Water Shortage Response Plan

2015 – 2020 Water System Plan

City of Olympia

This is an update to the Drinking Water Utility's 2008 Drought Response Plan.

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INTRODUCTION

DOH guidance document *Preparing Water Shortage Response Plan* was used to update the Utility's 2008 Drought Response Plan, now retitled to Water Shortage Response Plan (WSRP). The goal of the WSRP is to maintain essential public health and safety services and minimize adverse impacts affecting the lifestyles of the City's water customers. The WSRP outlines the City's short-term water shortage response activities and in conjunction with the Utility's Emergency Response Plan, positions the Utility to minimize the impacts of events that can be weather-related water shortages, natural or human-caused disasters, or other water system operating emergencies.

Background

The City of Olympia's water supplies are entirely from groundwater sources and for the most part draw from protected and productive aquifers. However, Kaiser Well (S03) experiences low aquifer levels in the late summer and Shana Park (S10) is shallow and has elevated nitrate levels. Drought conditions resulting in less than average fall/winter precipitation can decrease recharge to local aquifers and because of the lag time between drought conditions and recharge and groundwater withdrawals, impacts from this scenario may not be immediately evident. Impacts may become evident in shallow aquifers 6 months to 1 year following below-average rainfall and would likely be evident following a 1 to 2 year period of below-average precipitation. In deeper aquifers, it may take years before impacts of below-normal precipitation are observed. Unusually warm and dry weather sustained over the summer months also holds the potential to impact water supplies if the usual period of peak demand extends in duration.

Natural disasters such as earthquakes, flooding, snow and windstorms that result in power failures can result in water shortage situations lasting a longer period of time than a routine water main break. The same is true for human caused emergencies such as hazardous material spill, chlorine gas leak or an act of vandalism. Such emergencies can result in a critical water component to be out of service for an extended period of time resulting in a curtailment of water usage.

The Utility's Emergency Response Plan describes these scenarios in more detail. Also a field guide was developed for staff that provides specific information on how to isolate or respond to certain emergencies. Given the sensitive information in the field guide, it is not available to the general public.

For more information on the Olympia' water sources see **Chapter 4** *Source of Supply Program* and **Chapter 7** *Source Protection Program* of the 2015 – 2020 Water System Plan.

PROBLEM ASSESSMENT

A detailed supply and demand analyses were conducted as part of **Chapter 2** *Population and Demand Forecast* of the 2015 – 2020 Water System Plan. Below is a summary of those analyses:

Demand Analysis

To develop the WSRP, the Utility first analyzed both past and present supply and consumption information. Then the Utility evaluated existing sources and their limitations and projected this over a six year (2020) planning period. From this analysis the City was then able to determine the projected demand and any shortfall.

The current average water consumption data (time period of 2010 – 2012) was reviewed by customer category (e.g. single family, multifamily, commercial, wholesale, etc.) using meter data. **Table 1** below reflects this analysis by percentage and usage.

Table1. Average Meter Water Consumption by Customer Category (2010 – 2012 Average)

Customer Category	Average Metered Water Consumption 2010 – 2012 MG	Average Metered Water Consumption by Percentage
Single Family	946	40
Commercial	481	20
Multifamily	360	15
City of Lacey	291	12
Thurston PUD	89	4
State Government	83	4
Political Subdivision	82	3
Municipal	27	1
Billed Construction Sites	3	1
Total	**2362**	**100**

The average 2010 – 2012 peak day was then determined to be 11.92 MGD, with a peaking factor of 1.7.

The next component analyzed was the average day and maximum day demands, which are shown in **Table 2**.

Table 2. Projected Demand

Year	Average Day Demand (MGD)				Max Day Demand (MGD)	Total ERU
	Retail	PUD[1]	Lacey[1]	Total		
2015 (Plan Yr 1)	4.0	0.5	1.7	8.6	14.9	51,560
2020 (Plan Yr 6)	6.8	0	0	6.8	13.4	43,166
2034 (Plan Yr 20)	8.1	0	0	8.1	15.2	48,782
2064 (Plan Yr 50)	10.5	0	0	10.5	18.1	63,431

[1] Demands for Lacey and PUD are not included for the entire planning period since sales to both are expected to end by the start of 2017.

Lastly, the projected demographics are based on Thurston Regional Planning Council November 2012 data set and are shown below in **Table 3**.

Year	Population	Single-Family Households	Multi-family Households	Employment
2015 (Plan Yr 1)	62,097	17,144	11,601	58,840
2020 (Plan Yr 6)	68,011	18,147	13,644	62,825
2034 (Plan Yr 20)	83,388	22,122	17,595	73,981
2064 (Plan Yr 50)	113,427	29,815	25,600	102,026

Supply Analysis

The City has nine production wells. With the exception of Kaiser SO3 and Hoffman SO8, the other seven sources are used year round. **Chapter 4** *Source of Supply Program* of the 2015 – 2020 Water System Plan provides detailed discussions on water supply factors relevant to the City's water supply including: regional sources, the Nisqually Watershed and stream flow and groundwater interaction, the Deschutes Watershed and its stream flow and groundwater interaction, as well as a discussion on each of Olympia source production wells. The chapter concludes with an analysis of water rights and alternate sources, including interties with the Cities of Tumwater and Lacey. In brief, the McAllister Wellfield provides 15 MGD while the remaining four sources provide 4.9 MGD for a total of 19.9 MGD.

Demand and Supply Comparison Summary

Based on the water demand and supply projections for this six year planning period, 13.4 MGD is needed and the City's total available source capacity is 19.9 MGD. Additional planned sources (Briggs Well and Olympia Brewery) will serve to bolster the system's reliability in the future. Even though this analysis indicates a surplus of source, the City recognizes the continued importance of conservation and water shortage planning.

OPTIONS FOR DEALING WITH A WATER SHORTAGE

Water Resource Policies

The Utility is governed by many federal, state and local laws, regulations, policies and plans that form the legal context within which the Utility operates. Those dealing with water resource policies include, at a minimum: water rights (chapter 173-152 WAC), water code (chapter 90.03 RCW), groundwater (chapter 90.44 RCW), Group A water systems (chapter 246-290 WAC), water use efficiency (RCW 90.03.386(3), reclaimed water (chapter 90.46 RCW), growth management (chapter 90.48 RCW), watershed planning (chapter 90.82 RCW), Olympia Comprehensive Plan, Olympia Municipal Code and several service area codes and policies for service.

Water Shortage Response Team

When a **potential** water shortage is identified, the Utility would assemble a Water Shortage Response (WSR) Team to consider whether the WSRP should be implemented. The team would be comprised of the following staff though additional staff would be brought in, as needed:

- Director of Water Resources
- Water Resources Engineer
- Drinking Water Operations Supervisor
- Pump Stations Supervisor

- Water Quality Section Supervisor

The WSR Team would consider the following **water supply** factors:

- Total supply availability, including interties.
- Groundwater rights status for that particular year.
- Operational condition of all City sources, storage tanks, and other facilities.
- The rate of decline in aquifer levels compared with the normal operating levels.
- Surface water situations in proximity to City wells.
- Amount of time required to implement a supply-enhancement measure.
- Weather conditions as derived from short- and long-term weather forecasts and modeling by the National Weather Service.

The WSR Team would then consider the following water demand factors:

- Current trends and seasonal forecasts for the system's daily water demands.
- The estimated margin of safety provided by the demand reduction compared with the level of risk assumed if no action is taken.
- Amount of time required to implement a water use reduction measure.
- Magnitude of expected savings provided by a water use reduction measure.

Other factors the WSR Team would consider include:

- The value of lost water sales revenue compared with the increased margin of supply reliability.
- Consultation with elected officials, state resource agencies, the county, interested organizations, and the Nisqually Tribe.
- Required time lags to institute measures.
- Ultimate cost to City customers, both residential and commercial.
- Equity in demand reduction between customer classes.
- Current events.
- Actions taken by neighboring jurisdictions (i.e. Cities of Lacey and Tumwater), which influence or directly affect City residents.
- Environmental benefits.

Stages of a Water Shortage

The four stages of phased responses are implemented in an effort to manage water demand when supplies become limited. Stages will be implemented progressively, if conditions allow or as needed depending on the situation. Each stage includes a variety of communications, internal operations, supply side actions and demand management strategies, as appropriate. Below is a summary of those stages.

Stage 1. Advisory

In this stage, customers would be informed as early as meaningful data is available, that water supply and demand conditions may result in a less than normal supply of water. If the supply and demand situation foreseen at the Advisory Stage develops, then the Utility would move to the Voluntary Stage.

Stage 2. Voluntary Reductions

This is the first step in reducing water consumption during a potential or actual water shortage. At this stage, voluntary cooperation and support of customers is requested to meet water use reduction goals.

Stage 3. Mandatory Restrictions

If voluntary measures do not provide the necessary reduction in water use, then mandatory activities would be implemented.

Stage 4. Emergency Curtailment
This stage would only be used when extraordinary levels of reduction are required to ensure demand does not exceed supply and public health and safety are not compromised.

Demand Reduction Options

Table 4 provides a brief description of possible demand reduction options the Utility could possibly use based on the water shortage stage and an estimate (percentage) of water savings associated with it.

Table 4. Demand Reduction Options

Action	Stage and Consumption Reduction Goal Percentage				Comments
	Advisory	**Voluntary**	**Mandatory**	**Emergency**	
Communications	**1 - 5**	**5 – 10**	**10 – 20**	**20 - 30**	
Media coordination.	X	X	X	X	
Develop and implement public outreach and education plan.	X	X	X	X	
Coordination with resource agencies and local jurisdictions.	X	X	X	X	
Coordination with largest water users.	X	X	X	X	
Notify irrigation customers of potential shut down procedures.			X	X	
City	**1 - 5**	**5 – 10**	**10 – 20**	**20 - 30**	
WSR Team coordination and planning.	X	X	X	X	
Reduce all maintenance and operations water uses to essential levels.		X	X	X	
Reduce washing of City fleet vehicles.		X	X	X	
Eliminate hosing of sidewalks, driveways, parking lots, etc. at City facilities.		X	X	X	
Reduce watering of City-managed landscapes. Eliminate seasonal plantings.	X	X	X	X	Exemptions for public health or safety.
As necessary, activate emergency interties to increase emergency supply availability.		X	X	X	Meet or exceed citywide water use restrictions.
Assess water main flushing activities.	X	X	X	X	

Action	Stage and Consumption Reduction Goal Percentage				Comments
	Advisory	**Voluntary**	**Mandatory**	**Emergency**	
Increase water quality monitoring actions as necessary.					
Finalize water use restrictions, exemptions, and enforcement procedures and penalties.			X	X	Subject to City Council approval.
Apply surcharges and penalties.			X	X	
Initiate "Water watcher" patrols.			X	X	
Declare water emergency.				X	Subject to City Council approval.
Customers	**1 - 5**	**5 – 10**	**10 – 20**	**20 – 30**	
Initiate residential indoor water use recommendations	X	X	X	X	
Initiate residential outdoor water use recommendations/tip (non-landscape)	X	X	X	X	
Initiate residential landscape water use recommendations/tips.	X	X	X	X	
Initiate commercial water use recommendations/tips.	X	X	X	X	
Initiate commercial landscape water use recommendations/tips.	X	X	X	X	
Contact water waste customers to cease waste.			X	X	
Initiate time of day watering restrictions (i.e., prohibited from 6 a.m. to 10 p.m.).			X	X	
Initiate day(s) of week lawn watering restrictions.			X	X	
Prohibit all lawn/turf watering, including new installations.			X	X	Possible exemptions for ball fields/playfields for safety purposes. All lawn watering banned prior to moving to Emergency Stage.
Prohibit all garden/ornamental				X	

Action	Stage and Consumption Reduction Goal Percentage				Comments
	Advisory	Voluntary	Mandatory	Emergency	
landscape watering.					
Initiate ornamental fountain operation restrictions		X	X	X	Prohibited at Mandatory and Emergency Stages.
Initiate car washing restrictions.		X	X	X	Request at Voluntary Stage, restrictions as necessary.
Restrict/rescind hydrant use permits.			X	X	
Construction site water use restrictions, dust control best management practices required.			X		Water use prohibited only if reclaimed water is available. Best management practices required.
Initiate construction site water use restrictions				X	Water use prohibited. Reclaimed water may be used. Exemptions as necessary to meet air quality regulations.
Restrict outdoor use by customers with special medical needs				X	Special medical needs like home dialysis are exempt from any emergency surcharge or restrictions, provided they notify the City of such a need.
Initiate sidewalk, deck and driveway washing restrictions.			X	X	Except as necessary for public health or safety.
Initiate building pressure washing restrictions.			X	X	Limited at Mandatory Stage, prohibited at Emergency Stage.
Initiate Fire Department training exercise restrictions.		X	X	X	Requested at Mandatory Stage and restricted at Emergency Stage.
Restrict filling of swimming pools			X	X	Prohibited at Emergency State for both private and public pools.
Penalties	**1 - 5**	**5 – 10**	**10 – 20**	**20 - 30**	
None	X	X			
Issue warnings, make site visit, collect shut off and reconnection fee			X		
Institute rate changes to further encourage conservation			X	X	Requires City Council approval.
Impose surcharges			X	X	Requires City Council approval.

Triggering Criteria

Individual triggers for implementing the WSRP include both environmental (i.e., temperature, rainfall, instream flow, snowpack, climatologic data, etc.) or infrastructure. **Tables 5 – 8** provide details each stage as it relates to the objectives, triggers, actions, and communications.

Advisory Stage

There are a variety of conditions that may cause concern about water availability and signal a potential water shortage. Responses to triggering an Advisory Stage are shown in **Table 5**. A public message that might be drafted could be: "*The potential exists for lower than normal water supply. Customers may be asked to reduce consumption unless conditions return to normal. Please use water wisely. We will keep you informed."* The Advisory Stage may be discontinued when water supply conditions return to a normal situation.

Voluntary Stage

As information further confirms the need to step up the surveillance of conditions contributing to both environmental and or infrastructure concerns about meeting water needs, **Table 6** provides responses that could occur during the Voluntary Stage. A public message that might be drafted would be: *"We are relying on the support and cooperation of **all** water users to reduce consumption and stretch the available water supply. Water use needs to be reduced by _____ percent, approximately _____ gallons per household per day. Customers are responsible for determining how they will meet that goal. Water waste is not allowed. If everyone cooperates, more stringent restrictions may be avoided. In addition to meeting essential water needs of customers, the needs of fish habitat and other environmental concerns is a priority."* **Appendix B** lists water use reductions actions customers can do.

Mandatory Stage

At this point if voluntary actions do not result in needed demand reductions, the City will implement more aggressive actions and will limit or prohibit certain uses of water by customers. **Table 7** provides response that could occur during the Mandatory Stage. A public message that might be drafted would be: *"We are imposing mandatory restrictions to reduce demand because the voluntary approach is not resulting in necessary water use reductions. We are continuing to rely on the support and cooperation of our customers to reduce water use. However, we need the certainty and predictability of restricting certain water uses. This way, we can ensure that an adequate supply of water is available for public health and safety throughout this shortage."*

Emergency Stage

At this stage, the City would recognize that a critical water situation exists. Without additional significant curtailment actions, a shortage of water for public health and safety would be imminent.

This stage is characterized by two basic approaches. First, increasingly stringent water use restrictions would be established and enforced. Secondly, significant rate surcharges would be used to encourage customer compliance. While a rate surcharge may be implemented in either the Voluntary or Mandatory stages, a surcharge is a key component to the success of this stage, and any previous surcharge may be increased if appropriate. A public message that might be drafted would be: *"A water supply emergency exists. Severe restrictions on water use are necessary to maintain adequate water supplies essential for basic public health and safety. The public's continued cooperation is requested. Restrictions will be strenuously enforced."*

TABLE 5. ADVISORY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Prepare City staff, relevant agencies, and water users for a potential water shortage, thereby allowing all parties adequate time for planning and coordination. 2. Undertake supply management actions that forestall or minimize the need for more stringent demand or supply management actions later on.	1. Aquifer levels that are historically low in October/November (when levels are at their annual lowest). Staff would begin monitoring precipitation and analyzing all available data. If aquifer levels do not come up to historical levels, we would declare an Advisory Stage in March. 2. Aquifer levels that are significantly below historical normals for the current time of year and data indicates that expected demands may not be met if this trend worsens or continues. 3. Lower than normal winter precipitation.	1. Convene the City's Water Shortage Response Team to evaluate conditions, determine actions, and assign tasks. 2. Intensify communication with all City staff so they can communicate our message clearly to concerned customers. 3. Intensify data collection actions for well pumping records, tank level records, monitoring aquifer levels and weather conditions. 4. Assess current hydrant flushing activities to determine whether they should be accelerated so they are completed prior to the peak season or reduced to conserve supply. 5. Assess water quality in the distribution system to target areas that may experience degradation with reduced consumption. 6. Develop a list of critical water uses and users. 7. Reduce watering of City-owned and managed landscapes. Reduce or eliminate seasonal plantings. **Appendix E** contains a list of recommendations by Olympia's Parks Maintenance Supervisor regarding irrigation water use reduction steps in Parks-managed landscapes. 8. Initiate planning and preparation for Voluntary Stage actions, including an assessment of potential staffing impacts, training needs, and communications strategies.	1. Brief PW Leadership Team, Senior Management Team, Utility Advisory Committee, City Manager, City Council, and all City staff members. 2. Consult with and provide status reports to state resource agencies, interest groups, and Native American Tribes. Specific entities include Thurston County PUD #1, Cities of Lacey and Tumwater, Nisqually and Squaxin Island Tribes, Thurston County, State Departments of Health and Enterprise Services, interested environmental and community organizations, and large commercial customers. 3. Develop a status report for customers/businesses with special interests, such as the landscape and nursery industry and developers. 4. Develop and distribute public outreach and education materials explaining the drought response stages and expected ranges of actions through a variety of communication channels (i.e., print and radio media, TCTV, City website, direct mail, etc.). Post updated status reports on the City's website and through other communication channels. Prepare information for customers, including developers, who may be planning new landscaping.

TABLE 6. VOLUNTARY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Inform City water customers of a water shortage and the need to reduce water use and eliminate water waste. 2. Reduce water use to meet consumption goals through voluntary customer actions. 3. Forestall or minimize the need for more stringent demand or supply management actions. 4. Minimize the disruption to customers while meeting consumption goals. 5. Maintain the highest water quality standards throughout the shortage.	1. Aquifer levels continue to be low. 2. Rainfall is significantly less than normal by April 1. 3. The summer is predicted to be hot and dry. 4. Water use demand projections indicate a systematic response to reducing demand is required.	1. Continue Advisory Stage actions. 2. WSR Team to prepare weekly reports for distribution to staff and local media on supply conditions and consumption levels. 3. WSR Team will consider the current and projected supply conditions and seasonal demand and set consumption goals that may be revised as necessary. 4. Reduce all operating system water uses to essential levels. 5. **Appendix E** contains actions for reducing irrigation at City-owned and managed landscapes. 6. Reduce washing of City fleet vehicles; request that City departments bring fleet vehicles to commercial car washes that recycle water. 7. Eliminate hosing of sidewalks, driveways, parking lots, etc., at City facilities except in situations where it is necessary for public health and safety. 8. Activate any existing emergency interties as necessary to increase emergency supply availability. 9. Increase water quality monitoring actions as necessary. 10. WSR Team will evaluate whether target consumption levels and supply conditions warrant a rate surcharge to reinforce voluntary actions and/or to recover revenue losses. The WSR Team would make recommendations to the City Manager for recommendation to the City Council. 11. Implement staffing reassignments as needed and plan staffing changes that may be needed for the Mandatory Stage, including staff to enforce mandatory restrictions.	1. WSR Team would establish systematic communications with PW Leadership Team, Senior Management Team, City Manager, and City Council, including the suggested nature and scope of the voluntary measures and strategies. 2. **Appendix A** contains a list of public agencies, large customers and business groups who should be provided status reports on the situation. Specific entities include Thurston County PUD #1, Cities of Lacey and Tumwater, Nisqually and Squaxin Island Tribes, Thurston County, State Departments of Health, State and Enterprise Services, interested environmental and community organizations, and large commercial customers. Post updated status reports on the City website. 3. Develop and implement a comprehensive public awareness and education campaign with the goal of keeping customers informed about supply and demand conditions. This campaign will recommend customer actions to significantly reduce demand, reinforce desired customer actions, and remind customers that if goals are not achieved, mandatory restrictions may be necessary.

TABLE 6. VOLUNTARY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS - CONTINUE

Objectives	Triggers	Actions	Communications
			4. Promote consumption goals for typical households and a percentage reduction goal for commercial customers. 5. Prepare a current list of commercial car washes in Olympia that recycle water. 6. Contact the City's largest water users and request a percentage reduction. Contact other public agencies to inform them of conditions and request their cooperation. 7. Identify customers with large irrigation accounts and promote the use of daily weather information, such as rainfall and reduced evapotranspiration (ET) rates to minimize irrigation use. Provide current ET rates on the City's website. 8. Provide water quality information in public information so that if flushing is necessary, the public understands that it is essential for water quality maintenance. 9. Initiate remaining planning and preparation for the Mandatory Stage. 10. Establish regular communication with Public Works Department and City employees, especially staff that has regular contact with the public, such as Utility Billing representatives, meter readers, and Water Operations staff. Keep them up to date on conditions, goals, and City actions so they can provide accurate information to our customers.

TABLE 7. MANDATORY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Achieve targeted consumption reduction goals by restricting defined water uses. 2. Ensure that an adequate water supply will be available during the duration of the water shortage to protect public health and safety and to provide sufficient in-stream flows for fish habitat. 3. Minimize the disruption to customers' lives and businesses while meeting target consumption goals. 4. Promote equity among customers by establishing clear restrictions that affect all customers.	1. The City loses any one of our wells due to decreased aquifer level (75 percent of normal based on historical static water level). We would remain at the Mandatory Stage until this well comes back into service. 2. The current water supply would not be able to meet demand projections. 3. Measures implemented in the Voluntary Stage are not adequately reducing demand. 4. The time available to implement measures to reduce water use is not sufficient to allow education of customers required for voluntary compliance. 5. It is evident the level of water use reduction required would not be achieved through voluntary compliance.	1. Continue actions from Advisory and Voluntary Stages, as appropriate. 2. The WSR Team would develop a list of recommended water use restrictions and exemptions from restrictions. 3. The WSR Team would finalize and implement a process for receiving, recording, and responding to reported violations of restrictions. 4. The WSR Team would make recommendations to move to the Mandatory Stage and adopt mandatory restrictions, emergency surcharges, and fees to the City Council for adoption, subject to the City Manager's approval. The WSR Team would recommend the nature, scope, and timing of restrictions. 5. Work with City of Olympia Parks Maintenance Supervisor to restrict irrigation levels in park areas to levels that meet or exceed the irrigation restrictions while maintaining public safety, see **Appendix E**. 6. **Appendix C** provides an enforcement checklist the WSR Team would finalize and implement procedures and assess fines where mandatory restrictions are not followed. The WSR Team would review and process all requests for exemptions from mandatory requirements. 7. Work with the City of Olympia Fire Department to ensure that they are complying with mandatory restrictions, see **Appendix D**. 8. Initiate planning and preparation for the Emergency Stage.	1. WSR Team will provide periodic reports to the PW Leadership Team, Senior Management Team, and City Council, including the suggested nature and scope of the mandatory restrictions, implementation strategies, and customer response data. 2. Consult with and provide status reports to state resource agencies, interest groups, and Native American Tribes (**Appendix A** includes a list of appropriate contacts). Specific entities include Thurston County PUD #1, the Cities of Lacey and Tumwater, the Olympia and North Thurston School Districts, Nisqually and Squaxin Island Tribes, Thurston County, Washington Department of Fish and Wildlife, Washington State Parks, Washington Department of Natural Resources, interested environmental and community organizations, and large commercial customers. Post updated status reports on the City website. 3. Through a media campaign and direct mail communicate: • Scope and nature of mandatory restrictions. • Reasons for imposing the restrictions. • Consumption goals and ways in which to achieve those goals.

TABLE 7. MANDATORY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS - CONTINUED

Objectives	Triggers	Actions	Communications
			• Additional restrictions that may be imposed if water use reduction goals are not achieved. • Enforcement mechanisms and fines. • Rate surcharges. • Projections for how long restrictions will be in place. 4. In communicating mandatory restrictions to the public, a clear distinction will be made between lawn/turf watering and watering gardens and ornamental plantings. The type and amount of watering will be clearly defined. 5. Any exemptions from water use restrictions will be clearly identified. 6. Contact irrigation customers and inform them that the City may shut down their irrigation meters in the event of an immediate water shortage situation. 7. Provide area landscape management and property management companies with water use restriction information. 8. Restrict hydrant usage to essential purposes, including recall of hydrant meters previously issued. This should include contacting each registered hydrant user. Require the use of best management practices (BMPs) to reduce water use, meet operational needs, and provide for dust control. If reclaimed water is

Objectives	Triggers	Actions	Communications
			available, all hydrant meters may be rescinded. 9. Post updated status reports on the City website. 10. Continue and enhance communication actions from the Advisory and Voluntary Stages 11. Work with CP&D to defer landscape installations requirements until the shortage is over. **No exemptions will be allowed for watering new lawn installations**. 12. Advise the Fire Department to discontinue the use of water in training exercises until the emergency is over. 13. Evaluate resources and plans for moving into the Emergency Stage. As appropriate, begin preparatory measures.

TABLE 8. EMERGENCY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS

Objectives	Triggers	Actions	Communications
1. Ensure throughout the water shortage, an adequate water supply exists to protect public health and safety. 2. Sharply reduce water demand. 3. Restrict certain defined water uses in order to meet consumption goals.	1. The City is unable to use two wells due to decreased aquifer levels. 2. The City is unable to fully use McAllister Wellfield due to operational concerns or damage to the transmission line. 3. Measures to reduce water use implemented in the Voluntary and Mandatory Stages have not adequately reduced demand. 4. The time available to implement measures to reduce water use is not sufficient to allow education of customers required for voluntary or mandatory compliance.	1. The WSR Team would define the water shortage as an emergency and, through the City Manager, would implement procedures for the Council to formally declare a Water Shortage Emergency. 2. The WSR Team would develop a list of water use restrictions, prohibitions, exemptions, and surcharge rates for recommendation to City Council for consideration through the City Manager. 3. The WSR Team would increase the frequency of reports to the City Manager and City Council. Reports would provide detail on the implementation of the Emergency Stage and customer response data. 4. The WSR Team would establish water use reduction goals. Consumption goals may be set in a variety of ways. Determining factors include equity among customers and the utility billing software in use. Single-family residential goals may be set as a standard per house allotment or as a percentage reduction from the previous year's consumption. Consumption goals may be below customers' average winter month use. Commercial, institutional, and multifamily residential customers may be asked to reduce water use by a set percentage of their average consumption during the previous year.	1. Define the problem to the public as an emergency, and institute formal procedures to declare a citywide emergency. 2. Inform customers of the rate surcharge and how it will affect them. Provide information on an appeal process. 3. Define and communicate exemptions for medical facilities and other public health situations. 4. Consult with and provide status reports to state resource agencies, interest groups and Native American Tribes. Specific entities include Thurston County PUD #1, the Cities of Lacey and Tumwater, the Olympia and North Thurston School Districts, Thurston County, Washington Departments of Health, Enterprise Services, Fish and Wildlife, and Natural Resources; interested environmental and community organizations and large commercial customers. Post updated status reports on City website.

TABLE 8. EMERGENCY STAGE OBJECTIVES, TRIGGERS, OPERATING ACTIONS AND COMMUNICATIONS - CONTINUED

Objectives	Triggers	Actions	Communications
		5. Adjust or modify utility billing systems to implement any approved surcharges and penalties. 6. Increase enforcement actions in accordance with the applicable ordinance approved by the City Council. 7. Provide training for personnel and deploy additional "Water Watcher" patrols. 8. Notify the Police Department regarding enforcement of curtailment actions and coordinate with them regarding the potential need for enforcement assistance. 9. Further enhance aquifer and water quality monitoring actions. 10. Water Shortage Response Team to increase meeting frequency to daily status briefings to review the current situation and determine which actions are working and those that need to be improved. Focus on messages that are easy to communicate, implement, and have the potential to sharply reduce demand.	5. Through a media campaign and direct mail communicate to City customers the: • Scope and nature of rationing and curtailments, • Reasons for imposing the curtailments, • Water use reduction goals, • Enforcement mechanisms and fines, • Projections for how long curtailments will be in place, and • Rate surcharges. 6. Clearly identify any exemptions from the water use curtailment. 7. Inform customers about possible pressure reductions and problems this may cause. 8. Provide area landscape firms with water use curtailment information. 9. Provide contractors and landscape firms with information on locations to obtain reclaimed water for street cleaning, construction projects, landscape irrigation, dust control, etc. 10. Post updated status reports on the City website. 11. Continue and enhance communication actions from the Advisory, Voluntary, and Mandatory Stages.

Supply Augmentation Options

Table 9 provides a brief description of possible supply augmentation options the Utility could possibly use and an estimate of additional water supply (gpm) each option could provide.

Table 9. Supply Augmentation Options

Supply Augmentation Option	Additional Water Provided (GPM)	Comments
Treat Hoffman SO8 to remove iron and manganese. Also add disinfection.	1,000	Requires financing, engineer design, bid and construction. Allow approximately three years to complete from start to finish.
Develop PW-26 (McAllister Wellfield)	5,500	Requires financing, engineer design, bid and construction. Allow approximately three years to complete from start to finish.
Develop Briggs	1,100	Requires financing, engineering design, bid and construction. Allow approximately three years to complete from start to finish. Water right acre feet/year is limited, i.e., run 79 days @ 18 hrs/day to 178 days @ 8 hrs/day.
Use Brewery	2,171	Requires financing, engineer design, bid and construction of transmission man. Allow approximately two years.
Use Lacey Interties	2,550 (Sleater-Kinney) 2,250 (North Thurston High School)	There are limitations to these interties. The pressure on the Olympia side is higher than Lacey; therefore, the Olympia side must experience a loss of pressure in order to receive water.
Use Tumwater Interties	1,550 (Hwy 101/Crosby) 1,650 (Carlyon/Capitol Way)	There are limitations to these interties. The pressure on the Olympia side is higher than Tumwater; therefore, the Olympia side must experience a loss of pressure in order to receive water.
Renegotiate wholesale contractual agreement with Lacey	690 – 1,389	The City of Lacey expects to stop purchasing water (up to 1 MGD July – Oct and 2 MGD from Nov – June) from the City by the end of 2016.
Renegotiate wholesale contractual agreement with Thurston County PUD #1	360	Thurston County PUD #1 expects to stop purchasing water from the City by the end of 2014.

Evaluating and Selecting a Course of Action

Depending on how much notification the Utility has regarding an impending water shortage, the most expeditious and cost efficient course of actions include communicating early with customers on conserving water by reducing or eliminating outdoor use, including reducing outdoor use by the City. Because of the cost and time needed to either treat an existing source, i.e., Hoffman or develop new sources, i.e., PW-26 and Briggs, using Brewery water would be necessary. Finally the interties with Lacey, Tumwater and PUD could be used if those cities were not experiencing a similar water shortage and their system pressure was higher than the City's.

PLAN IMPLEMENTATION

Schedule and Estimated Costs

An estimate of the time and cost for demand reduction and supply augmentation options are shown in **Table 10** below.

Table 10. Schedule and Estimated Costs

Program Element	Average Turn-Around Time[1]	Estimated Cost
A. Demand Reduction Options: 1. Communications • Utility insert	30 days – 4 months	$3,000/mailing
• Post Card	2 to 3 weeks	$9,600/mailing
• News Releases	1 business day	Staff time
• Website	1 business day	Staff time
• TCTV	1 business day	Staff time
• Radio	2 to 3 days	Staff time
• Email	1 business day	Staff time
2. "Water Watcher" Patrols	30 days	Staff time
B. Supply Augmentation Options: • Reduce Lacey wholesale allotment	8 weeks per wholesale agreement[2]	Annual revenue loss between $19,510 - $27,180
• Reduce Thurston PUD wholesale allotment	Immediate per wholesale agreement	Annual revenue loss between $5,100 - $5,765
• Use Lacey interties - Pending	TBD days per ILA	Staff time
• Use Tumwater interties	Requires City Council proclamation of an emergency before use	Staff time
• Treat Hoffman Well SO8	Three years	$2.05 million
• Use Brewery water	Two years	Unknown
• Develop PW-26	Three years	$3 million
• Develop Briggs well	Two years	$2.5 million. Costs do not include treatment.

[1] Many of these turn-around times can be significantly shorted during an emergency for printed materials that can be printed in house (i.e., brochures/fact sheets, door hangers, postcards, etc.) or electronic media (i.e., email, Facebook, news releases, etc.). [2] In case of an emergency associated with McAllister Wellfield or the transmission main upstream of the Lacey interties, a minimum of two (2) hours notification is required.

Financial Program

Communication costs, for the most part can be absorbed by existing operating budgets. However, the supply augmentation costs would need to be funded through the CFP and or the Drinking Water State Revolving Fund. Depending on the cause of the shortage (i.e., emergency declaration), FEMA funding may also be available.

Monitoring Program

The Utility will track existing or potential water shortages by monitoring:

- Local aquifer levels, especially those associated with Kaiser SO3 (i.e. 75 percent of normal based on historical static water level).
- Local winter precipitation, especially lower than normal precipitation (i.e., less than normal by April 1).
- Regional forecasts on aquifer levels and precipitation.
- Water use demand against water consumption
- Loss of use of more than one source due to decreased aquifer levels, water quality or operational issues.

APPENDIX A – WATER SHORTAGE RESPONSE CONTACT LIST

A working list of contacts for easy reference should be developed and regularly updated by staff in the Water Conservation Office. In the event of a water shortage caused by a drought, the following will be contacted directly. They will be apprised of the situation, and their support and cooperation in reducing demand will be requested.

Other Public Agencies

- City of Tumwater
- City of Lacey
- Thurston County
- Olympia School District
- North Thurston School District
- State Department of General Administration
- State Department of Ecology
- State Department of Health
- Thurston County PUD #1

Large Customers

Water Conservation Staff will develop a contact list based on previous two year's water consumption

Landscape Interests

- WSU/Thurston County Cooperative Extension
- Local nurseries
- Local landscape contractors
- The Irrigation Association
- Washington Association of Landscape Professionals
- Washington State Nursery and Landscape Association

Business Groups

- Thurston County Chamber of Commerce
- Master Builders Association
- Olympia Downtown Business Association
- Rotary Clubs of Thurston County

APPENDIX B – VOLUNTARY CUSTOMER WATER USE REDUCTIONS

Residential Indoor

- Flush the toilet less often. Each flush uses 1.6 to 7 gallons of water, depending upon the age of the toilet.
- Dishwashers should be run only when there are full loads of dishes. Each load uses 8 to 13 gallons of water, less than by hand washing.
- Wash only full loads of laundry. Each load uses 15 to 40 gallons of water. High-Efficiency washing machines use approximately 30 percent less water than standard models.
- Keep a pitcher of cold drinking water in the refrigerator rather than running the faucet until the water gets cold.
- Take shorter showers. Each minute of showering time uses 2.0 to 5 gallons of water. Try to limit showering time to five minutes.
- Avoid letting the faucet run while shaving, brushing teeth, or washing vegetables.
- While waiting for hot water, use a container to catch wasted tap water for use on plants.

Residential Outdoors

- Wash cars less often. Instead of using a hose, consider a commercial car wash that recycles water.
- Always use a shutoff nozzle when using a hose. Be sure there are no leaks in any hose fittings.

Commercial and Residential Landscape

- Water lawns and gardens only early in the morning or late in the evening to reduce water loss from evaporation.
- Consider letting established lawns go dormant until the shortage is over. Homes that normally water lawns will save from 25 to 50 percent by not watering them.
- Do not water lawns when it is raining. If you have an automatic irrigation system, learn how to change the program that controls your system in order to cut back on irrigation time. Turn off automated irrigation system clocks during rainy spells. Install a rain sensor on automatic irrigation systems that will override the system during rainfall. The City provides these at no cost to its customers.
- Eliminate outdoor water play, such as running through a sprinkler, plastic water slides, and wading/swimming pools that requires frequent refilling.
- Eliminate all hosing of sidewalks, driveways, and decks. Use a broom instead.
- Water established plants only when necessary, testing the soil moisture levels in the root zone with your fingers. Two to four inches of mulch in your planting beds will help retain moisture.
- Create tree wells around trees to minimize runoff when watering.

Commercial

- Set goals for reduced water use and inform managers and employees. Give businesses ideas for limiting water use and ask them for their ideas.
- Repair all leaks and dripping faucets. Ensure that constantly running toilets are repaired. Urge employees to report leaks.
- Reduce or eliminate routine vehicle cleaning during the shortage. Use a local commercial car wash facility that recycles water.
- Ensure that all hoses are fitted with shutoff nozzles.
- Eliminate hosing as a means of disposing of used ice.
- Eliminate all hosing of walkways, parking lots, and loading docks. If washing paved areas is necessary for public health and safety, pressure washers use substantially less water.
- Postpone routine building washing until after the shortage.
- Post signs informing customers of the nature of the water shortage and ask for cooperation in reducing water use.
- Turn off all non-recirculating fountains. On windy days, when there is significant water loss, turn off **all** fountains.
- Ask restaurants to deliver water only on request.
- Accelerate restroom upgrades by replacing older toilets with low-flow (1.6-gallon-per-flush) or High-Efficiency (1.0 to 1.3 gallon per flush) models.

APPENDIX C – MANDATORY RESTRICTONS

Enforcement Procedural Checklist

_____ Determine fines and/or surcharges to be imposed for mandatory restriction infractions, including whether or not there will be "one fine for all infractions" or whether certain selected water use reduction actions would command a higher fine than others.

_____ Determine the number of warnings before fines or surcharges apply.

_____ Establish a database for tracking violations.

_____ Print self-duplicating "Notice of Violation" forms: one copy for location where violation occurred, one to record violation with billing. Print violations and fines on the Notice of Violation.

_____ Assign and train staff with customer service and communication experience to "Water Watch."

_____ Establish procedure for "Water Watchers" to record warnings and penalties on customer accounts.

_____ Establish a "hotline" for customers to report violations. To help avoid frivolous complaints, recorded message should note that only complaints with name and address of complainant will be pursued.

_____ Provide all field and customer service staff members with fact sheets and question and answer sheets. Provide briefings on restrictions and enforcement procedures. Train field staff to tag obvious violations.

APPENDIX D – FIRE DEPARTMENT WATER SHORTAGE RESPONSE

The City of Olympia's Fire Department uses water in a variety of ways. These uses include:

- Hydrant/line flushing (only do flushing every other year. In off years measure static pressure with gauge)
- Vehicle washing
- Washing of drill pad
- Wet Training (nine times each quarter)
- Pumper Testing
- Irrigation

The following explains how these water uses might be affected during the four stages of water shortage response.

Advisory Stage

At this stage, we would be communicating a **possible** water supply shortage to our customers. It may make sense to schedule any line flushing or wet training for earlier in the season in case restrictions are in place.

Voluntary Stage

In this stage, we would be asking our customers to voluntarily reduce their water use by a certain amount (generally about 10 percent). The Fire Department may change their water use at this stage in the following ways:

- Vehicle washing: Currently, vehicles are rinsed every night and washed twice a week. During this stage, vehicles would only be washed if they have mud on them but would continue to be rinsed each evening.
- Drill pad washing: The pad is now washed twice during the summer. If the voluntary stage occurs during summer months, a sweeper from the Public Works Department would be brought in to sweep the pad instead of washing it.
- Pumper testing: Recycled water is used, and this usage would not be affected.
- Hydrant/line flushing: Scheduled flushing could still occur at this stage.
- Training: Scheduled wet training could still occur at this stage.
- Irrigation: Irrigation of landscape should be slightly reduced at this stage.

Mandatory Stage

At this stage, we would acknowledge a serious water supply shortage. Water use restrictions would be enforced with fines. The Fire Department may alter their water use in the following way at this stage:

- Vehicle washing: As in the Voluntary Stage, vehicles would only be washed if there is mud on them. Additionally, rinsing would only happen every other evening.
- Drill pad washing: As in the Voluntary Stage, the sweeper would be used instead of water.
- Pumper testing: Recycled water is used, and this usage would not be affected.
- Hydrant/line flushing: Scheduled flushing should not occur at this stage.
- Training: Scheduled wet training should not occur at this stage.
- Irrigation: Irrigation of landscape should be reduced at this stage.

Emergency Stage

At this stage, the City of Olympia would be faced with a critical water supply shortage. The goal would be to provide enough water to provide for our customers' health and safety during the duration of the emergency. Customers would be allotted a certain amount of water and charged heavy surcharges if they exceed these amounts. No outdoor irrigation would be allowed for any of our customers. At this stage, the Fire Department would need to change their water uses in the following ways:

- Vehicle washing: Vehicles would only be washed if there is mud on them. No rinsing could occur. Vehicles that can fit in commercial car washes must be washed only at facilities that recycle water.
- Drill pad washing: As in the Voluntary Stage, the sweeper would be used instead of water.
- Pumper testing: Recycled water is used, and this usage would not be affected.
- Hydrant/line flushing: Scheduled flushing may not occur at this stage.
- Training: Scheduled wet training may not occur at this stage.
- Irrigation: Irrigation of landscape may not occur at this stage.

APPENDIX E – OLYMPIA PARKS DEPARTMENT ALTERNATIVE IRRIGATION PLAN

As a water shortage continues to progress, the need to reduce or eliminate water consumption at City owned parks will be needed. Below are reduction responses, depending on the water shortage stage.

Voluntary Reduction: Reduce outdoor watering by 5 – 10% and eliminate seasonal plantings.

Mandatory Restriction: Reduce outdoor watering by 20 - 30% and initiate time of day watering restrictions of no watering from 6 a.m. to 10 p.m. Ball and play fields may be exempted for safety purposes.

Emergency Curtailment: All outdoor watering to cease unless reclaimed water is available for use.