
Report

City of Columbia City Source Water Protection Plan

February 2014

Prepared for
City of Columbia City
P.O. Box 189
Columbia City, OR 97018



Prepared by

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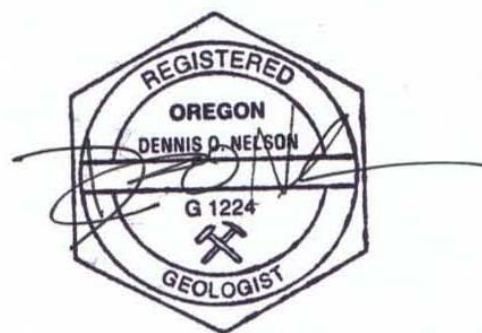
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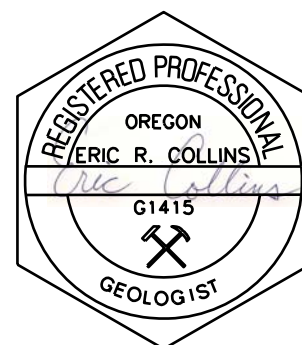
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1.0 Introduction

The City of Columbia City (City) is located in northwestern Oregon on the banks of the Columbia River approximately 31 miles north of the City of Portland on Highway 30. Figure 1 is a site vicinity map showing the location of the City and the Columbia River. The population of the City of Columbia City was estimated to be 1,945 in July 2013. The City's drinking water is currently supplied by City Wells PW-1 and PW-2 and an "as needed" connection with the City of St. Helens.

The City recognizes the importance of protecting its drinking water supply, not only for the present, but for the future as well. The costs associated with contaminated drinking water are high, both in dollars and public opinion. Safe drinking water is essential to the long term sustainability of the City, its population and economy. Developing an approach to protect that resource will reduce the risks of a contamination event occurring. In this document, the City outlines its strategies for protecting its drinking water sources.

1.1 Background

In the 1986 Amendments to the Safe Drinking Water Act (SDWA), the U.S Environmental Protection Agency (EPA) introduced the concept of protecting public drinking water. The initial focus was on groundwater through the Wellhead Protection Program. States were required to develop individual programs consistent with EPA guidelines. Oregon adopted the state's Wellhead Protection Program in 1996. The 1996 SDWA Amendments expanded the program to include surface water systems and changed the program name to Source Water Protection.

Oregon adopted rules consistent with the 1996 amendments in 1998. The Department of Environmental Quality (DEQ) is the lead agency for drinking water protection in Oregon, working in conjunction with the Oregon Health Authority's (OHA) Drinking Water Program. Consistent with the 1993 Oregon Legislature, protecting drinking water supplies in Oregon is voluntary.

The 1996 Amendments mandated that states develop Source Water Assessments (SWA) for public water supplies in order to provide the systems with the information they would need to develop individual protection plans, i.e., where their drinking water comes from (Delineation), what potential contaminant sources (PCSs) occurred within the delineated area (PCS Inventory), and what is the susceptibility of the drinking water supply is to these PCSs. The SWA for the City was recently updated (Equant and GSI Water Solutions, Inc, 2013), and the results of that revised SWA forms the basis of the City's Source Water Protection Plan (SWPP) provided in the text below.

The SWA summarized the local geology and well construction issues as they pertain to the quality of the drinking water source. The report identified the area believed to be most critical to preserving water quality (i.e., Drinking Water Protection Area) and have identified PCSs

within that area. In addition, the report provided recommendations, i.e., Best Management Practices, regarding the proper use and practices associated with some common PCSs. The City believes public awareness is a powerful tool for protecting drinking water and information in the SWA, as well as in this report, will help increase public awareness about the relationship between land use activities and drinking water quality.

1.2 Source Water Protection Requirements

The EPA identified seven elements that need to be addressed in a Source Water Protection Plan. These are described in detail in DEQ's Administrative Rules OAR 340-040-0170. Note that in these rules, the original term "Wellhead Protection" is used in place of Source Water Protection.

1. The Drinking Water Protection Areas must be delineated as described under OHA's rules under OAR 333-061-0057(1)(i). In Oregon, the delineation, provided by the SWA, includes an aquifer sensitivity analysis, i.e., how rapidly contaminants may move from the surface to the aquifer.
2. The Plan shall identify all the Responsible Management Authorities and jurisdictional boundaries of each within a Drinking Water Protection Area.
3. An inventory identifying the potential sources of contamination within the Drinking Water Protection Area(s) shall be completed. In Oregon, the inventory contained within the SWA, is combined with the sensitivity analysis to determine the susceptibility of the water supply to a specific PCS at a specific location within the Drinking Water Protection Area(s).
4. Develop a Management Plan, identifying the management action(s) to be employed to reduce the risk of contamination to the groundwater from existing and future PCSs, and a justification for the proposed management actions and level of protection provided.
5. Development of a contingency plan for the SWAs in accordance with OHA rules under OAR 333-061-0057(3)
6. A process for the siting of new public water system wells or springs in accordance with OHA rules under OAR 333-061-0057(2);
7. A description of the public participation efforts shall be included in the Plan, including:
 - a. Documentation that property owners and residents within the DWPA were notified of the development of a Protection Plan
 - b. Formation of a Team from a new or existing group to develop the Plan
 - c. Description of steps taken to provide opportunity for various interests within the affected area to participate;
 - d. Documentation that all local public hearing procedures were followed in developing and adopting the Plan

Any city that wishes to submit their respective plan for certification must meet the above conditions. The DEQ takes the lead in plan approval and certification while OHA certifies the delineation and reviews the Contingency Plan and New Sources elements. The following

sections describe how the development of the City's Source Water Protection Plan adheres to the required elements listed above.

2.0 Source Water Protection Development Team

Early in the Plan development process, the City realized the benefit of gathering input from local stakeholders (residents, businesses, etc.). In early meetings with the City Administrator and the City's Planning Director, it was decided that the City's Public Works Superintendent and Water/Sewer Committee would be well suited to participate in Plan development since they are knowledgeable of the City's water supply system and the committee represent various stakeholder interests.

Therefore, the Source Water Protection Development Team consists of the following members, all of which are Columbia City citizens:

- Leahnette Rivers, City Administrator/Recorder
- Micah Rogers, Public Works Superintendent
- Josh Fromm, Co-Chair of the Water/Sewer Committee - City Council Member/construction worker by trade
- Sally Ann Marson, Co-Chair of the Water/Sewer Committee - City Council President/retired from the banking industry
- John Burdett - Committee Member - retired public works superintendent
- Robert Campbell - Committee Member - retired natural gas sales and marketing representative
- Charles Garman - Committee Member - vice president of large marine vessel sales
- Bill Guy - Committee Member - electrical engineer
- Finos Lunsford - Committee Member - insurance agent
- Larry Preston - Committee Member - retired civil engineer/water district general manager

3.0 Delineation of the Source Water Protection Area (DWPA)

The delineation of the Drinking Water Protection Area (DWPA) is a fundamental aspect of the source water assessment. When information regarding the DWPA location is provided to the community, it enables the community to develop management strategies that will have the most impact with regard to preserving long-term drinking water quality. For groundwater systems, the DWPA identifies the area on the surface which directly overlies the portion of aquifer that supplies enough groundwater to the well, wellfield, or spring to meet long-term water demand. Once delineated, the DWPA outline is placed on a map that provides the community with the knowledge of the geographic area where contamination poses the greatest threat to the drinking water supply.

Equant and GSI completed DWPA delineation for Columbia City and summarized the results in a technical memorandum dated June 20, 2013 (Appendix A). Refer to the memorandum for information on the hydrogeologic conceptual model, delineation methodology, groundwater flow model development, and capture zone analysis. The delineation also considered the presence of potentially interfering wells, including the City of St Helens' Ranney Wells (R-2 and R-3 are currently active). The locations of the City's water supply at Public Works and the City of St Helens Ranney Wells are shown below in Figure 2.



Figure 2: Well locations. PW-1 and PW-2 represent the City's water supply wells at Public Works. R-1, R-2, and R-3 represent City of St Helens Ranney Collector wells.

The results of the Source Water Protection Area delineation (synonymous with DWPA) are shown below in Figure 3. The figure also shows Time-of-Travel zone (TOT) estimates which are time estimates for groundwater to flow from the zone boundary to the wells.

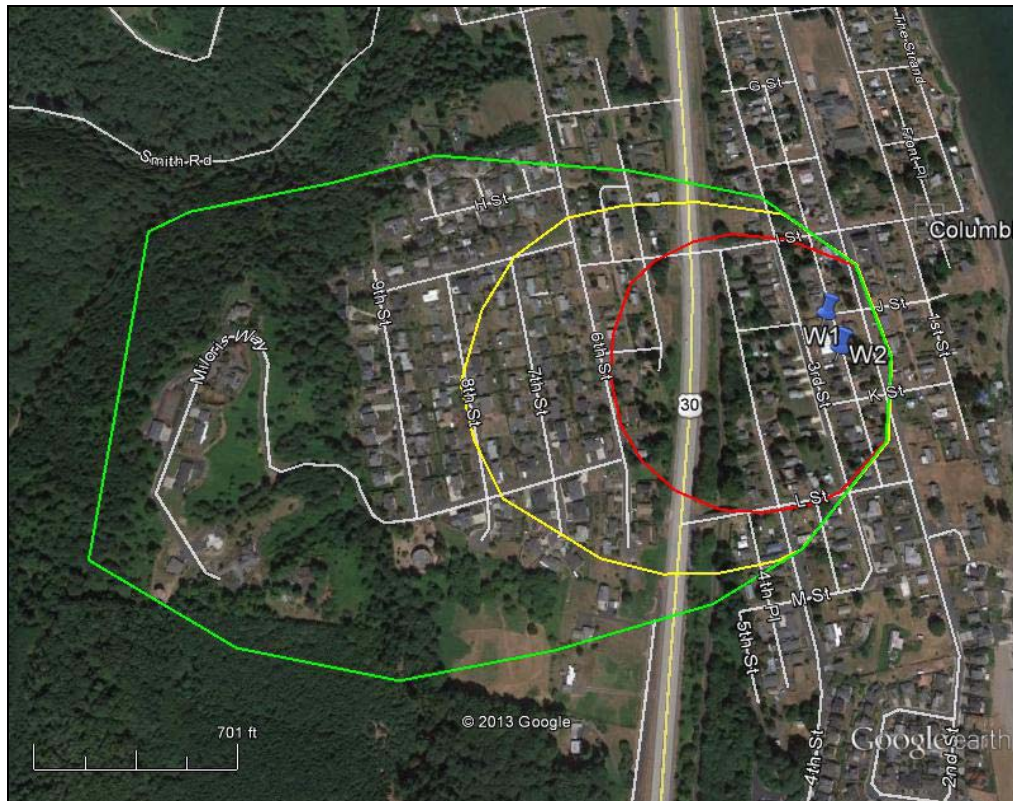


Figure 3. Delineation of DWPA with time-of-travel zones: 1-year TOT (red), 1-2 year TOT (yellow), and 2-5 year TOT (green).

The SWPA Delineation memorandum was submitted to OHA for certification. The OHA certified the DWPA delineation (Delineation Certificate #0017) as documented in a letter to Columbia City, dated July 25, 2013.

4.0 Responsible Management Authorities

The Drinking Water Protection Area (DWPA) is the area most critical to preserving water quality. Responsible management authorities associated with the DWPA are discussed in this section. The entire 1- and 2-year TOT zones lie within the City Limits and coincident Urban Growth Boundary and are therefore under the City’s jurisdiction (Figure 4 below). Approximately 50percent of the area within the 2-5-year TOT zone is also within the City Limits. The 5-year TOT zone, however, extends beyond the City Limits/Urban Growth Boundary and falls with the Columbia County’s jurisdiction. A small wedge of County jurisdiction occurs along the Columbia River Highway as it enters the SWPA from the south. Both the State’s Columbia River Scenic Highway (Hwy 30) and the railroad cross the SWPA within the 1-year TOT zone (Figure 4 below).

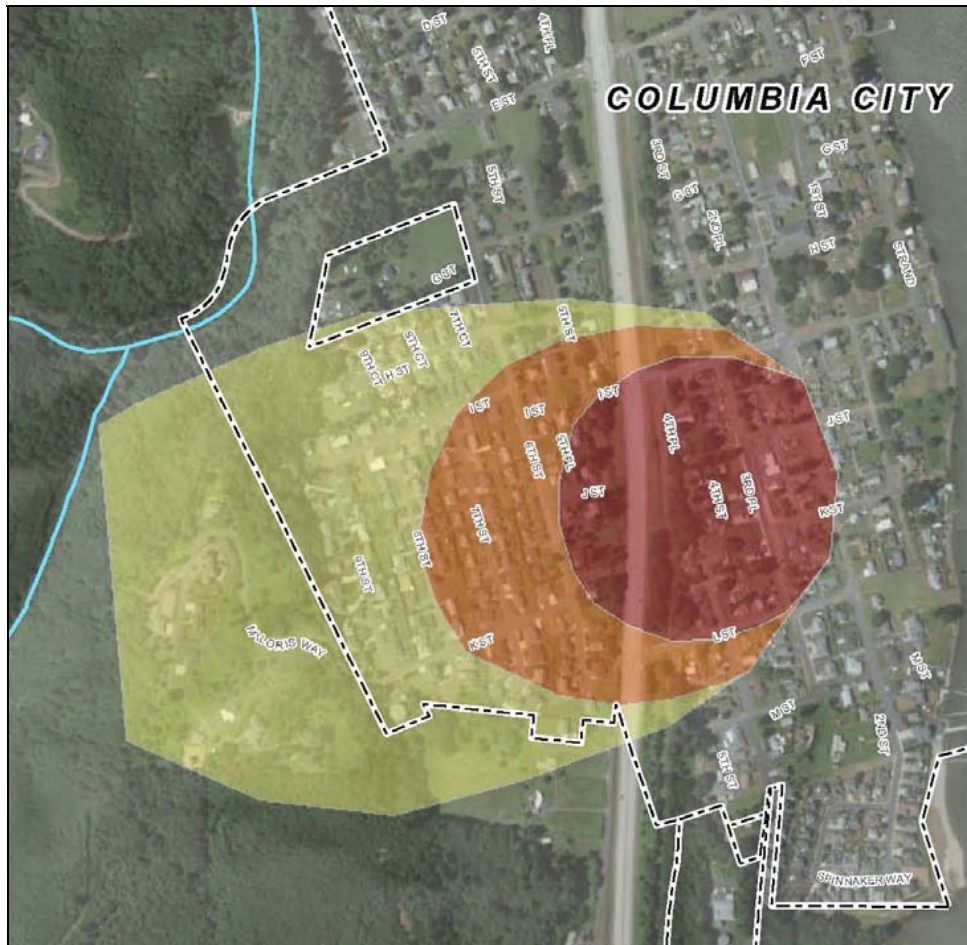


Figure 4. Map showing the location of Columbia City’s Drinking Water Protection Area relative to the City Limits boundary (dash-dot line). Shaded areas represent the following: red = 1 year time-of-travel (TOT), orange = 1-2 year TOT, and yellow = 2-5 year TOT.

5.0 Aquifer Sensitivity Analysis

After the DWPA was delineated, the aquifer susceptibility to potential contaminant sources inside the DWPA was evaluated. Aquifer susceptibility is dependent on two factors, the natural environment’s characteristics that permit migration of a contaminant to the aquifer (i.e., aquifer sensitivity) and the presence, distribution, and nature of the potential contaminant sources within the DWPA (i.e., the PCS Inventory). It should be understood that the public water system’s drinking water source cannot be susceptible to contamination, even if the aquifer is sensitive, unless potential contaminant sources are present within the DWPA. Therefore, the intent of the sensitivity analysis is to identify those areas within the DWPA where the aquifer is most sensitive to contamination.

5.1 Sensitivity Analysis Methodology

Aquifer sensitivity refers to those natural factors characteristic of the aquifer and overlying materials, in addition to those that are imposed upon the aquifer, such as well construction, that increase the potential for both surface and subsurface contaminants to gain access to the aquifer. The aquifer sensitivity analysis depends on a number of factors that can collectively or individually allow the aquifer to become contaminated. Factors considered during the sensitivity analysis are described below and presented in detail in the Source Water Assessment Report (GSI, 2013). Characteristic factors pertaining to sensitivity are categorized as highly or moderately sensitive. Those factors related directly to the well or wellfield are conditions that can be corrected by the water system, thus potentially lowering the overall sensitivity. However, those factors related to the aquifer tend to be a direct result of natural conditions and in most cases cannot be modified.

- **Depth to the Aquifer.** The depth to the first water-bearing zone below the casing seal is important in controlling the aquifer's sensitivity because it relates to the time of travel from the surface to groundwater. The greater the distance and estimated travel time, the greater is the potential for the contaminant to be degraded to insignificant levels during downward movement.
- **Aquifer Characteristics.** Aquifer characteristics refer to the geologic material (lithology) that groundwater is moving through and how the lithology controls that movement.
- **Soil Types.** Although soils usually comprise a very small portion of the overburden above the aquifer, they are the first natural barrier between the surface and the water-table. Therefore, the amount of time it takes for water to pass through the soil zone can be used as a factor in determining overall aquifer sensitivity.
- **Infiltration Potential.** The infiltration potential is related to the time it takes for water to travel to the aquifer (permeability of the material from the surface to the aquifer) and the amount of water (precipitation + irrigation) that is available.
- **Well Construction.** If improperly constructed, these wells can become conduits for contamination to move from the surface or near-surface environment into the well and down to the aquifer. The City's water supply wells at Public Works are considered properly constructed.
- **Water Quality Monitoring History.** Most groundwater contamination originates at the surface (accidental/deliberate spills, chemical applications, roadway/parking lot runoff, etc.) or in the shallow subsurface (underground storage tanks, septic systems, shallow injection wells, etc.) therefore, a review of water quality monitoring results for each water system can provide valuable information regarding aquifer sensitivity.

5.2 Highly Sensitivity Criteria

Based on our assessment of the well reports and available monitoring history for the City, the aquifer supplying wells PW-1 and PW-2 is not highly sensitive. However, soils with high and moderate permeability occur in the DWPA (Figure 5 below).

5.3 Moderately Sensitive Criteria

Based on our analysis within the DWPA, the aquifer supplying wells PW-1 and PW-2 is considered moderately sensitive because of occurrence of nitrate in the 2.7 to 3.8 mg/L range and a moderate infiltration potential at both sites. The DWPA contains highly permeable shallow soils, i.e., the Latourell Silt Loam and the Multnomah Loam. Highly permeable soils are those soils for which it has been estimated to take less than 65 hours for water to pass through their profile under saturated conditions. The area covered by these soils is shown in red in Figure 5. The City of Columbia City's drinking water source meets criteria for moderate sensitivity.

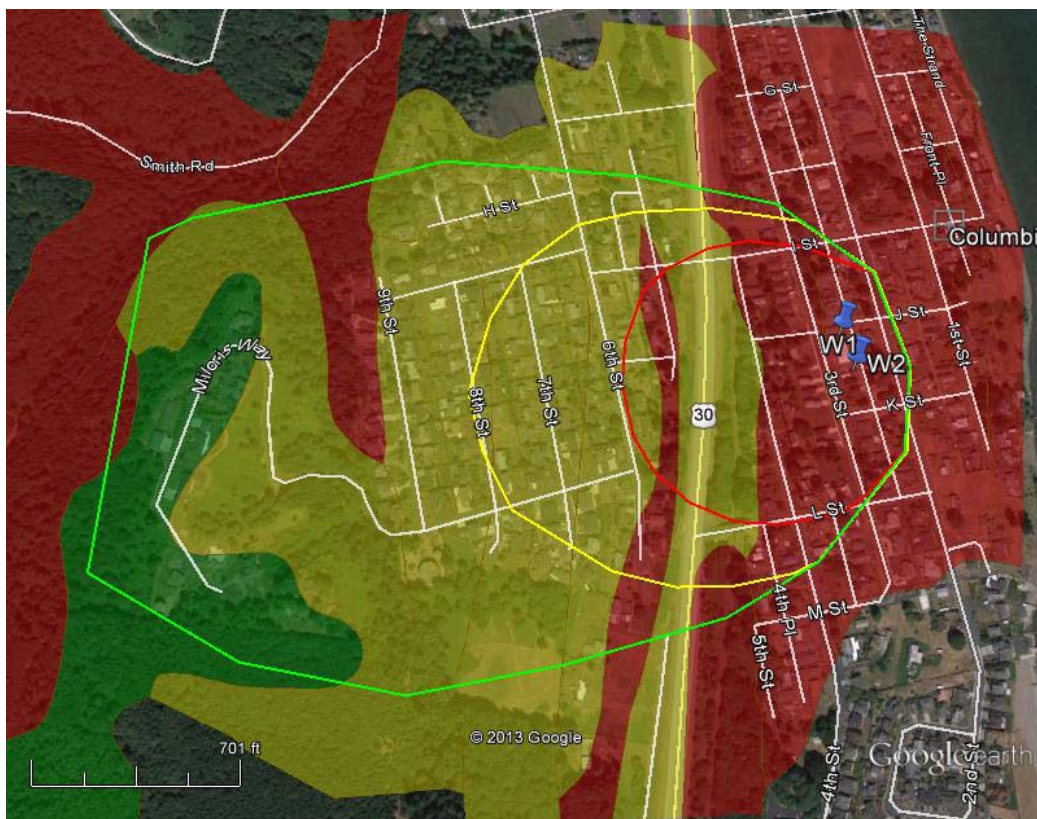


Figure 5. Aquifer sensitivity as a function of soil zone permeability and time required for water to move through them. Red indicates high sensitivity (<65 hours), yellow indicates moderate sensitivity (65 – 256 hours) and green reflects low aquifer sensitivity (>256 hours). The 1-, 2-, and 5-year time-of-travel zones are shown.

6.0 Potential Contaminant Source Inventory

This section discusses the methods and results of the inventory of potential contaminant sources that was completed during the Source Water Assessment (GSI, 2013). The primary intent of the inventory was to identify and locate significant potential sources of any of the contaminants of concern within the DWPA. Significant sources of contamination can be defined as any facility or activity that stores, uses, or produces, the contaminants of concern and has a sufficient likelihood of releasing such contaminants to the environment at levels that could contribute significantly to the concentration of these contaminants in the source waters of the public water supply. The results of the inventory provide:

- Information on the locations of potential contaminant sources, especially those that present the greatest risks to the water supply,
- An effective means of educating the local public about potential contaminant sources, and
- A reliable basis for developing a local management plan to reduce the risks to the water supply.

6.1 Background

The inventory was focused primarily on the potential sources of contaminants regulated under the federal Safe Drinking Water Act (SDWA). The inventory was designed to identify several categories of potential sources of contaminants including micro-organisms (i.e., viruses, *Giardia*, *Cryptosporidium*, and bacteria); inorganic compounds (i.e., nitrates and metals); and organic compounds (i.e., solvents, petroleum compounds and pesticides). Contaminants can reach a water body (groundwater, rivers, lakes, etc.) from activities occurring on the land surface or below it. Contaminant releases to water bodies can also occur on an area-wide basis or from a single point source.

It is advantageous to identify as many potential risks as possible within the DWPA during the inventory. It is important to remember the sites and areas identified in this section are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

Past, current, and possible future potential sources of contaminants were identified through a variety of methods and resources: including review of DEQ and other agencies' databases of currently listed sites, interviews with City staff, review of aerial photograph, and field observations as discussed in the Source Water Assessment Report (GSI, 2013).

6.2 Inventory Results

Potential contaminant sources were identified within the delineated one, two, and five-year time-of-travel zones (TOT) (Figures 6a and b below and Table 1; note that PCS #7 was originally

identified as a PCS, but later determined to be of no risk. As a result, it was removed from the list). The delineated DWPA for the wells is primarily dominated by municipal and residential land uses. A total of ten moderate to high potential contaminant sources were identified within the two-year time-of-travel zone for the wells. The potential contaminant sources in this area include higher density (urban) residential dwellings, municipal sewer lines, the Public Works Shop, stormwater dry wells, parking lots, the railroad, and the highway. Area-wide potential sources such as the residential areas and sewer lines extend into the 2- to 5 year TOT. Most of the potential sources pose a relatively moderate to higher risk to the drinking water supply.

The size of the DWPA is designed to approximate the next 5 years of groundwater supply for the City of Columbia City Public Water System. The City's DWPA is shown in Figure 6a below. The 2-year TOT shown on the map is specifically used as a conservative estimate of the survival time of some viruses in groundwater. Based on assessment results, the aquifer is not considered highly sensitive to contamination. Therefore, even though potential sources of viruses occur within the DWPA (sewer lines, urban residential housing and surface water), the drinking water supply is not considered susceptible to viral contamination. The City currently disinfects their water for bacteria and viruses (4-log virus removal).

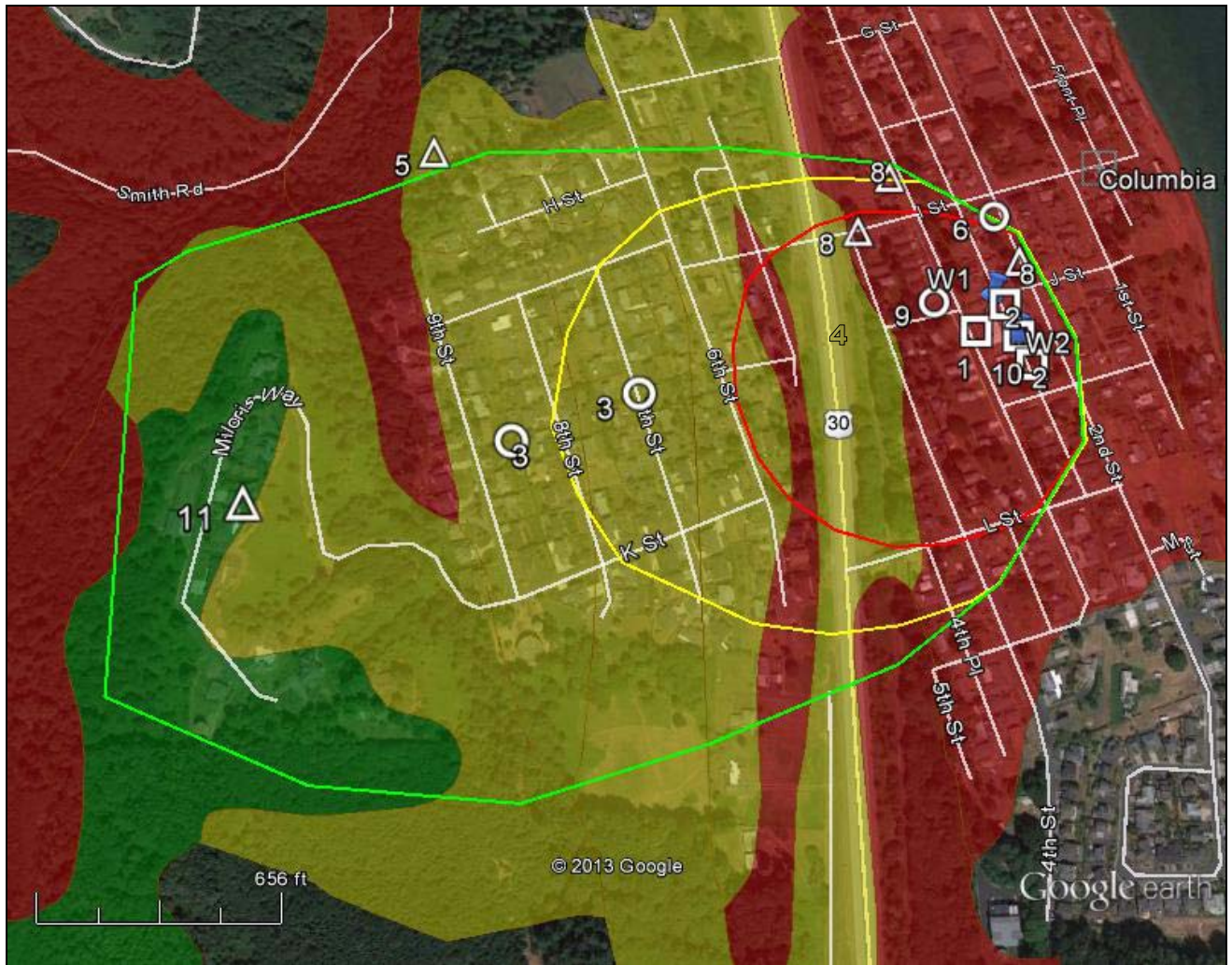


Figure 6a. Locations of identified potential contaminant sources overlain on the soil sensitivity zones within the DWPA of Columbia City. The 1-, 2-, and 5-year time-of-travel zones are shown. High risk sources are shown as squares, moderate risks as circles, and low risks as triangles. Associated numbers reflect PCS identities indicated in Table 1.



Figure 6b. As in Figure 6a, except larger scale showing Public Works Shop and City wells.

7.0 Susceptibility of the Drinking Water Source

Drinking water susceptibility is defined as the potential for contamination within the DWPA to reach the wells being used by the City. The overall purpose of the susceptibility analysis is to identify the potential threats to drinking water quality and help prioritize community efforts for minimizing the contamination risk associated with those threats. Therefore, the susceptibility analysis is dependent on four factors: 1) the location of the DWPA, 2) the sensitivity associated with the wells 3) the natural sensitivity of the aquifer to contamination, and 4) the occurrence and distribution of high- and moderate-risk PCSs within the DWPA.

The susceptibility analysis was completed by overlaying the potential contaminant source inventory results onto a map of the highly and moderately sensitive aquifer areas within the DWPA. These areas are where rapid infiltration of water from the surface is most likely to occur. The sensitivity with the DWPA is reflected by shallow soil permeability (Figure 6a and 6b). The City chose to address all high- and moderate-risk potential contaminant sources that occur within the DWPA in order to reduce the risk of contaminated drinking water supply.

In the Source Water Assessment, a total of 13 potential contaminant source sites were identified inside the DWPA (Figures 6a and 6b). A total of 10 PCS sites occur inside the 2-year TOT and 3 sites lie within the 2-year to 5-year TOT. Of the PCSs inside the 2-year TOT, 4 are of high-risk (sewer lines (throughout the 2-year TOT), the Public Works Shop, and chemical storage), 3 are moderate relative risks (urban residential, transportation roadways, parking lot and dry wells) and 3 are low risk (Decommissioned USTs). Three PCSs, urban-density housing (moderate risk), low-density residential housing and a burned structure (lower risk), occur within the 2- to 5-year TOT. Note that the potential contaminant sources sewer lines and urban housing occur throughout the area although shown as two and three points each, respectively, on the map.

Based on the analysis, the relative susceptibility to specific potential contaminant sources, the Assessment Report considered the City’s water supply wells to be highly susceptible to potential contaminant sources (sites 1, 2 and 3, 4, 6, and 9).

To guide the development of the protection strategies, the relative susceptibility was combined with the specific time-of-travel zone to illustrate the benefit of developing protection strategies (Table 2). Those PCSs of moderate to higher risk PCSs in highly sensitive areas within the 1-year TOT zone (Figure 6b) had higher benefit scores. PCSs with higher benefit scores should have a higher priority with respect to the development of management strategies.

Table 2. Implementation Impact/Benefit Score¹ based on Susceptibility² and Time-of-Travel Zone³		
<u>Higher Benefit</u> Benefit Score* = 9	<u>Moderate Benefit</u> Benefit Score* = 6	<u>Lower Benefit</u> Benefit Score* ≤ 6
1. City Shop 2. Sewer Lines 3. Urban Residential 6. Parking Lot 9. Stormwater Dry Wells (2 in the 1 year TOT)	3. Urban Residential 4. State Hwy and Railroad	5. Burned Structure 8. Decommissioned UST 11. Rural Residential 9. Stormwater Dry Well (1 in the 2-5 year TOT)

1. Benefit Score = Susceptibility score x Proximity zone score

2. Susceptibility Score: 3 points for highly susceptible (high to moderate risk and high sensitivity); 2 points for moderately susceptible (high risk in low sensitivity; moderate risk in moderate sensitivity); 1 point for lower susceptibility (moderate risk in low sensitivity and all low risk PCSs)

3. Time-of-Travel (TOT) zone score: 3 points for within 1 year TOT; 2 points for between 1 and 2 year TOT; 1 point for between 2 and 5 year TOT.

8.0 Source Water Protection Management Strategies

In considering management strategies, the City worked towards the goal of reducing the risk of contamination of their drinking water. All of the management strategies developed by the SWP Team, as described below, meet that goal.

The City has already adopted several management strategies and Best Management Practices (BMPs) to prevent releases of hazardous substances and minimize the risk of contaminating the City's water supply wells. The following sections summarize the City's SWP management strategies.

8.1 Public Education and Notification

The City recognizes that an informed population is more likely to accept and contribute to the SWP Plan.

1. Install notification signs along Highway
 - a. Install signs (e.g., "Entering the Source Area for Columbia City's Drinking Water") at DWPA boundaries east and west along Highway 30 and along selected well-traveled streets in the City. The signs should include a phone number to report spills. Signs along Highway 30 will need Oregon Department of Transportation (ODOT) approval.
 - b. Develop a strategy for periodically altering the appearance of the signs (colored flagging?) so that they will continue to remind citizens of the importance of the resource.
2. Place maps of the DWPA in public places (e.g., library, City Hall, Community Center, post office, etc). Also post a map on the City's website
3. Provide for public education about drinking water protection.
 - a. Use the City's newsletter to make available to the public basic information about the water cycle, how groundwater occurs, and that groundwater is recharged from the surface, making it vulnerable to surface activities.
 - b. Make public education materials available to the public. Use information available from the DEQ (<http://www.deq.state.or.us/wq/dwp/assistance.htm>) and EPA (<http://cfpub.epa.gov/safewater/sourcewater/index.cfm>) websites.
 - c. Notify citizens within the DWPA's. Use the City's newsletter and website to inform residents of their location and that they are living directly above their drinking water source.
 - d. Provide information to area businesses regarding drinking water protection and appropriate best management practices for their activities. Use materials available on DEQ's website (<http://www.deq.state.or.us/wq/dwp/assistance.htm>).

8.2 Fire Department and County Emergency Response

The fire department and County Emergency Responders serve as a “first responder” to spills as well as to fires. Inadvertent flushing of chemicals into the soil may pose a risk to the aquifer.

1. The City will inform the local Fire Department about the location of the SWP area in order to ensure that fires are extinguished in a manner that minimizes risk to groundwater.
2. The City will notify emergency responders (e.g., police, fire department, County) regarding the location and sensitivity of the SWP area and to use special care in responding to spills or other releases.

8.3 Railroad

The rail line parallels highway 30 through the City. Although a railroad tanker spill within the DWPA is very unlikely, the consequences could be extremely detrimental to the aquifer used for the City’s drinking water supply.

1. Notify the railroad of the sensitivity of the DWPA and its importance to the City’s drinking water. Obtain approval from the rail line to install rail-side signs at the SWP area boundaries - “Entering the Source Area for Columbia City’s Drinking Water”. The signs should include a phone number to report spills. Signs may have to have color/shape changed semi-annually to ensure recognition.

8.4 Public Works

Based on the PCS Inventory, the City’s Public Works Shop (PCS #1 in Figures 6a and 6b) provides vehicle maintenance as well as storage and handling of chemicals that may pose a risk to the aquifer beneath the DWPA.

1. According to City staff, there are several chemical products stored at the shop that have expired and can no longer be used. Equant has provided the City with a recommended chemical disposal vendor to facilitate removal.
2. Public Works uses a limited quantity of chlorinated solvents in the form of aerosol products (e.g., Brake Kleen, Engine Brite). However, chlorinated solvents have a high toxicity and are mobile in groundwater. Non-chlorinated solvent products are available as a substitute and are recommended at Public Works. Chemicals will be stored in a manner to provide secondary containment should a release occur.
3. BMPs already implemented at the Shop include: 1) used oil and used antifreeze are managed by a qualified disposal vendor, 2) no fuel tanks at Shop, 3) no floor drains in Shop, 4) no steam cleaning operations, 5) secondary containment berm around chemical product storage area, and 6) all vehicle servicing performed indoors.

8.5 Stormwater Dry Wells

Based on the City's 2007 Stormwater Management Plan (SMP) for Underground Injection Control (UIC) Systems Report, several dry wells are located within or near the DWPA (SMP ID #1A, #5, #6, #6B, and the parking lot dry well at "I" Street between 1st and 2nd Streets). Contaminants discharged to dry wells have a shorter vertical distance to migrate to groundwater compared to surface releases and, therefore, pose a higher risk to the aquifer beneath the DWPA.

1. The City's 2007 SMP for UICs is more than five years old. To meet the DEQ's UIC requirements, the SMP will be reviewed and updated.
2. The City will evaluate dry well alternatives related to the active dry wells located within the DWPA (e.g., dry well retrofits, alternate stormwater disposal and dry well decommissioning). If the dry wells will not be used for stormwater disposal, the dry wells will be decommissioned in accordance with DEQ requirements.
 - a. Dry wells #5 and #6 are located within the 1-year TOT.
 - b. Dry well #1A is located in the 2- to 5-year TOT and the parking lot dry well is located just outside the DWPA.
3. The City will decommission the abandoned dry well #6B in accordance with DEQ UIC requirements which includes pre-closure registration, soil sampling beneath the dry well, and a closure report.

8.6 Sewer Line near Public Works

According to City staff, the sanitary sewer lines are camera surveyed to assess conditions and potential leaks. However, the 4-inch main sanitary sewer line located along Second Place and west of the Public Works shop has not been camera surveyed.

1. The City will include the sewer main near the Shop during the next camera survey event.

8.7 Enforcing Zoning Regulations

The City limits the storage or use of hazardous substances within the residential areas of the City. The City has in-place a "Home Occupation Type" permit requirement that allows the City to constrain activities within residential areas in order to minimize such activities.

9.0 Implementation of Source Water Protection Strategies

The City realizes that Source Water Protection strategies can only be effective if they are implemented. Therefore, the City has developed the implementation plan described below. The City also realizes that the time frames may need to be adjusted should unforeseen conflicts or other issues arise.

Table 3. Time Frame for the Implementation of Source Water Protection Management Strategies in Columbia City, Oregon

Year of Implementation	Management Strategy
2014	<input type="checkbox"/> 8.1.1 Install DWPA signs along highway <input type="checkbox"/> 8.1.2 Provide DWPA maps in public places <input type="checkbox"/> 8.1.3 Provide public education and information regarding SWP <input type="checkbox"/> 8.2.1 Notify Fire Dept. of special fire extinguishing procedures <input type="checkbox"/> 8.2.2 Notify local emergency responders of DWPA location and sensitivity <input type="checkbox"/> 8.3.1 Notify railroad authority of DWPA location and sensitivity <input type="checkbox"/> 8.4.1 Remove out-of-date chemical products from City Shop <input type="checkbox"/> 8.4.2 Phase out use of chlorinated solvent products at City Shop <input type="checkbox"/> 8.5.1 Review and Update the 2007 SMP for UICs
2015	<input type="checkbox"/> 8.6.1 Perform a camera survey of the sewer line near the shop
2018	<input type="checkbox"/> 8.5.2a Evaluate alternates for dry wells in 1-year TOT and implement selected alternative
2024	<input type="checkbox"/> 8.5.2b Evaluate alternates for dry well in 2-to 5-year TOT and implement selected alternative <input type="checkbox"/> 8.5.3 Decommission abandoned dry well

10.0 Contingency Plan

The management strategies of this plan provide mechanisms designed to reduce risk to groundwater contamination. In the event that a spill or other contamination release happens, the City should be prepared to deal with such an occurrence. The contingency plan describes procedures for responding to a contaminant release or disruption in the City’s water supply. Many emergency response elements have already been developed for the City (refer to the 2009 Columbia County Multi-Jurisdictional Hazard Mitigation Plan Update).

The City's contingency plan addresses the ten elements required by the Oregon Drinking Water Protection Program. These elements include the following:

1. Potential Threats to the Drinking Water Supply,
2. Protocols for Incidence Response,
3. Prioritization of Water Usage,
4. Key Personnel and Development of Notification Roster,
5. Short and Long Term Water Supply Replacement,
6. Short and Long Term Water Conservation,
7. Plan Updating and Review,
8. Personnel Training,
9. Provisions for Public Education, and
10. Logistical and Financial Resources.

10.1 Potential Threats to the Drinking Water Supply

Primary threats to Columbia City's drinking water system are related to an interruption of water delivery or contamination of the groundwater supply. Four types of events have been identified that could cause an interruption in delivery and/or contamination of the water supply, including:

1. Mechanical problems: power outage, broken main, pump failure;
2. Detection of a contaminant at the wellhead;
3. Chemical spill in the following zones of the drinking water protection area;
 - a. Within One-year time of travel (TOT) - Transportation of fuels and other chemicals including the railroad and highway. Public Works shop and rural resident's use of hazardous chemicals, e.g., stored fuel, petroleum products, pesticides and fertilizers.
 - b. One-year to Five-year TOT - Transportation of fuels and other chemicals. Rural resident's use of hazardous chemicals, e.g., stored fuel, petroleum products, pesticides and fertilizers.
4. Sabotage

The most likely threats to the drinking water system are mechanical failure, a chemical release within the groundwater protection area and a detection of a contaminant at the wellhead.

10.2 Protocols for Incident Response

This element details the appropriate response for the most likely potential threats listed above.

1. Mechanical and flooding related interruptions:
 - a. Rely on reservoir capacity for emergency storage

- b. Apply conservation measures
2. Detection of Contaminant at the wellhead:
- Response to the detection of a contaminant at the wellhead depends on whether the substance's concentration reaches or exceeds the maximum contaminant level (MCL). If the contaminant is detected at elevated levels, but still below the MCL, it is recommended that the City's customers be notified of the contaminants presence but that it is considered by the federal Safe Drinking Water Act to be safe to consume at that level. The OHA Drinking Water Program (DWP) should be consulted and quarterly monitoring implemented in order to determine that the concentration remains below the MCL. If the MCL is exceeded by the contaminant concentration, the following procedures should be implemented (DWP will consult):
- a. Shut down contaminated well(s)
 - b. Implement conservation/curtailment plan, if necessary, as outlined in the City's Water Curtailment Plan (Appendix B)
 - c. Identify local wells that may be affected or may cause migration of the contaminant
 - d. Issue a public notice
3. Chemical spill within the drinking water protection area:

Within One-year TOT:

- a. Shut down the Public Works wells immediately. Do not restart well until the extent and character of the release has been determined and no risk to well is indicated.
- b. Contact Columbia County Emergency Response Coordinator if spill occurs.
- c. Follow communication procedures contained in Section 10.4 of this plan.
- d. Inform emergency responders that spill is within the drinking water protection area.
- e. Maintain up-to-date "North American Emergency Response Guidebook" to determine what chemicals have been spilled (Chemical ID number on vehicle) and their characteristics. Guidance for action in the event of an accident involving hazardous substances is provided in this guidebook. Contact the Oregon Fire Marshal (1-503-378-3473), CHEMTREC (1-800-424-9300) or CHEM-TEL, INC. (1-800-255-3924) as necessary for guidance.
- f. Follow procedures for approaching area to minimize risk to personnel.
- g. Have absorbent and containment material on hand. Use only if trained to do so.
- h. Identify local private wells that may also have to be shut down.
- i. Send news release to local media.
- j. Notify residents and businesses about conservation measures needed to be taken.

- k. Implement conservation/curtailment plan, if necessary, as outlined in the City's Water Curtailment Plan (Appendix B)
- l. Leave clean-up to responsible party.

One-year to Five-year TOT:

- a. Contact Columbia County Emergency Response Coordinator if spill occurs.
- b. Follow communication procedures contained in Section 10.4 of this plan.
- c. Inform emergency responders that spill is within the drinking water protection area.
- d. Maintain up-to-date "North American Emergency Response Guidebook" to determine what chemicals have been spilled (Chemical ID number on vehicle) and their characteristics. Guidance for action in the event of an accident involving hazardous substances is provided in this guidebook. Contact the Oregon Fire Marshal (1-503-378-3473), CHEMTREC (1-800-424-9300) or CHEM-TEL, INC. (1-800-255-3924) as necessary for guidance.
- e. Identify local wells that may also have to be shut down.
- f. Notify residents and businesses that conservation measures may need to be taken.
- g. Send news release to local media
- h. Follow procedures for approaching area to minimize risk to personnel.
- i. Leave clean-up to responsible party.

4. Sabotage:

Although extremely unlikely, the City should become aware of what types of vandalism or sabotage could occur and develop strategies to respond to these actions. The EPA has recently provided information to assist water systems in determining vulnerable areas within a water system and describes ways to minimize risk. This information can be accessed through the DWP website: www.dhs.state.or.us/publichealth/dwp/index.cfm. Additional websites include: www.epa.gov and <http://awwa.org>. Funding is available for infrastructure improvements from the drinking water state revolving loan fund.

Important elements in developing a strategy may include:

- a. Guarding against unplanned physical intrusion
- b. Making security a priority for employees and area residents
- c. Integrating response actions into the incident response protocol (above)
- d. Investing in security and infrastructure improvement

Implementation of strategies associated with sabotage can best be accomplished by the following:

- a. Integration of responses to sabotage into the incident response protocol above

- b. Remain informed regarding potential threats, direct and indirect, that may apply to the City by attending available training and reading information distributed by water-related organizations (see websites above)
- c. Consider steps that might minimize unplanned intrusion at the well sites, e.g., fencing

10.3 Prioritization of Water Usage

This element prioritizes community needs in case the water supply is interrupted and/or a replacement supply is necessary. The City’s water storage reservoirs provide emergency water supply for several days. In the event of an emergency where the well(s) is shut down and water conservation/curtailment is necessary, the City will prioritize water use in accordance with the Water Curtailment Plan (Appendix B).

10.4 Key Personnel (Notification Roster)

In the event of an emergency situation threatening the water supply, key people must be notified and response procedures coordinated between city, county, and state personnel. These personnel are listed below with respect to each potential threat/incident response:

- 1. Mechanical problems

Lead: Columbia City Public Works Department
 Emergency Dispatch: 9-1-1 or 503-397-1521
 Office Phone: 503-366-0454
 Cell Phone: 971-563-3127

- 2. Detection of a contaminant at the wellhead

Lead: Columbia City Public Works Department
 Emergency Dispatch: 9-1-1 or 503-397-1521
 Office Phone: 503-366-0454
 Cell Phone: 971-563-3127

- 3. Chemical spill

Mandatory Contacts:

Lead: Columbia River Fire & Rescue
 Emergency Dispatch: 9-1-1 or 503-397-1521
 Office Phone: 503-397-2990

Columbia City Public Works Department
 Emergency Dispatch: 9-1-1 or 503-397-1521
 Office Phone: 503-366-0454

Cell Phone: 971-563-3127

Columbia City Police Department
Emergency Dispatch: 9-1-1 or 503-397-1521
Office Phone: 503-397-4010
Cell Phone: 971-563-3824

Other Potential Involved Agencies:

Columbia County Public Health
Regional HazMat Response Teams
Oregon Department of Environmental Quality
Oregon Department of Transportation

Portland and Western Railroad
State Notification: Oregon Emergency Response System (OERS): 1-800-452-0311
Federal Notification: National Response Center (NRC): 1-800-424-8802

4. Sabotage

Mandatory Contacts:

Lead: Columbia City Police Department
Emergency Dispatch: 9-1-1 or 503-397-1521
Office Phone: 503-397-4010
Cell Phone: 971-563-3824

Columbia City Public Works Department
Emergency Dispatch: 9-1-1 or 503-397-1521
Office Phone: 503-366-0454
Cell Phone: 971-563-3127

Other Potential Involved Agencies:

Columbia County Public Health
Columbia River Fire & Rescue
Regional HazMat Response Teams
Oregon Department of Environmental Quality
State Notification: Oregon Emergency Response System (OERS): 1-800-452-0311
Federal Notification: National Response Center (NRC): 1-800-424-8802

In each of the above situations, other key personnel and officials will be notified as deemed appropriate based upon the severity of the situation, such as the Columbia County 9-1-1 Communications Center, City Administrator, City Emergency Manager, Mayor and City Council, Public Health Department, Water Resources Department, etc. The City's Public

Information Officer will prepare press releases as deemed appropriate for distribution via the news media, Community Alert Network, social media, etc.

10.5 Short-Term and Long-Term Replacement of Water Supply

In the event of an emergency, the minimum water needs of the community must be met, and this supply must meet applicable health standards. Short-term options are those where the alternative supply is needed for a few hours or days. Long-term options are considered for a permanent alternative supply.

The City purchases fully treated water from the City of St Helens on an as needed basis. Ranney Wells R-2 and R-3 are the main sources of water for the City of St Helens. In an emergency, the City plans to rely on water supply from the City of St Helens until a long-term solution is in place. A potential long-term solution for water supply would probably include wellhead treatment or a new well.

10.6 Conservation Practices

Conservation of water use will lessen demands on the City's public water system in the event of an emergency situation. Refer to the City's Water Curtailment Plan, Ordinance No. 00-563-O, for information on planned conservation practices in emergency situations (Appendix B).

10.7 Plan Testing, Review, and Update

The adequacy of the City's contingency plan will be evaluated, reviewed, and updated using an annual review. The public water system coordinator will review any personnel or situational changes and make adjustments to the plan on at least an annual basis. The notification schedule will be revisited to ensure that the proper names and phone numbers are in place.

10.8 Personnel Training

To be effective, contingency plans must rely on properly trained people operating within a well-organized and effective system with up-to-date information. County and state emergency responders have been professionally trained to deal with hazardous materials (HAZMAT) responses. Local personnel should also be trained in initial HAZMAT response because they could be the first to arrive on site. Equally important to what local personnel should do is what they should not do. The North American Response Guidebook has specific step-by-step procedures for first responders, including detailed safety precautions that should be followed. Local personnel will be provided copies of this information. Other training methods, such as videos or guidance, will be used as available and appropriate.

10.9 Public Education

Educational materials build and maintain support for the Contingency Plan and can encourage assistance and understanding when contingency plans are put into effect. Management strategies for the City have a strong educational component that satisfies part of this element of the contingency plan. However, there are other educational components directly related to this contingency plan that must be implemented to make the plan an effective emergency response

tool. Before an emergency occurs, local residents and business owners must be knowledgeable about appropriate conservation measures that they will be expected to apply. Informational packets need to be prepared and distributed in advance of a water supply interruption or contamination.

10.10 Logistical and Financial Resources

The City should participate in an emergency response situation only to the extent of providing assistance and information regarding the water system and the particular needs of the community. The City should not attempt any clean-up efforts on its own, although containment may be appropriate. The responsible party is legally obligated to report and clean up chemical releases. Appropriate clean up measures will be dependent on the type and quantity of chemical released.

Contingency elements provide mechanisms for a well-planned response in the event of a contaminant release or disruption in the City's water supply. The City's future growth will also increase demands for an additional water supply. An analysis of potential new well sites from a groundwater risk perspective provides a basis for selecting a new well location that minimizes future contamination risks. An analysis and recommendation of a new well site is contained in the following section.

11.0 New and Future Groundwater Sources

The City of Columbia City Water Master Plan (WMP), dated March 2013, estimates future water demand over a 20-year planning period and recommends a new water source to supplement the existing water supply. The new source is expected to provide at least 150 gpm to meet the projected Maximum Daily Demand (MDD) - 400 gpm would be "most desirable". The WMP evaluated the feasibility of new sources including: 1) additional water supply wells, 2) City of St Helens Ranney Well R-1, and 3) the Columbia River. The WMP recommended the acquisition of Ranney Well R-1 which has a reported capacity of 500 gpm. Refer to the WMP for more details regarding the issues and status of this potential alternative for supplemental water supply.

In 2005, OHA Drinking Water Program completed a DWPA assessment for the City of St Helens water supply wells including Ranney Well R-1. If the City moves forward to the due diligence phase of acquiring Ranney Well R-1, the City may update the DWPA for this well to comply with the delineation requirements given in OAR 333-061-57 (3) (a). The City may also update this Plan to comply with the SWP recertification requirements (see below).

12.0 Recertification of the Source Water Protection Plan

Recertification of SWPPs is required on a 5-year cycle (OAR 340-040-0190). The purpose of recertification is to ensure that responsible management parties continue to acknowledge the

DWPA and are taking steps to reduce the risk to drinking water quality. The City can submit the current Plan for recertification without modification if certain conditions apply, including:

- No conditions that potentially could modify the boundaries of the Plan have occurred, including new sources inside or outside the existing DWPA.
- An updated inventory is completed and submitted showing that no new PCSs not addressed in the current Plan, are present within the delineated DWPA.
- The management practices are still applicable and are being implemented.