the water transfer provisions in ORS 540.572 to 540.578 and OAR 690-021-0070 to 690-021-0700 shall submit an annual report describing progress-to-date in implementing a water management and conservation plan.

(4) Water management and conservation plans submitted by agricultural water suppliers shall meet the requirements listed in OAR 690-086-0225 to 690-086-0270.

(5) A water conservation plan prepared in accordance with criteria of the Bureau of Reclamation and substantially meeting the requirements of OAR 690-086-0225 to 690-086-0270 may be submitted to meet the requirements of these rules.

(6) At least 30 days prior to submitting a draft plan to the Department, an agricultural water supplier shall make the draft plan available for review by each affected local government.

(7) Each agricultural water supplier preparing a water management and conservation plan is encouraged to develop and implement a program to involve the supplier's patrons in the preparation of the plan. Recommendations include making the plan available for public inspection and conducting public meetings to provide information and gather input on the plan.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02

690-086-0225

Agricultural Water Supplier Plan Elements

A water management and conservation plan submitted by an agricultural water supplier shall include:

(1) An agricultural water supplier description as described under OAR 690-086-0240;

(2) An agricultural water conservation element as described under OAR 690-086-0250;

(3) An agricultural water allocation/curtailment element as described under OAR 690-086-0260;

(4) An agricultural water supply element as required under OAR 690-086-0270;

(5) A list of the affected local governments to whom the draft plan was made available pursuant to OAR 690-086-0220(6) and a copy of any comments on the plan provided by the local governments;

(6) A proposed date for submittal of an updated plan based on the proposed schedule for implementation of conservation measures, any relevant schedules for other community planning activities, and the rate of growth of or other changes expected by the water supplier; or an explanation of why submittal of an updated plan is unnecessary and should not be required by the Department.

Stat. Auth.: ORS 536.027, 537.211 and 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 4 2002, f. & cert. ef. 11-1-02

690-086-0240

Agricultural Water System Description

The description of the water system shall include at least the following information:

(1) General location of water right acreage, numbers of the associated water right certificates and permits and a description of relevant conditions of the water rights including the seasons of use and the uses of any other permitted withdrawals by the supplier;

(2) Source(s) of water; storage and regulation facilities; and a summary of any transfer, rotation, exchange or intergovernmental cooperation agreements;

(3) A schematic of the system showing storage and distribution facilities, drainage systems, measurement stations, generalized district boundaries, points of diversion and locations of major operational spills;

(4) Current water use, including peak and average annual diversions and, when available, water reuse and return flows;

(5) A summary of major classifications of user accounts showing water right acreages, the number of accounts of each classification, and the beneficial uses for which water is provided (irrigation, frost protection, temperature control, agricultural use, livestock, domestic, etc.);

(6) Types of on-farm irrigation systems common within the supplier's accounts;

(7) A general characterization of crops commonly grown and the estimated average and peak consumptive use of the crops; and

(8) A description of the operation and maintenance program.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02

690-086-0250

Agricultural Water Conservation Element

The water conservation element shall include at least the following:

(1) A progress report on the conservation measures scheduled for implementation in the water management and conservation plan previously approved by the Department, if any;

(2) A description of the water supplier's agricultural water measurement program and a statement that the program complies with the measurement and reporting standards in OAR chapter 690, division 85, that a time extension or waiver has been granted, or that the standards are not applicable;

(3) A description of other conservation measures currently implemented by the water supplier;

(4) Short- and long-term goals of the water supplier to improve water management;

(5) An evaluation of the opportunities for improving water use efficiency which includes:

(a) A description of losses of water from canals, pipelines, and laterals, including any operational spills;

(b) An assessment of the extent to which water deliveries are insufficient to meet crop needs;

(c) A list of alternative conservation measures to reduce the losses of water identified in subsection (a) of this section and address any insufficiencies of water deliveries identified in subsection (b) of this section; and

(d) An assessment of existing and future alternatives to finance conservation measures including an analysis of the possibility of applying for the allocation of conserved water (OAR 690-018-0010 to 690-018-0090).

(6) For each of the following conservation measures not currently being implemented, and evaluation of whether implementation of the measure is feasible and appropriate for ensuring the efficient use of water and the prevention of waste:

(a) Promotion of energy audits offered through local electric utilities for district water users;

(b) Conversion to metered, pressurized deliveries to all parcels of one acre or less;

(c) Piping or lining earthen canals;

(d) Modifying distribution facilities and district policies to increase the flexibility of water deliveries;

(e) Provision of on-farm irrigation scheduling assistance;

(f) Construction of re-regulating reservoirs;

(g) Adoption or rate structures that support and encourage water conservation;

(h) Each of the conservation measures listed in OAR 690-086-0250(5)(c); and

(i) Any other conservation measures identified by the water supplier that would improve water use efficiency.

(7) A description and estimated schedule for implementation of each of the following conservation measures:

(a) An information and education program aimed at improving the efficiency of use of water delivered. The program should address all types of uses served and include voluntary water use audits; and

(b) Any other conservation measures identified as feasible and appropriate under section (6) of this rule.

(8) A program to monitor and evaluate the effectiveness of the conservation measures which are implemented.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02, Renumbered from 690-086-0240(2)

690-086-0260

Agricultural Water Allocation/Curtailment Element

The water allocation/curtailment element shall include at least the following:

(1) A description of the frequency and magnitude of past supply deficiencies and current capacity limitation. The description shall include an assessment of the ability of the water supplier to maintain delivery during drought or other source shortages.

(2) A description of the water supply situation(s) that cause the water allocation/curtailment element to be implemented, including identification of the supply situations which trigger warnings to users or public notice of impending shortage;

(3) A description of the procedure used to allocate water during water shortages.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02, Renumbered from 690-086-0240(3)

690-086-0270

Agricultural Water Supply Element

The long-range water supply element shall include at least the following:

(1) An estimate of the water supplier's long-range water demand projections for 20 years;

(2) A comparison of the projected water needs and the size and reliability of water rights permits or other current water supply contracts held by the water supplier;

(3) A list of potential sources of water, including conservation and reuse, to supply the long-range needs;

(4) A comparison among the potential sources of additional water considering costs, availability, reliability, and likely environmental impacts;

(5) An evaluation of the effects of the following factors on long-range water needs:

(a) Regional options for meeting future water needs;

(b) Urbanization and other land-use trends;

(c) Provisions in affected local governments' comprehensive plans relating to agricultural lands, urbanization, water resources, water supply, public facilities and services, and any other pertinent plan element or ordinance relating to uses or lands served, or proposed to be served, under the long-term water supply plan.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02, Renumbered from 690-086-0240(4)

Water Management and Conservation Plan Review and Enforcement

690-086-0900

Water Management and Conservation Plan Review, Approval and Enforcement

(1) The rules in OAR 690-086-0900 to 690-086-0920 set out the process and criteria for the Department's review, approval and enforcement of the water management and conservation plans submitted by agricultural and municipal water suppliers. The rules apply to the submittal and review of draft plans, proposed final plans, and subsequent updates.

(2) During the plan review and approval process, the Department may allow additional time for a municipal water supplier to implement water metering under OAR 690-086-0150(4)(b) or a benchmark established in a previously approved plan if the water supplier shows that additional time is necessary to avoid unreasonable and excessive costs.

(3) Notwithstanding any of the requirements of these rules, except OAR 690-086-0150(2) and 690-086-0250(2), the Department may approve a water management and conservation plan if the plan is generally consistent with the applicable criteria and includes a schedule for completion within five years of any additional work necessary to satisfy the requirements.

(4) Any plan approval that contains a requirement that a municipal water supplier complete additional work under section (3) of this rule shall preclude additional diversion of water under an extended permit beyond the need quantified for the next two years.

Stat. Auth.: ORS 536.025 & ORS 536.027
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 4 2002, f. & cert. ef. 11-1-02

690-086-0905

Notice of Submittal of a Draft Plan or Updated Plan

(1) The Department shall notify affected local governments, affected Indian tribes, and all persons on the Department's weekly mailing list that a draft water management and conservation plan prepared under the requirements of OAR 690-086-0125 or 690-086-0225 has been submitted to the Department and is available for review.

(2) Any person may review and submit written comments on the draft plan within 30 days of the notification in section (1) of this rule. Written comments submitted under this subsection must cite specific provisions of concern in the draft plan, describe how each of the provisions cited do or do not satisfy the requirements of OAR chapter 690, division 086, suggest any modification in each provision that would be necessary to satisfy the relevant requirement, and include information to support any suggested modifications.

Stat. Auth.:ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02, Renumbered from 690-086-0910(1) & (2)

690-086-0910

Preliminary Review of Draft Plans

(1) The Department shall undertake a preliminary review of the draft plan and the comments received pursuant to OAR 690-086-0905 to determine whether the plan includes the required elements of 690-086-0120 to 690-086-0170 or 690-086-0220 to 690-086-0270.

(2) For a plan submitted by a municipal water supplier, the Department shall review the plan to determine if the information and analyses in the plan are sufficient for the Department to make the determination required under OAR 690-086-0130.

(3) For a plan submitted by an agricultural water supplier the Department shall review the plan to determine whether:

(a) The plan includes the information required in OAR 690-086-0240;

(b) The water supplier has complied with the requirements of OAR 690-086-0250 and has included a description of the actions to be taken in the implementation of water conservation measures that are feasible and appropriate for ensuring the efficient use of water and the prevention of waste; considering:

(A) The economic feasibility of the measures for the water supplier;

(B) Any likely adverse environmental impacts of implementation of the measures;

(C) Whether the measures are available and proven;

(D) The time needed to implement the measures;

(E) The effects of local variations in soil type and weather on the potential for successful implementation of the measures; and

(F) Whether the measures are consistent with other relevant water management plans and subbasin conservation plans.

(c) The water allocation/curtailment element prepared under OAR 690-086-0260 satisfactorily promotes water curtailment practices and the coordination of usage regulation, taking into account state water law and local conditions, or is substantially the same as a curtailment plan prepared pursuant to ORS 536.780 and OAR 690-019-0090 and approved by the Department within the previous five years; and

(d) The water supplier has included the information required in OAR 690-086-0270, and, in the list of potential sources of water to meet projected demands, included the development of any conservation measures which are available at a cost which is lower than the cost of other

identified sources or has provided sufficient justification for the factors used in selecting other sources for development.

(4) Upon completion of the preliminary review and no later than 90 days after receipt of a draft plan, the Department shall:

(a) After considering public comments, provide the Department's written comments on the plan to the water supplier and any person who submitted comments pursuant to OAR 690-086-0905; or

(b) After considering public comments if the Department determines that the draft plan includes the required plan elements under OAR 690-086-0125 or 690-086-0225, and for municipal water supply plans, that the plan meets the criteria under 690-086-0130, issue a final order approving the plan pursuant to 690-0086-0915(4) or (5) and notify any person who submitted comments pursuant to 690-086-0905 of the issuance of the order.

(5) The Department shall include in its written comments prepared under section (4) of this rule:

(a) For each deficiency identified in the review, a citation of the relevant statute or rule;

(b) To the extent possible, identification of any constraints to implementation of the water management and conservation plan and recommendations on appropriate actions to secure any identified new sources of water;

(c) An evaluation of the extent to which a request for additional time under OAR 690-086-0900 (2) satisfies the relevant requirements of the rules;

(d) A prescribed reasonable period of time of not less than 60 days, identified in consultation with the water supplier, for the water supplier to respond to the Department's review and to submit a proposed final plan; and

(e) Copies of any written comments received pursuant to OAR 690-086-0905.

(6) If the Department does not meet the 90-day deadline in section (4) of this rule:

(a) For purposes of ORS 540.572, a plan submitted by an agricultural water supplier after November 1, 2002, is deemed approved for the period from the expiration of the 90-day deadline until 120 days after the Department provides written comments under section (5) of this rule; and

(b) For municipal water suppliers whose additional diversion of water under an extended permit is only authorized upon issuance of a final order approving a water management and conservation plan, notwithstanding OAR chapter 690, division 315, the Director may by order authorize diversion of an additional specified quantity of water as necessary to prevent harm to public welfare, safety and health.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02

690-086-0915

Final Review of Plans

(1) Upon receipt of a proposed final plan, the Department shall evaluate the plan to determine if it includes the required elements of OAR 690-086-0125 to 690-086-0170 for municipal water suppliers or 690-086-0225 to 690-086-0270 for agricultural water suppliers. The evaluation shall be limited to a review of modifications in the plan and issues that were identified in the Department's written comments provided under 690-086-0910 and, if any deficiencies are identified, the Department's review shall cite the relevant statute or rule.

(2) If the Department determines that the final plan does not include the required elements of OAR 690-086-0120 to 690-086-0170 or 690-086-0220 to 690-086-0270, the Department shall consult with the water supplier and may provide additional time to correct any discrepancies.

(3) For a water management and conservation plan submitted by a municipal water supplier, the Department shall review the plan to determine if the information and analyses in the plan are sufficient for the Department to make the determination required under OAR 690-086-0130.

(4) For a water management and conservation plan submitted by a municipal water supplier, if the Department determines that the proposed final plan includes the required elements under OAR 690-086-0120 to 690-086-0170 and meets the applicable criteria under 690-086-0130, the Department shall issue a final order approving the plan and notify the water supplier and any person who submitted comments pursuant to 690-086-0905 of the approval. The Department's order shall include the following:

(a) A quantification of the maximum amount of water to be diverted during the next 20 years under each extended permit, or for a longer period as specified for an extended reservoir permit;

(b) The date on which an updated plan shall be submitted to the Department. A municipal water supplier may submit an updated plan at any time prior to the date specified if necessary to accommodate unanticipated events, but the Department shall not require submittal of an updated plan earlier than five years after issuance of the order approving the plan; and

(c) A schedule for submittal of five-year progress reports on implementation of the water conservation and supply measures described in the plan.

(5) For a water management and conservation plan submitted by an agricultural water supplier, if the Department determines that the proposed final plan satisfies the relevant requirements or if the water supplier satisfactorily corrects any identified discrepancies, the Department shall issue a final order approving the plan and notify the water supplier and any person who submitted comments pursuant to OAR 690-086-0905 of the approval. The Department shall specify in the order approving the plan if an updated plan shall be required and, if so, the date on which the updated plan shall be submitted to the Department. The Department shall not require submittal of an updated plan earlier than five years after issuance of the order approving the plan.

(6) The Department shall issue a final order denying approval of the plan and notify the water supplier and any person who submitted comments pursuant to OAR 690-086-0905 of the issuance of the order if:

(a) The Department determines that the proposed final plan does not contain the plan elements required under OAR 690-086-0125 or 690-086-0225;

(b) For municipal water suppliers, the plan does not meet the criteria under OAR 690-086-0130;

(c) The municipal water supplier has failed to adequately justify a request for additional time to implement water metering under OAR 690-086-0150(4)(b) or a benchmark established in a previously approved plan; or

(d) The work plan submitted under OAR 690-086-0900(3) is insufficient for completing the additional work necessary to satisfy the requirements of these rules.

(7) The Department may deny approval of a water management and conservation plan if the water supplier fails to submit a final plan to the Department within 120 days after receipt of the Department's preliminary review.

(8) If the Department issues a final order denying approval of the plan, the water supplier may request that the Department reconsider the order and the Director appoint a five-member review board to review the plan. The board shall include at least two individuals from the basin in which the supplier is located who are engaged in similar uses of water, the local watermaster, and other individuals knowledgeable about water use practices and water conservation. After reviewing the plan and evaluating any additional information presented by the water supplier and the Department, the board may recommend that the Department:

(a) Reconsider the decision not to approve the plan;

(b) Reconsider the decision not to approve the plan contingent on the water supplier agreeing to specified modifications; or

(c) Reaffirm the original decision not to approve the plan.

(9) The Department shall notify the water supplier, the members of the review board, and any person who submitted comments pursuant to OAR 690-086-0905 of any action taken based on the board's recommendation.

(10) The water supplier or a person who has submitted comments pursuant to OAR 690-086-0905 may, within 30 days of a notification pursuant to OAR 690-086-0910(5)(b) or section (4), (5), (6), or (9) of this rule, appeal a decision by the Department to approve or to not approve a plan to the Commission. The Commission may deny the appeal or may accept the appeal and remand the plan to the Department to seek resolution of the issues identified in the appeal and, if the issues are not resolved, to initiate a contested case proceeding pursuant to ORS 183.413 and OAR chapter 690, divisions 1 and 2.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 4 2002, f. & cert. ef. 11-1-02, Renumbered from 690-086-0910(7)

690-086-0920

Enforcement

If the Director determines that a water supplier has failed to submit a water management and conservation plan as required under OAR 690-086-0010 to 690-086-0270 or has failed to satisfactorily implement an approved water management and conservation plan, the Director may proceed with one or more of the following actions:

(1) Provide an additional, specified amount of time for remedy;

(2) Initiate an evaluation of the supplier's water management practices and facilities to determine if the use of water is wasteful;

(3) Initiate regulation of water use under OAR 690-250-0050 to eliminate waste;

(4) Rescind a previous approval of a water management and conservation plan; and

(5) If the submittal of the water management and conservation plan is required under a condition of a permit or an extension approved under OAR chapter 690, division 315 or 320, assess a civil penalty under OAR 690-260-0005 to 690-260-0110 or cancel the permit.

Stat. Auth.: ORS 536.027, ORS 537.211 & ORS 540.572
Stats. Implemented: ORS 537.230, ORS 537.630 & ORS 539.010
Hist.: WRD 11-1994, f. & cert. ef. 9-21-94; WRD 11-1994, f. & cert. ef. 9-21-94

APPENDIX B

CITY of NEHALEM
WATERLINE AND HYDRANT MAPPING

SCALE: 1"=2800'

2015

2" PVC
2" STEEL
2" HDPE
4" PVC
4" A/C
4" HDPE
6" PVC
6" HDPE
8" PVC
8" HDPE
10" PVC
10" HDPE
12" PVC

URBAN GROWTH BOUNDARY

CITY LIMITS

WATER SERVICE AREA

RAW WATER INTER-TIE W/ MANZANITA

BOB'S CREEK INTAKE/DIVERSION

Bob's Creek

URBAN GROWTH BOUNDARY

TRANSMISSION LINE ROUTE MARKHAM (1961)

TREATMENT PLANT

RESERVOIR

NORTH FORK ROAD

DIVISION ST

Nehalem River

McDONALD ROAD

Anderson Creek

Coal Creek

North Fork Nehalem

Neahkahnie Creek

Alder Creek

101

INTER TIE W/ CITY OF MANZANITA

Manzanita

EXISTING BOOSTER PUMP

B ST

A ST

10TH ST

9TH ST.

THE PROMENADE

BAYSIDE GARDENS RD.

TOHL AVE

FERN WAY

NEPTUNE WAY

Nehalem

Bayside Gardens

Alder Creek

Nehalem Bay

TIDELAND ROAD

NEHALEM POINT

Mohler

53

GRAPHIC SCALE
1400 0 700 1400 2800
SCALE: 1"=2800'

otak
- SURVEYING
- CIVIL ENGINEERING
- PLANNING
- WATER RIGHTS
- WETLAND CONSULTING

CLATSOP COUNTY
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APPENDIX C

DRAFT HOUSING NEEDS ANALYSIS – NEHALEM

Revised August 3, 2007

Statewide Planning Goal 10 requires cities to plan for future housing needs. More specifically, it requires them to provide opportunities for the development of adequate numbers of needed housing units at price ranges and rent levels that are commensurate with the financial capabilities of Oregon households. It also requires that they allow for flexibility of housing locations, types and densities. They are required to ensure that there is enough land within their urban growth boundary (UGB) to meet these needs for a 20-year period. The following steps have been taken to ensure that the City of Nehalem meets these objectives:

- Conducted an inventory of "buildable" land within the City's UGB that is zoned to allow for housing development.
- Identified long-term (20-year) needs for additional housing, considering the following factors:
  - Recent, current and expected future population trends related to household size, income and age.
  - Housing market characteristics, including the current mix of housing, cost of different types of housing, vacancy rates and other factors.
  - Types of housing allowed by different zoning classifications.
- Compared the supply of land in different zones to the estimated need for housing in each zone to ensure that there is enough land within the City's UGB and that it is zoned appropriately to meet long-term housing needs.

The remainder of this document describes these efforts and the resulting findings. It is a snapshot in time of the ability of the City to meet long-term needs of future residents and should be reassessed and updated periodically to ensure that the City can continue to meet these needs. This analysis also will be conducted within a larger regional context – i.e., considering the combined housing needs and land supplies of the communities of Manzanita, Nehalem, Neahkahnie and Wheeler. This report is a revised draft of an earlier version prepared and presented to a project advisory committee in March, 2007.

LAND SUPPLY

Buildable land within the City's UGB includes land that is completely vacant, as well as land that is partially vacant and theoretically has the potential for additional development based on parcel size, zoning, the location of existing development and environmental constraints. The buildable land supply was evaluated by reviewing the following information:

- Tax assessor data
- GIS data

- Aerial photographs
- Site visits to identify potential constraints to development or redevelopment
- Consultation with City staff and members of the Nehalem Project Advisory Committee

There are approximately 207 acres of buildable land on 241 lots within Nehalem's UGB, excluding land zoned for industrial or water-dependent use. Land considered potentially unbuildable due to environmental constraints was removed from the inventory summarized in Table 1. Environmental constraints include riparian areas, significant wetlands and slopes of greater than 25%. Lots that are too narrow or small to meet minimum lot size requirements are also considered unbuildable, as have portions of existing subdivisions which are dedicated to open space in perpetuity.

Table 1. Gross Buildable Land by Zoning Designation, Nehalem UGB

Zone	Acres	Lots
C	4.07	15
LM	1.70	1
Total	*5.77*	*16*
A1	2.00	1
MR	1.43	1
R1	23.70	37
R2	62.39	57
R3	19.15	34
RL	30.69	53
RM	8.95	33
RT	53.55	9
Total	*201.86*	*225*
	207.63	***241***

To more realistically assess the potential for future housing units, additional land was deducted from lots larger than one acre in size to account for land needed for roads and other public facilities. In addition, the acreage for each parcel was converted to the capacity for new buildable lots, assuming the average lot size/densities shown in Table 11 and rounding the acreage down to the nearest whole lot.

Subtracting the areas described above and converting land to buildable lot or housing unit capacity leaves Nehalem with the equivalent of approximately 149 acres of land within the UGB zoned for residential use. This includes some parcels zoned for commercial use, in which residential uses also are allowed.

Table 2. Net Buildable Land by Zoning Designation, Nehalem UGB

Designation	Acres
C	2.8
MR	2.2
RL	19.8
RM	5.8
R1	15.7
R2	42.8
R3	13.0
RT	46.6
Total	***148.6***

Source: Cogan Owens Cogan

POPULATION PROJECTIONS

Local governments are required by the Oregon Department of Land Conservation and Development (DLCD) administrative rules to use coordinated county and city population projections for the purposes of estimating housing and employment needs. If other projections are used, the jurisdiction must prepare and present enough data to justify the use of the alternative projections. Use of alternative projections ultimately requires the city and county to revise the coordinated county and city projections. Such a process typically requires a significant level of resources and takes several months. Tillamook County worked with cities within the county to prepare a set of coordinated population projections in 2002. The projections included a set of low and high estimates for each city in the County.

For the purposes of this analysis, the consulting team has used a modified set of current population estimates. Use of an updated 2006 population estimate can be accomplished through a minor amendment to the coordinated forecast. County, city and DLCD representatives have tentatively agreed that modifications to the 2006 population estimate for Nehalem are merited by the fact that the coordinated forecast appears to include only the population within the city limits as indicated by a comparison of the forecasts with historical Census data. The current estimate needs to be adjusted to include population within the entire urban growth boundary (UGB) of Nehalem.

There is a significant number of housing units in the area between the city limits and the UGB (over 400 or almost three times the number within the city limits), which includes an estimated 640 additional people, assuming similar occupancy rates within and outside the city limits. When added to the PSU 2006 estimate within the City of 220, the total estimated population within the UGB was 922 people in 2006.

While the project team has agreed to modify the estimated 2006 population estimate, the growth rates assumed in the coordinated city and county population forecasts will continue to be used. The forecast assumes a future growth rate of approximately 1% per year over the next 20 years. This growth rate is consistent with the growth rate experienced in recent years.

Table 3 summarizes historical and projected future population, assuming an updated current (2006 population estimate) and the future growth rate assumed in the coordinated county-city forecasts. It also accounts for population within the entire UGB as described above.

Table 3. Historical and Future Population Data and Forecasts, Nehalem UGB

	1990 *	2000*	2006	2017	2027
Population	170	203	860	963	1,067

* Includes only estimated population within the city limits. Estimates for future years include population estimated within the entire UGB.

HOUSING OCCUPANCY AND STRUCTURE TYPE

In 2006, based on the local estimates of housing units and vacancy rates, there were an estimated 396 households in the Nehalem UGB. There were an estimated 582 housing units in Nehalem in 2006, indicating a vacancy rate of approximately 32%. The majority of vacant housing units were used for seasonal occupancy (i.e., second/vacation homes).

A majority of year-round occupied and total homes in Nehalem are single-family dwellings (over 79% in 2000), with manufactured homes accounting for the majority of the remainder (17.1%) according to the 2000 Census.

Table 4. Housing Units by Structure & Occupancy, City of Nehalem, 2000

Unit Type	Total	Occupied
1 Unit Detached	79.1%	77.2%
1 Unit Attached *	1.6%	2.2%
2 Units	0.0%	0.0%
3 or 4 Units	2.3%	3.3%
5-9 Units	0.0%	0.0%
10-19 Units	0.0%	0.0%
20-49 Units	0.0%	0.0%
50+ Units	0.0%	0.0%
Manufactured Homes	17.1%	17.4%
Other	0.0%	0.0%

Source: US Census

* This is the Census term for single-family attached housing (e.g., townhouses or rowhouses)

In the City of Nehalem, 75% of year-round residents own their homes, while 25% are renters.

HOUSING COSTS, HOUSEHOLD INCOMES AND HOUSING AFFORDABILITY

Average and median home values in 2006 were approximately $281,000 and $254,000 respectively; with 44% of homes in the $100,000 - $300,000 price range and 22% in the $300,000 - $400,000 (see Table 5). Anecdotal information from project advisory committee members indicates that this data likely underestimates local housing costs.

Table 5. Home Value of Specified Owner Units, City of Nehalem, 2006

Home Value	Number of Homes	% of Total
Less than $50,000	6	8%
$50,000-$99,999	4	6%
$100,000-$149,999	7	10%
$150,000-$199,999	13	18%
$200,000-$299,999	12	16%
$300,000-$399,999	16	22%
$400,000-$499,999	7	10%
$500,000-$749,999	7	10%
$750,000-$999,999	1	1%
$1,000,000 and Above	0	0%
Total Units	**73**	100%
Average Home Value: $281,301		
Median Home Value: $254,167		

Source: US Census, ESRI BIS, Marketek

Table 6 summarizes data related to household income for Nehalem residents in comparison to the state as a whole. It indicates a median household income of under $38,000 in Nehalem, about $12,500 less than for the state as a whole. It also shows a higher percentage of residents in the four lowest income categories in Nehalem compared to the state, and a lower percentage in almost all of the higher income ranges, compared to other parts of the state.

Table 6. Household Income, City of Nehalem, 2006

Income	Nehalem	State of Oregon
Less than $15,000	14.6%	11.9%
$15,000 to $24,999	13.5%	10.4%
$25,000 to $34,999	16.9%	11.1%
$35,000 to $49,999	20.2%	16.6%
$50,000 to $74,999	14.6%	20.8%
$75,000 to $99,999	6.7%	12.5%
$100,000 to $149,999	6.7%	10.8%
$150,000 to $199,999	2.2%	3.0%
$200,000 and more	4.5%	2.9%
Median Household Income	**$37,619**	**$50,051**

Source: ESRI BIS, Marketek

Housing affordability is typically assessed in one of two ways – either by estimating the percentage of households which spend more than 30% of their monthly income on housing (the standard measure of affordability) or by comparing incomes to the supply of housing at prices that people in those income levels could afford. The most recently available data related to the first measure comes from the 2000 US Census. That data indicated that almost 23% of all homeowner households spent more than 30% of their incomes on housing, while about 26% of renter households did the same. These percentages likely have climbed since the year 2000, given increases in housing costs, particularly for owner-occupied housing during this period.

Table 7 compares household incomes to the supply of homes available at prices that those households could afford if they spent approximately 30% of their monthly income on housing costs. Unfortunately this data only covers households within the city limits of Nehalem, although similar trends may be present within the UGB. The table indicates that there is a significant gap between the residents' incomes and housing that is affordable to them in most income categories below $75,000 household income.

Table 7. Comparison of Housing Incomes and Costs, City of Nehalem, 2006

Income	*Households*	*Affordable Monthly Housing Costs*	*Supply*			*Surplus/ -Gap*
			Owner housing	*Rental housing*	*Total*	
Less than $15,000	13	Less than $325	5	0	5	-8
$15,000 to $24,999	12	$325-$624	4	14	18	6
$25,000 to $34,999	15	$625-$874	5	4	9	-6
$35,000 to $49,999	18	$875-$1249	6	1	7	-11
$50,000 to $74,999	13	$1250-$1874	12	0	12	-1
$75,000 to $99,999	6	$1875-$2499	13	0	13	7
$100,000 to $149,999	6	$2500-$3749	16	0	16	10
$150,000 to $199,999	2	$3750-$4999	7	0	7	5
$200,000 and more	4	$5000 or more	2	0	2	-2

PROJECTION OF FUTURE HOUSEHOLDS AND HOUSING UNITS

As noted previously, the number of future housing units needed and built in Nehalem will be affected not only by the projected increase in population but also by the future vacancy and seasonal home occupancy rates. For example, if the vacancy rate does not change, for every three new people who move to Nehalem to live full time, one more house will be needed for a seasonal occupant. However, if the seasonal occupancy rate increases overall, the even more housing units and land will be needed.

For these reasons, assumptions about the future vacancy rate are very important. At 32%, Nehalem currently has a relatively moderate seasonal occupancy rate, compared to other coastal communities. It is much lower than Manzanita's (73%) but higher than Warrenton's (13%). There have been no future projections of changes in seasonal occupancy rates for Nehalem or the North Coast area published by public agencies or private firms. However, some information is available about national trends for the second home market and trends in other communities on the north coast, including the following observations and predictions:

- Approximately one in six owners of second homes has purchased their second homes for retirement.
- The typical current second home owner is in his or her early 60s, with an annual household income of $76,000.
- The baby-boomer population, many of whom are nearing retirement age own a large share of existing second homes. On average, future second-home buyers are expected to be younger.
- While many second home owners move into these homes full-time after retirement, a large percentage of coastal second-home owners eventually return to larger urban areas where they are closer to health and other support services.
- Real estate and housing industry representatives note an increasing percentage of homes being built and sold for the second-home market in communities such as Astoria and Warrenton that have had historically lower seasonal occupancy rates than other cities on the coast (e.g., Cannon Beach and Manzanita).
- Most project advisory committee members predict that the seasonal occupancy rate in Nehalem will increase over the next 20 years, partly as a result of spillover effect from Manzanita.

Taking the above factors into account, for the purposes of this analysis, the seasonal occupancy is projected to increase slightly over the next 20 years from 32% to 40%. Average household sizes are expected to remain approximately the same (2.33 persons per household).

Table 8. Historical and Projected Future Population, Households and Housing Units, Nehalem UGB, 1990 - 2027

	1990 *	2006	2017	2027
Population	170	922	1,032	1,144
Households	71	396	449	497
Housing Units		582	702	828
Vacancy Rate		32%	36%	40%

* City limits only

FUTURE NEEDED HOUSING TYPES

The following trends are expected to affect the need for different types of housing:

- Increasing cost of land and housing in coastal and other communities throughout Oregon. Housing costs are significantly higher in Nehalem than statewide averages and in the other two study area communities.
- Relatively modest increases in wages, consistent with trends during the last ten years.
- Continued need for relatively low cost housing for households and families with lower incomes, including workers in the retail/tourism sector, particularly in Wheeler and Nehalem where median household incomes are significantly lower than statewide figures.
- Continued need for some manufactured housing as a potential supply of low-cost, workforce housing.
- A somewhat higher seasonal occupancy rate based on spillover effects from Nehalem and other nearby coastal communities with higher seasonal occupancy rates and higher land and housing prices.
- Potential increase in need and market for multi-family and single-family attached housing as a potential supply of low and moderate cost housing. May be limited opportunities for developing this type of housing on a large scale, given community size and building industry, particularly in Nehalem and Wheeler.

The following table identifies current and projected percentages and numbers of homes by housing type in Nehalem.

Table 9. Existing and Projected Future Housing Units by Type, Nehalem UGB, 2006 - 2027

Unit Type	Housing Units			
	2006		2027	
	Number	*Percent*	*Number*	*Percent*
1 Unit Detached	449	77.2%	555	67.0%
1 Unit Attached*	13	2.2%	41	5.0%
Duplexes	0	0.0%	41	5.0%
Triplexes, fourplexes	19	3.3%	33	4.0%
5 or more units	0	0.0%	33	4.0%
Manufactured Home	101	17.4%	124	15.0%
Total Units	**582**		**828**	

Source: US Census and Cogan Owens Cogan

* This is the Census term for single-family attached housing (e.g., townhouses or rowhouses)

FUTURE LAND NEEDS

The amount of land needed for future housing depends on the number of housing units expected and the average density (or lot size) at which they are developed. State regulations require that the City estimate the amount of land needed in each zoning designation where housing is allowed. In Nehalem, housing can be constructed in several residential (MR, RL, RM, R-1, R-2, R-3 and RT) and commercial (C) zones. Based on the types of housing allowed and the relative supply of buildable land in each zone, the following future distribution among zones is expected:

- About one-third of new single-family detached housing is expected to be located in the R-2 zone, with modest amounts (15% each) in the RL, R-1 and R-3 zones and small amounts in the other zones.
- Single-family attached housing will be located primarily in the R-3 zone, with modest amounts in the C, R-2 and R-1 zones and a small amount in the RM zone.
- Duplexes will be located primarily in the R-2 zone, with modest amounts in the R-3, RL and RM zones.
- Multi-family housing will be located exclusively in the R-3 zone, the only zone in which it is allowed.
- Mobile homes will continue to be located primarily in RT zone, with smaller amounts in other residential zones.

The following two tables summarize the projected distribution and average density of future development by housing type and city zoning designation based on the assumptions above and should be considered a projection. It does not require a certain distribution among different zones or preclude a different percentage or number of

housing units be built in any given zone or area, assuming there is adequate land to accommodate them.

Table 10. Projected Distribution of Future Housing Units by Housing Type and Zoning Designation, Nehalem UGB, 2027

Housing Type	MR	RL	RM	R-1	R-2	R-3	RT	C
1 Unit Detached	3%	15%	5%	17%	35%	15%	10%	0%
1 Unit Attached *	0%	0%	5%	15%	20%	45%	0%	15%
Duplexes	5%	10%	15%	0%	40%	20%	5%	5%
Triplexes, four-plexes	0%	0%	0%	0%	0%	100%	0%	0%
5 or more units	0%	0%	0%	0%	0%	100%	0%	0%
Manufactured Home	0%	10%	10%	5%	5%	5%	65%	0%

Source: Cogan Owens Cogan

* This is the Census term for single-family attached housing (e.g., townhouses or rowhouses)

Table 11. Projected Average Lot Size for Development by Zoning Designation and Housing Type, Nehalem UGB, 2027

Housing Type	MR	RL	RM	R-1	R-2	R-3	RT	C
1 Unit Detached	5,000	10,000	5,000	7,500	5,000	5,000	5,000	5,000
1 Unit Attached *			3,700	3,700	3,700	3,700		3,700
Duplexes	3,700	8,700	3,700		3,700	3,700	3,700	3,700
Triplexes, four-plexes						3,300		
5 or more units						2,500		
Manufactured Home		10,000	5,000	7,500	5,000	5,000	5,000	5,000

Source: Cogan Owens Cogan

* This is the Census term for single-family attached housing (e.g., townhouses or rowhouses)

Tables 12 and 13 indicate the number of new housing units and amount of land needed for each type of housing in each zoning designation. Average densities in housing units per acre are shown as "net densities," i.e., not including land needed for roads and other public services because such areas already have been subtracted from the supply of buildable land.

Table 12. Projected Total Future Housing Units and Acres of Land Needed by Housing Type and Zoning Designation, MR, RL, RM AND R-1 zones, Nehalem UGB, 2027

Housing Type	MR		RL		RM		R-1	
	Units	*Acres*	*Units*	*Acres*	*Units*	*Acres*	*Units*	*Acres*
1 Unit Detached	3	0.4	16	3.8	5	0.6	18	3.2
1 Unit Attached *	0		0		1	0.1	4	0.3
Duplexes	2	0.2	4	0.3	6	0.5	0	
Triplexes, four-plexes	0		0		0		0	
5 or more units	0		0		0		0	
Manufactured Home	0		2	0.5	2	0.2	1	0.2
Total	***5***	***0.5***	***22***	***4.6***	***14***	***1.4***	***23***	***3.7***

Source: Cogan Owens Cogan

* This is the Census term for single-family attached housing (e.g., townhouses or rowhouses)

Table 13. Projected Total Future Housing Units and Acres of Land Needed Designation, R-2, R-3 and RT zones, Nehalem UGB, 2027

Housing Type	R-2		R-3		RT		C	
	Units	*Acres*	*Units*	*Acres*	*Units*	*Acres*	*Units*	*Acres*
1 Unit Detached	37	4.3	16	1.9	11	1.3	0	0.0
1 Unit Attached *	6	0.5	13	1.1	0		4	0.3
Duplexes	16	1.4	8	0.7	2	0.2	2	0.2
Triplexes, four-plexes	0		14	1.1	0			
5 or more units	0		33	1.9	0			
Manufactured Home	1	0.1	1	0.1	15	1.8	0	0.0
Total	***60***	***6.4***	***85***	***6.9***	***28***	***3.2***	***6***	***0.5***

Source: Cogan Owens Cogan

* This is the Census term for single-family attached housing (e.g., townhouses or rowhouses)

The following table summarizes the difference between the supply of buildable land and the amount of land needed in each zone to meet these future land needs. This assessment indicates an overall surplus of residential land of over 121 acres.

Table 14. Comparison Between Land Supply and Need by Zoning Designation, Nehalem UGB, 2027

	Supply	Need	Surplus/(Gap)
MR	2.2	0.5	1.7
RL	19.8	4.6	15.3
RM	5.8	1.4	4.4
R1	15.7	3.7	12.0
R2	42.8	6.4	36.4
R3	13.0	6.9	6.1
RT	46.6	3.2	43.4
C	2.8	0.5	2.2
Total	***148.6***	***27.2***	***121.4***

Source: Cogan Owens Cogan

ALTERNATIVE LAND NEED SCENARIOS

We have identified two "what-if" scenarios to identify the implications of different assumptions about future growth rates and/or vacancy rates. Higher population growth rates and higher vacancy rates would both tend to increase the projected need for land within Nehalem. We have identified the following two possible scenarios in which vacancy and growth rates vary. No other factors were varied as they will have only marginal impacts on the projected land need. Many others also could be identified. However, the following represent an attempt to approximate higher land need situations.

- ***Alternative Scenario A***. Vacancy rates remain the same, while population rates increase to an annual average growth rate of 3.5%, similar to what has been experienced during the last six years.
- ***Alternative Scenario B***. Vacancy rates increase to 45% while population growth rates increase to an annual average growth rate of 3.5%.

Land needs for these three scenarios are summarized in Tables 15 and 16.

Table 15. Alternative *Scenario A*, Comparison Between Land Supply and Need by Zoning Designation, Nehalem UGB, 2027

(Average Annual Growth rate = 3.5%; Vacancy rate = 40%)

	Supply	Need	Surplus/(Gap)
MR	2.2	1.9	0.3
RL	19.8	19.9	0.0
RM	5.8	5.2	0.5
R1	15.7	15.9	-0.2
R2	42.8	23.5	19.3
R3	13.0	18.4	-5.4
RT	46.6	13.9	32.7
C	2.8	1.0	1.8
Total	***148.6***	***99.6***	***49.0***

Source: Cogan Owens Cogan

Table 16. Alternative *Scenario B*, Comparison Between Land Supply and Need by Zoning Designation, Nehalem UGB, 2027

(Average Annual Growth rate = 3.5%; Vacancy rate = 45%)

	Supply	Need	Surplus/(Gap)
MR	2.2	2.3	-0.2
RL	19.8	23.3	-3.4
RM	5.8	5.9	-0.1
R1	15.7	18.6	-2.9
R2	42.8	27.3	15.5
R3	13.0	21.0	-8.1
RT	46.6	16.5	30.1
C	2.8	1.1	1.6
Total	***148.6***	***116.0***	***32.6***

Source: Cogan Owens Cogan

CONCLUSIONS AND RECOMMENDATIONS

Following is a brief summary of preliminary conclusions and recommendations.

- The analysis indicates a significant surplus of land overall within Nehalem's UGB and the ability to accommodate growth during a 20-year period within expanding the city's UGB or relying on land within adjacent cities urban areas to accommodate needs projected in Nehalem. Even under the highest of the two "what-if" scenarios, a surplus of over 50 acres of land is indicated over the 20-year planning period, with only slight deficits for specific zoning designations.
- The analysis shows a surplus in each individual plan designation for the base case analysis. There is a slight gap for some designations for the "what-if" scenarios.

- The needs analysis generally identifies a significant gap between incomes and housing prices with a shortage of housing for most people with incomes under $75,000 and a surplus of housing affordable to people with incomes above $75,000.
- Some of the data used to estimate housing needs and conditions, including data on housing values and prices, is several years old. As a result, the data likely underemphasizes gaps in housing affordability.
- The housing market cannot be expected to meet the projected housing needs of Nehalem residents alone. A variety of strategies can be implemented by the City in partnership with non-profit and for-profit developers and others to encourage the development of housing in price ranges and types that would be affordable to a wider range of residents. Many of those strategies are identified in the following *Proposed Housing Policies* section.

PROPOSED BUILDABLE LANDS AND HOUSING POLICIES

Following is a draft set of recommended policies that may be implemented in Nehalem to help meet housing needs and goals for community residents. These goals, policies and strategies would amend and/or supplement existing policies. Policies with no recommended changes are not shown below. Strategies should be considered as a menu of tools the City could use to promote development of housing affordable to permanent resident with low and moderate incomes.

Goals

[*No changes recommended*.]

Policies

[*No changes recommended to first three policies*.]

4. The City will zone adequate land to meet identified future housing needs for a broad range of housing types, including single-family attached and detached homes, manufactured homes, duplexes and multi-family dwellings.

5. The City supports the efficient development of housing and land to minimize environmental impacts and provide public services in a cost effective manner.

6. The City will encourage the use of sustainable development and building materials including use of energy efficient materials and design principles.

7. The City will allow for and encourage and support the development of housing units in conjunction with commercial development (e.g., housing located above commercial uses) to provide diversity and security in commercial areas and a range of housing options.

8. The City will ensure compliance with federal and state fair housing laws which affirm access to housing opportunities for all people in Nehalem.

9. The City will allow for accessory dwelling units (i.e., "granny flats") in residential zones.

10. The City will encourage investment of public and private resources in areas expected to be less likely to be impacted by global warming, where reliable, scientific information warrants such consideration.

Strategies

1. Explore and provide information about opportunities to consolidate buildable land where it will promote more efficient development.

1. Regularly update the City's inventory of buildable land (at least every five years) and use it to both identify housing development opportunities and assess the ability to meet future housing needs. If growth is occurring at a faster rate than previously predicted, work with the County to update the county's coordinated population forecast and the City's housing needs analysis.

2. Work with the development community to ensure creation of new housing that meets identified future needs.

3. Monitor pubic facility capacity to ensure that proposed new residential developments can be adequately served by water, sewer, transportation, drainage and other public facilities.

4. Update the City's zoning ordinance to include provisions for accessory dwelling units.

5. Consider passing an ordinance requiring replacement of affordable housing in conjunction with closure of manufactured home parks.

6. Support statewide efforts to allow for inclusionary housing and affordable housing funding mechanisms currently prohibited or not allowed by state law, such as real estate transfer taxes or "flipping fees."

7. Consider waiving or deferring city fees such as development fees or system development charges for affordable housing projects that meet defined criteria and result in permanently affordable housing.

8. Support mechanisms and organizations that help reduce the cost of or leverage other monies to develop affordable housing such as community land trust, housing trust funds or similar entities.

9. Consider the use of density bonuses or other incentives to encourage the development of affordable housing.

10. Work with other public agencies and/or other organizations to provide or assist in paying for technical assistance for housing projects targeted to households with low or moderate incomes developed by nonprofit organizations.

11. Work with state and federal agencies, and other organizations to acquire and bank vacant or underutilized properties, including urban reserve lands, for the future development of housing affordable to households with low and very low incomes.

12. Negotiate agreements to develop housing affordable to residents with low or moderate incomes on lands to be annexed.

13. Advocate for national and state funding from the National Housing Trust Fund, Oregon Housing Trust Fund, and Lenders Tax Credit.

APPENDIX D

City of Nehalem - Water Rights Inventory

NOTE: Completing your water right inventory using this tabular format will ensure that all required information, as outlined under OAR 690-086-0140(5), is supplied.

Application No. (5)(a)	Permit No. (5)(a)	Priority Date (5)(b)	Certificate No. (5)(a)	Source (5)(c)	Use (5)(d)	Maximum Allowed Rate(cfs) (5)(e)	Allowed Rate under Development Limitations (cfs) (5)(e)	Actual Diversion				Authorized Completion Date (5)(h)	Source Issues *Identification of:* • *ST&E species present in the source;* • *Water quality limited parameters listed for the source; **and/or*** • *Source well(s) located within a Critical Ground Water Area* (5)(i)	Notes *(Facility Name, Reliability Issues or Problems, Etc.)*
								Maximum Instantaneous Rate Diverted to Date (cfs) (5)(f)	Maximum Annual Quantity Diverted to Date (MG) (5)(f)	Average Monthly Diversion (MG) (5)(g)	Average Daily Diversion (Gallons) (5)(g)			
S-1296	S-673	3-9-1911	8480	Bob's Creek	Municipal	2.0 cfs	n/a -certificated		40.8			n/a - certificated		
S-31252	S-24623	12-12-1956	27291	Coal Creek	Irrigation of 60.0 acres	0.43 cfs	n/a -certificated					n/a - certificated		
S-59373	S-44881	9-27-1979	57340	Coal Creek	Livestock Use, Dairy Barn Use, and Domestic Use for 3 families including irrigation of 0.5 acre of lawn or non-commercial garden for each family	**0.12 cfs**, being… 0.01 cfs for Livestock Use, 0.10 cfs for Dairy Barn Use, and 0.01 cfs for Domestic	n/a -certificated					n/a - certificated		
S-59448	S-45008	10-22-1979	n/a	Coal Creek, West Branch Coal Creek, and Unnamed stream, tributary to Coal Creek	Municipal, subject to the terms of an Agreement between Oregon Department of Fish and Wildlife and the City of Nehalem, recorded in Vol. 6, Pg. 751-752 Misc. records of Water Resources.	**4.0 cfs**, being… 1.5 cfs from Coal Creek, 1.5 cfs from West Branch Coal Creek, and 1.0 cfs from Unnamed stream, tributary to Coal Creek	**0.0 cfs**					October 1, 2051	<u>*ST&E species* (State Listing/Federal Listing)</u> Oregon Coast Coho (Sensitive-Vulnerable/Threatened) Pacific Eulachon/Smelt (N/A/Threatened) Chum Salmon (Sensitive-Critical/N/A) Steelhead-Winter Run (Sensitive-Vulnerable-N/A) Western Brook Lamprey (Sensitive-Vulnerable-N/A) Pacific Lamprey (Sensitive-Vulnerable-N/A) <u>*Water quality limited parameters*</u> *None* <u>*Source well(s)*</u> *None*	
R-23362	R-946	8-12-1948	21572	Neahkanhie Creek	Storage of water for operation of ram, fish, recreation, and domestic irrigation (…to be appropriated under Permit S-18403)	2.0 af of storage	n/a -certificated					n/a - certificated		Water rights certificates 21572 and 21573 list the water source as Necarney Creek. OWRD online , mapping tool indicates these sources are actually located on Neahkanhie Creek, corresponding locations referenced on the Oregon Department of Fish and Wildlife maps also indicate the location is Neahkanhie Creek not Necarney Creek.
S-23363	S-18403	8-12-1948	21573	Neahkanhie Creek and stored water under Permit R-946	Fish Culture, Recreation, Operation of ram, and Domestic irrigation of not to exceed 0.5 acre domestic lawns and gardens	**0.3 cfs**, being… 0.03 cfs for domestic irrigation, 0.25 cfs for fish and recreation, and 0.02 cfs for operation of ram	n/a -certificated					n/a - certificated		Water rights certificates 21572 and 21573 list the water source as Necarney Creek. OWRD online , mapping tool indicates these sources are actually located on Neahkanhie Creek, corresponding locations referenced on the Oregon Department of Fish and Wildlife maps also indicate the location is Neahkanhie Creek not Necarney Creek.
S-57353	S-43203	4-27-1978	58896	Unnamed stream, tributary of Nehalem River	Domestic Use for one family including irrigation of 0.5 acre of lawn or non-commercial garden	0.01 cfs	n/a -certificated					n/a - certificated		
S-58370	S-44087	2-28-1979	57337	Unnamed stream, tributary of Nehalem River	Domestic Use for one family including irrigation of 0.5 acre of lawn or non-commercial garden	0.01 cfs	n/a -certificated					n/a - certificated		
S-60106	S-44875	5-7-1980	57339	Unnamed stream, tributary of North Nehalem River	Domestic Use for one family including irrigation of 0.5 acre of lawn or non-commercial garden	0.01 cfs	n/a -certificated					n/a - certificated		
S-60916	S-45424	10-16-1980	57343	West Fork Coal Creek, tributary of Coal Creek	Domestic Use for one family including irrigation of 0.5 acre of lawn or non-commercial garden	0.01 cfs	n/a -certificated					n/a - certificated		
S-60822	S-45503	1-2-1981	57344	West Fork Coal Creek, tributary of Coal Creek	Domestic Use for one family including irrigation of 0.5 acre of lawn or non-commercial garden	0.01 cfs	n/a -certificated					n/a - certificated		