

Wellhead Protection Program

INTRODUCTION

A wellhead protection program is a proactive and ongoing effort of a water purveyor to protect the health of its customers by preventing contamination of the groundwater it supplies for drinking water. Section 1428 of the 1986 Amendments to the Federal Safe Drinking Water Act (SDWA) mandates that each state develop a wellhead protection program. In Washington State, the Department of Health (DOH) is the lead agency for the development and administration of the State's wellhead protection program. All federally defined Group A public water systems that use groundwater as their source are required to implement a wellhead protection program. All required elements of a local wellhead protection program must be documented and included in either the Comprehensive Water System Plan (applicable to the City of Stanwood) or Small Water System Management Program document (not applicable). The State mandate for wellhead protection and the required elements of a wellhead protection program are contained in WAC 246-290-135, Source Protection, which became effective in July of 1994. The minimum required elements of a wellhead protection program for water systems in Washington State that rely on groundwater are as follows.

- A completed susceptibility assessment of each water source.
- Delineation of wellhead protection areas for each water source with the six-month, one, five, and ten-year time of travel boundaries marked using DOH or Environmental Protection Agency (EPA) guidance for delineation.
- An inventory of known and potential contaminant sources located within the defined wellhead protection areas. This inventory list shall be updated every two years.
- Documentation of the purveyor's notification to all owners/operators of known and potential sources of groundwater contamination within the defined wellhead protection areas.
- Documentation of the purveyor's notification to regulatory agencies and local governments of the defined boundaries of the wellhead protection areas and the findings of the contaminant source inventory.
- A contingency plan to ensure that customers have an adequate supply of water in the event that contamination causes a temporary or permanent loss of the system's principal source of supply.
- Documentation of the purveyor's coordination with local emergency spill responders (including police, fire, and health departments), including notification of wellhead protection area boundaries, and results of the susceptibility assessment, inventory findings, and contingency plan.

RECENT PROGRAM ACTIVITIES

The City of Stanwood (City) has established an active wellhead protection program to protect the health of its customers by preventing contamination of the groundwater. Recently the City has actively participated in the following wellhead protection activities:

- Developed and distributed public education materials within the wellhead protection areas to address groundwater protection and household, landscape, and gardening practices that could affect groundwater quality. The public education information was included in the City's 2013 Consumer Confidence Report.
- Bryant Well No. 3 was constructed and a separate wellhead protection document was prepared. The document is included as **Appendix A**.
- Established a capital improvement item in the City's WSP for performing a more accurate delineation of the wellhead protection area boundaries utilizing a combined analytical and hydrogeologic approach. The City also will also conduct a detailed inventory of potential sources of groundwater contamination and carry out other wellhead protection program requirements as outlined within this wellhead protection program.

SUSCEPTIBILITY ASSESSMENT

In 1994, DOH developed the Susceptibility Assessment Survey Form for water purveyors to complete to determine a drinking water source's potential for contamination. The results of the susceptibility assessment may provide monitoring waivers that allow reduced source water quality monitoring.

Based on the results of the City's susceptibility assessment, DOH assigned a susceptibility rating for each source. The three susceptibility ratings are low, moderate, and high. DOH assigned a moderate susceptibility rating to Bryant Well No. 1, a low susceptibility rating to Bryant Well No. 2 and a high susceptibility rating for the Hatt Slough Springs. In 2009, the Cedarhome Well received a low susceptibility rating. The sources were granted a susceptibility waiver that allowed the City to avoid monitoring of ethylene dibromide and other soil fumigants, dioxin, endothall, diquat, and glyphosphate. Sill Well did not require a susceptibility rating because it is inactive.

DELINEATION OF WELLHEAD PROTECTION AREAS

A wellhead protection area is the surface and subsurface area surrounding a well, well field, or spring through which contaminants are likely to pass and eventually be transported into the drinking water system. This is the area around the source that must be managed to protect the water supply from contamination. Establishing or delineating the boundaries of the wellhead protection area for each source is most commonly accomplished using the estimated time of travel rates of groundwater.

Wellhead Protection Area Zones

The first component of a wellhead protection area is the sanitary control area required by WAC 246-290-135. This protective area should already be tightly controlled by the purveyor to minimize direct contamination at the wellhead. The minimum sanitary control area for a well shall be a radius of 100 feet around the wellhead and 200 feet around springs. The construction, storage, disposal or application of known or potential contaminants is prohibited within this area, unless permitted by

DOH and the water purveyor.

Wellhead protection areas are based on six-month, one-year, five-year, and ten-year time of travel zones. For example, a one-year time of travel zone represents an area around the well or well field in which contaminants could reach the well within one year. Each zone has different management strategies based on the urgency of response and characteristics of risks to public health posed by contaminants within the zones. An additional zone, called the buffer zone, may also be established to provide an area of added protection outside the ten-year time of travel zone for the wellhead protection area.

Delineation Methods

There are several delineation methods that can be used to define wellhead protection areas, but the simplest approach is the Calculated Fixed Radius (CFR) method. This method requires the least amount of technical data and is typically used for the initial delineation to identify immediate threats to water quality. Data input includes the annual volume pumped by the well, the open interval or length of the well screen, aquifer porosity, and the desired travel time (typically six-month, one-year, five-year, and ten-year). The Time of Travel (TOT) data calculated from the CFR method is used to create circular boundaries around each of the wells or well fields representing the hypothetical distance that a contaminant will travel for the given length of time.

The major drawback of the CFR method is that groundwater rarely behaves this simply; therefore, additional study of the aquifer in question is recommended to determine more accurate protection zones. Other more complex (and probably more accurate) delineation methods utilize analytical models, hydrogeologic mapping, and computer flow models. The City's wellhead protection TOT zones were based on the CFR method and modified based on recommendations by a licensed hydrogeologist after review of geologic and hydrologic characteristics of major topographic and hydraulic characteristics identified on maps of the area. The Cedarhome, Sill, Fure, and Bryant wells are all located on the East Stanwood Plateau; therefore, areas of the CFR delineations downhill from the plateau were removed from the wellhead protection areas. Hatt Slough Springs is at the crest of a different plateau, and the areas of the CFR delineations downhill from that crest were also removed from the wellhead protection plan. The wellhead protection area boundaries, based on time of travel calculations for each of the City's active and inactive water sources, are shown in **Figure 1**.

Delineation Results

The City utilized the CFR method and annual water rights quantity to update the wellhead protection area boundaries. **Table 1** presents data for each of the City's active and inactive well sources and one spring source and the results of the CFR computations. The Sill Well is included although it is an inactive source. The Fure Well, Bryant Well #2, and Hatt Slough Springs are also currently inactive. The wellhead protection area boundaries for the six-month, one-year, five-year, and ten-year time of travel computations are presented in **Figure 1**.

**Table 1
Well Data and Calculated Fixed Radius Values**

Description	Bryant Well #1	Bryant Well #2	Cedarhome Well	Fure Well	Hatt Slough Springs	Sill Well (Inactive)
Data						
Source No.	S02	S03	S07	S04	S01	S05
Sec-Twp-Rng	S29 T32N R4E	S29 T32N R4E	S20 T32N R4E	S20 T32N R4E	S05 T31N R4E	S20 T32N R4E
Year Constructed	1948	1966	1995	1951	1934	1958
Ground Elevation (ft)	62	63	140	105	n/a	135
Well Depth (ft)	250	200	490	157	n/a	235
Pump Intake Depth (ft)	129	128	364	150	n/a	
Depth to Top of Screen or Perforations (ft)	50	168	365	145	n/a	197
Depth to Bottom of Screen or Perforations (ft)	245	200	480	150	n/a	235
Water Bearing Interval or Length of Screen (ft)	195	32	115	5	5	38
Static Water Depth (ft)	83.5	81	130	50	n/a	90
Pumping Water Depth (ft)	88.5	86	256		n/a	
2007 Pumping Rate (gpm)	565		0	0	97	0
Annual Water Right (gallons) ¹	781,567,200		315,360,000	39,420,000	591,300,000	52,560,000
Aquifer Porosity (estimated)	0.22		0.22	0.22	0.22	0.22
Calculated Fixed Radius (CFR) Values¹						
6-Month Time of Travel (ft)	623		515	873	3,382	366
1-Year Time of Travel (ft)	880		728	1,235	4,783	517
5-Year Time of Travel (ft)	1,969		1,629	2,761	10,694	1,157
10-Year Time of Travel (ft)	2,784		2,303	3,905	15,124	1,636

Delineation Update Requirements

DOH recommends that water systems upgrade their initial delineation using a more sophisticated groundwater flow model approach within five years following the initial delineation. In addition, wellhead protection area boundaries should be reviewed and revised when new wells are brought on-line or when there is a change in the annual volume pumped from a well. DOH recommends reevaluation of the wellhead protection area boundaries during the update of the Comprehensive Water System Plan, which occurs on a six-year schedule.

INVENTORY OF POTENTIAL CONTAMINANT SOURCES

An essential element of wellhead protection is an inventory of all potential sources of groundwater contamination throughout delineated wellhead protection areas. The purpose of the inventory is to identify past, present, and proposed activities that may pose a threat to the source of water supply (i.e. the aquifer).

Inventory Approach

An inventory of potential sources of groundwater contamination was conducted in 2008 during the preparation of the City’s Comprehensive Water System Plan. Several databases maintained by the Washington State Department of Ecology (Ecology) and the US EPA were searched for known and

potential contaminant sources. In addition, the Washington State Department of Transportation (WSDOT) was contacted regarding past automobile accidents in which hazardous materials were being transported in the Stanwood area along State Route 532 and Pioneer Highway. State Route 532 passes through the Bryant Wells' six-month time of travel zone and Fure Well's five-year time of travel zone. Pioneer Highway is also located near the wells, but is not considered a potential contaminant source because it is downhill from the East Stanwood Plateau and the wells. Aerial images of Cedarhome Well's wellhead protection area were surveyed during its susceptibility assessment for large yards and agricultural areas that could be sources of fertilizer, yard chemicals, and pet/farm animal waste pollution to groundwater.

Inventory Findings

The inventory efforts described above revealed several potential sources of contamination located within the City's wellhead protection areas. The approximate location of the sites is shown in **Figure 1** and a list of the potential sources of contamination is shown in **Table 2**. The EPA Resource Conservation Recovery Act (RCRA) website revealed no additional potential contamination sources within the wellhead TOT zones.

Other potential sources of contamination that are not specifically shown in **Figure 1** or listed in **Table 2** are discussed below.

**Table 2
Potential Sources of Contamination**

No.	ID	Name	Address	Material Stored/Status	WHPA Location
WQ-1	ECY/26452412	Warm Beach Chr Camp & Confer Ctr	20800 Marine Dr	Wastewater discharge permit- Individual Minor Municipal/ Active	Hatt Slough 10-year
U-1	ECY/13575917	Cedarhome General Store	6809 284th St. NW	Unknown/ Active UST	Cedarhome 5-year
U-2	ECY/43169419	Spane Buildings, Inc.	27004 64th Ave. NW	Petroleum products/ Inactive UST	Bryant 6-month
U-3	ECY/35448677	Bus Garage UST 8831	7401 272nd St. NW	Petroleum products/ Inactive UST	Bryant 5-year
U-4	ECY/42615692 RCRA/110005318646	Tesoro 62137	7306 267th Pl. NW	Petroleum products/ Active UST	Bryant 6-month
U-5	ECY/24568985	Continental Woodcraft Co.	6713 268th St. NW	Petroleum products/ Inactive UST	Bryant 6-month
U-6	ECY/63161552	Stanwood Exxon	26712 72nd Ave. NW	Petroleum products/ Active UST	Bryant 6-month
LO-1	N/A	Landowner #1	6308 Jensen Rd	Potential fertilizer, yard chemicals	Cedarhome 6-month
LO-2	N/A	Landowner #2	6220 284th St. NW	Potential fertilizer, yard chemicals	Cedarhome 1-year
LO-3	N/A	Landowner #3	6109 Jensen Rd	Potential fertilizer, yard chemicals	Cedarhome 5-year
LO-4	N/A	Landowner #4	6104 284th St. NW	Potential fertilizer, yard chemicals	Cedarhome 5-year
LO-5	N/A	Landowner #5	6608 284th St. NW	Potential fertilizer, yard chemicals	Cedarhome 5-year
LO-6	N/A	Landowner #6	6204 Jensen Rd	Potential fertilizer, yard chemicals	Cedarhome 1-year
LO-7	N/A	Landowner #7	28123 68th Ave NW	Potential fertilizer, yard chemicals	Cedarhome 1-year
LO-8	N/A	Landowner #8	28015 Jensen Rd	Potential fertilizer, chemicals	Cedarhome 5-year
LO-9	N/A	Landowner#9	28603 68 th Ave NW	Potential fertilizer, yard chemicals	Cedarhome 5-year
LO-10	N/A	Cedarhome Elementary	27911 68 th Ave NW	Potential fertilizer, yard chemicals	Cedarhome 6-month
SDP-1	N/A	Stormwater Detention Pond	Tax Parcel 01027800099900	-	Cedarhome 6-month

Source of Information

ECY: Washington State Department of Ecology
RCRA: Resource Conservation Recovery Act

Hazardous Spills on Highways – State Route (SR) 532 passes through the six-month time of travel zones of the Bryant Wells’ wellhead protection area and the five-year TOT zone for the Fure Wells’ wellhead protection area. Vehicle accidents within this section of Highway 532 could result in spills of gasoline or other transported hazardous materials that would threaten the aquifer of the Bryant and Fure Wells. Pioneer Highway is another heavily traveled highway in the Stanwood area. This highway is not considered a potential contaminant source because it is downhill from the East Stanwood Plateau; therefore, any accidents or spills on Pioneer Highway should not affect the wells. Two accidents involving fuel spills occurred between 1992 and 1996, according to WSDOT. Information from 1996 through 1998 is very limited. A new request for collision data from 1999 to 2008 (2008 data is preliminary) was made in October 2008. The new data revealed no hazardous materials spills along SR 532 between Pioneer Highway and 64th Avenue NW in that time period. Although no accidents involving hazardous materials have been reported, spills are always a concern given the wells’ close proximity to SR 532.

Pesticide and Herbicide Use along Roads – Pesticides and herbicides are typically applied along County roads by the Snohomish County Public Works Department and along the State highways by the WSDOT. Although the chemicals in pesticides and herbicides are a potential source of contamination to the City’s water sources, proper application will most likely avoid contaminating the groundwater.

Septic Systems – Septic systems for wastewater disposal and treatment are found in areas of the City that are not served by the City’s sewage collection system. These on-site sewage disposal systems, which typically consist of a septic tank and drainfield, may pose a threat to the City’s groundwater sources. The ability to remove pollutants from the discharge of these systems depends on the type of the surrounding soil. In addition, septic systems may be unlawfully used for disposal of toxic materials.

Home Oil Furnace Tanks – Some residents in the Stanwood area may be using oil furnaces to heat their homes. The number and location of these is unknown. The fuel for oil furnaces can be stored in above-grade or buried tanks. The City’s groundwater sources may be threatened by heating oil that leaks out of the tanks into the underlying soil. The risk of this potential contaminant depends on the location of the leaking tanks relative to the City’s wells, the amount and rate of leakage, and the type of underlying soil.

Hazardous Household Materials – Almost all households have hazardous materials that are commonly used for a variety of cleaning and maintenance purposes. Some of these materials include cleaning solvents, paints, antifreeze, and engine oil. Improper use or disposal of these may result in contamination of the City’s groundwater sources. All of the wells and the springs have single-family residences located within their wellhead protection areas.

Private Wells – Poorly constructed private wells with inadequate seals and improperly abandoned wells may pose a threat to the City’s groundwater sources. Poorly constructed private wells with insufficient seals provide a direct pathway for contaminants from stormwater runoff, rodents, insects, and other pollutants to enter the same aquifer used by the City’s wells.

Stormwater – Stormwater runoff can potentially contaminate the City’s groundwater sources. Runoff from industrial and commercial areas can contain high levels of metals and hydrocarbons. Runoff from residential areas is typically high in nutrients, pesticides, and metals. A stormwater detention pond is located within the six-month time of travel of the Cedarhome Well, and is also within the five-year time of travel for the Sill Well (inactive).

Creeks – Creeks located within wellhead protection areas can carry contaminants that may pose a threat to the City’s groundwater sources. Church Creek is a large creek that runs through the Cedarhome, Sill (inactive), Fure, and Bryant Wells’ six-month TOT zones. In addition, Hatt Slough Springs is located approximately 250 feet from Hatt Slough and the Stillaguamish River. Both water bodies flow through the springs’ six-month TOT zone.

Lawn Care and Agricultural Practices – Farms and residences with large lawns or crops within the wellhead protection areas can be a threat to the City’s groundwater sources. Inadequate cleanup of animal waste is the most likely source of potential contamination found on ranches. Fertilizer runoff is a potentially dangerous source of nitrates (exposure to nitrates and nitrites causes “Blue Baby Syndrome” in infants). There are many residences with large lawns, and numerous farms exist in and around the Stanwood area.

Inventory Update Requirements

In accordance with WAC 246-290-135, the inventory list of actual and potential groundwater contaminant sources located within the delineated wellhead protection areas must be updated every two years. Inventory updates should be scheduled such that every third update is accomplished at the same time as the reevaluation of the wellhead protection area boundaries, which is required during each six-year Comprehensive Water System Plan update.

NOTIFICATION OF INVENTORY FINDINGS

Owners and operators of known and potential sources of groundwater contamination will be notified of their location within the delineated wellhead protection areas. Regulatory agencies, local governments, and emergency response agencies will also be notified of the location of the wellhead protection areas, contaminant source inventory findings, contingency plans, and emergency response procedures. **Table 3** lists all of the notification recipients. An example of each of the three types of notification letters that will be sent is attached in **Appendix B**. All existing customers were notified of the wellhead protection program and the importance of protecting the City’s sources in the 2013 Consumer Confidence Report included in **Appendix L** of the WSP.

**Table 3
Notification Recipients**

ID	Agency or Business	Contact Person	Mailing Address	City, State Zip
Businesses and Residencies within Wellhead Protection Area				
WQ-1	Warm Beach Camp	Owner	20800 Marine Dr.	Stanwood, WA 98292
U-1	Cedarhome General Store	Owner	6809 284 th St NW	Stanwood, WA 98292
U-2	Spane Buildings, Inc.	Owner	27004 64th Ave NW	Stanwood, WA 98292
U-3	Bus Garage UST 8831	Owner	7401 272 nd St NW	Stanwood, WA 98292
U-4	Tesoro 62137	Owner	7306 267 th PI NW	Stanwood, WA 98292
U-5	Continental Woodcraft Co.	Owner	6713 268 th St. NW	Stanwood, WA 98292
U-6	Stanwood Exxon	Owner	26712 72 nd Ave. NW	Stanwood, WA 98292
LO-1	Landowner #1	Owner	6308 Jensen Rd	Stanwood, WA 98293
LO-2	Landowner #2	Owner	6220 284 th St NW	Stanwood, WA 98294
LO-3	Landowner #3	Owner	6109 Jensen Rd	Stanwood, WA 98295
LO-4	Landowner #4	Owner	6104 284 th St NW	Stanwood, WA 98296
LO-5	Landowner #5	Owner	6608 284 th St NW	Stanwood, WA 98297
LO-6	Landowner #6	Owner	6204 Jensen Rd	Stanwood, WA 98298
LO-7	Landowner #7	Owner	28123 68 th Ave NW	Stanwood, WA 98299
LO-8	Landowner #8	Owner	28015 Jensen Rd	Stanwood, WA 98300
LO-9	Landowner #9	Owner	28603 68 th Ave NW	Stanwood, WA 98301
LO-10	Cedarhome Elementary	Principal	27911 68 th Ave NW	Stanwood, WA 98302
SDP-1	City Should Verify and Contact Owner			Stanwood, WA 98302
Regulatory Agencies and Local Governments				
WA State Dept. of Health, Office of Drinking Water	Northwest Regional Manager		20435 72 nd Ave S, Suite 200	Kent, WA 98032-2358
WA State Dept. of Ecology, Northwest Regional Office	Director		3190 160 th Ave. SE	Bellevue, WA 98008
Snohomish County Health District	Health Officer		3020 Rucker Ave.	Everett, WA 98201
Stanwood Planning Department	Planner		10220 270 th St. NW	Stanwood, WA 98292
Snohomish County Planning	Director		3000 Rockefeller, MS 604	Everett, WA 98201
WA State Department of Transportation	Northwest Regional Director		15700 Dayton Ave. N	Seattle, WA 98133
Emergency Response Agencies				
Stanwood Fire Dept.	District Fire Chief		8117 267 th St NW	Stanwood, WA 98292
Stanwood Police Dept.	Police Chief		8727 271 st St NW	Stanwood, WA 98292
Snohomish County Sheriff	Sheriff		3000 Rockefeller, MS 606	Everett, WA 98201
Wa State Patrol	District 7 Captain		2700 116 th St. NE	Marysville, WA 98271
City of Stanwood Water Customers				
All Water Customers	Varies		Varies	Stanwood, WA 98292

CONTINGENCY PLANNING

The City has developed an Emergency Response Plan for the water system. The Emergency Response Plan includes a contingency operation plan for the wells and other water system facilities. The contingency operation plan for the wells in the event of contamination of the water source is as follows.

Emergency Condition: Aquifer Contamination

Impact on System: Potentially major impact. If water is not suitable for potable use there is a major loss of supply.

Emergency Response:

1. Shut down the wells that pump water from the aquifer that is contaminated and use the other non-affected wells.
2. Notify DOH of the aquifer contamination.
3. Notify all customers of the problem and instruct them to boil all water to be used for consumption and cooking.
4. Analyze water quality of water within reservoirs and dispose of properly if contaminated.
5. Disinfect reservoirs and water mains, as necessary, to remove contaminated residuals.
6. Adjust control of system facilities, as necessary, to provide supply from storage facilities if water within them is not contaminated.
7. Monitor water quality at affected well field and investigate cause of contamination.
8. Implement water use reduction measures, as necessary, to ensure an adequate supply of water.

The City's plan to pursue long-term alternative sources of supply, including additional groundwater wells and emergency interties, will improve the City's ability to maintain uninterrupted water supply during times of source water quality emergencies.

PROGRAM IMPLEMENTATION AND RECOMMENDATIONS

The City's Wellhead Protection Program is an on-going effort that requires staffing and resources to ensure its effectiveness in protecting the source of drinking water that is supplied to the City's customers. As discussed previously in this document, the regulations require that the City perform an inventory of all potential sources of groundwater contamination throughout the delineated wellhead protection areas every two years. In addition, DOH recommends that water systems upgrade their initial delineation using a more sophisticated groundwater flow model approach within five years of the initial delineation. At a minimum, the City must reevaluate the wellhead protection area boundaries during the Comprehensive Water System Plan update process, which occurs every six years.

The City has adopted a wellhead protection ordinance that addresses permitted uses and performance standards for properties located within designated wellhead protection areas. Chapter 17.135 of the Stanwood Municipal Code addresses these specific standards and requires a critical

areas report for proposed uses that are prohibited within the TOT zones.

The following tasks will be pursued as part of the City's on-going Wellhead Protection Program.

- Perform a more accurate delineation of the wellhead protection area boundaries utilizing a combined analytical and hydrogeological approach.
- Update and perform a more detailed inventory of potential sources of groundwater contamination.
- Confirm location, condition, and proper closure of abandoned private wells, especially those within one-year time of travel zones.
- Distribute the required notifications as a result of updated delineations and inventory findings. Letters should be sent to local responders, regulatory agencies, and owners/operators of known and potential sources of groundwater contamination within the defined wellhead protection areas.
- Establish a Wellhead Protection Committee to promote public education and awareness of the City's groundwater sources and contaminant prevention. Coordinate these efforts with the regional agencies.
- Restrict land uses in the one-year time of travel zones that pose a high risk to groundwater, such as gas stations, oil recycling, dry cleaners, fuel storage facilities, high-density animal keeping, high-density septic systems, and golf courses. Update the City's wellhead protection ordinance as necessary. Coordinate these efforts with Snohomish County.
- Develop signage at the perimeter of and at strategic locations around the wellhead protection areas to inform people that they are entering an area that contains the City's drinking water source and is vulnerable to surface activities.

APPENDIX A

Wellhead Protection Plan

Bryant Well 3

City of Stanwood

Prepared by
RH2 Engineering, Inc.
September 2014

Background

This report by RH2 Engineering, Inc., (RH2) describes the City of Stanwood (Stanwood) wellhead protection plan (WHPP) for a new replacement well (Bryant Well 3), which was constructed in November 2013 and will be operated as a source of municipal supply for Stanwood. The attached **Figure 1** shows the location of Bryant Well 3 and existing Bryant Well 1.

Stanwood will likely operate Well 3 at a rate of approximately 1,000 gallons per minute (gpm). For the purposes of developing the WHPP for Well 3, it is assumed that Stanwood will withdraw groundwater from the well at rate of 1,000 gpm every day of the year for approximately 8 hours, which is equivalent to 175,200,000 gallons per year. Stanwood intends to operate Well 3 in combination with Well 1, which is completed in the same aquifer. After the initial 2 years of operation of Well 3, Stanwood will have better understanding of the operation of the Bryant well field (Well 1 and Well 3) and update its WHPP to reflect future operation of the well field.

The WHPP is part of Washington State Department of Health (DOH) source approval under Chapter 246-290 of the Washington Administrative Code (WAC). This report describes the WHPP and includes a summary of geologic units that underlie Stanwood and comprise the source aquifer for the two wells; a delineated wellhead protection area (WHPA) for each well; and an inventory of potential contaminant sources in the WHPAs that could threaten the water quality of the source aquifer.

In the State of Washington, local wellhead protection programs must include:

- A completed susceptibility assessment for each source;
- A delineated WHPA for each well;
- An inventory of potential contaminant sources in the WHPAs;
- Documentation showing the water system has provided delineation and inventory findings to required entities;
- Contingency plans for providing alternate drinking water sources if contamination does occur; and
- Coordination with local emergency responders for appropriate spill or incident response measures.

Source Aquifer Characterization

The WHPA delineation and susceptibility assessment are based partially on the aquifer characteristics and the expected annual groundwater withdrawal from the source wells. This section summarizes the findings of several hydrogeologic investigations of the local and regional areas of Stanwood wells.

The drilling, design, construction, and testing of Well 3 is summarized in the Bryant Well No. 3 Construction and Testing Technical Memorandum (Well 3 Tech Memo) completed by RH2 in December 2013. The source aquifer for Well 3 is comprised of an 83-foot-thick sand and gravel aquifer at a depth of approximately 148 to 231 feet below ground surface (bgs) which is overlain by approximately 140 feet of silt and clay. Well 3 is completed at the base of the aquifer above its contact with underlying silty sand with gravel. The source aquifer is highly confined and static groundwater level in the well is approximately 110 feet below ground surface.

Groundwater in the source aquifer is recharged primarily by precipitation on the uplands east of Stanwood and by recharge through exchange of shallower groundwater within the lower Stillaguamish River valley. Groundwater in the deep aquifer likely flows towards the east at a gradient similar to the regional topography.

Aquifer Parameters

Based on the 24-hour constant-rate pumping test completed in October 2013 (Well 3 Tech Memo) the estimated aquifer transmissivity for theoretical calculation of radius of influence under long-term pumping scenarios is 660,000 gallons per day per foot (gpd/ft) based on Well 3 testing at 1,000 gpm for 24 hours. The regional groundwater horizontal hydraulic gradient for the source aquifer is likely oriented from the northeast to southwest, but the magnitude of the gradient is unknown.

WHPA Delineation

A WHPA is intended to identify areas around the source well that present potential threats from surface contamination. The zone of risk decreases radially with distance from Well 3. A WHPA may include up to four or five zones. Each zone represents the length of time it would take a particle of water to travel from the zone boundary to Well 3. The three primary zones are based on the estimated time it would take a hypothetical water particle to travel through the aquifer to the pumping well. These travel-time-based aquifer management zones create an early warning system that gives a public water system time to respond to a contaminant moving in an aquifer before it arrives at the water supply well. The travel time estimates may be modified to consider the vertical travel time from surface sources to the aquifer, particularly where the depth to groundwater is small and/or the soils above the aquifer are more permeable. These time-of-travel zones are conservative, as most contaminants in groundwater comprise organic molecules, which typically migrate more slowly in an aquifer than the water molecules.

Wellhead Protection Zones for Well 3:

Sanitary control area: The area immediately around the wellhead.

Zone 1: The 1-year horizontal time-of-travel boundary for groundwater. Zone 1 is managed to protect the drinking water supply from viral, microbial, and direct chemical contamination. Zone 1 includes a 6-month time-of-travel boundary.

Zone 2: The 5-year time-of-travel boundary for groundwater. Zone 2 is managed to control potential chemical contaminants. All potential contaminant sources must be addressed with emphasis on pollution prevention and risk reduction. Zone 2 provides information that local planners use to cite future high-risk and medium-risk potential contaminant sources.

Zone 3: The 10-year time-of-travel boundary for groundwater. Zone 3 is the outer boundary of the wellhead protection area. In Zone 3, potential high- and medium-risk contaminant sources receive increased regulatory attention and technical assistance, with emphasis on pollution prevention and risk reduction.

Buffer zone: An area sloping upward from Zone 3, potentially including the entire zone of contribution. The buffer zone may include additional non-contiguous critical aquifer recharge areas requiring protection from contamination.

Delineation Method

DOH requires delineation of the area around a groundwater source that contributes groundwater recharge and potentially any surface contaminants that may migrate to the well during projected groundwater withdrawal. DOH guidance suggests using the calculated fixed-radius (CFR) method as a simplified approach to wellhead delineation where groundwater conditions are uniform or data are limited. DOH encourages more sophisticated approaches for complex hydrogeologic conditions or where susceptibility from surface contamination may be high.

The complex, non-uniform geologic conditions of the source aquifer suggest the use of a hydrogeologic approach to delineate the WHPA zones for Well 3. However, the drawdown effects of long-term pumping are not yet sufficient to support this type of WHPA delineation. Therefore, the CFR approach was used to initially delineate the WHPAs. Subsequent update of the WHPP would consider local and regional hydrogeologic conditions, estimates of aquifer properties based on long-term well field operation.

The CFR approach uses the formula:

$$\text{WHPA Radius} = \frac{QT}{(\pi)(n)(H)}$$

Where:

- Q = annual pumping volume (assuming 1,000 gpm constant rate for 8 hours per day, every day of the year)
- T = years (0.5, 1, 5, 10)
- n = aquifer porosity = 30 percent
- H = well screen length (or aquifer thickness) = 83 feet

Based on these values, the CFR-based WHPAs for Well 3 are summarized as follows:

Well 3	0.5-year	1-year	5-year	10-year
WHPA radius	387 ft	547 ft	1,224 ft	1,731 ft

The magnitude of the groundwater gradient is likely generally low based on the relatively high aquifer transmissivity value, and the gradient is likely oriented from northeast to southwest, which would elongate the WHPAs into ellipses and shift the center of the WHPAs toward the northeast in the upgradient direction of groundwater flow. Subsequent updates to the WHPP will include evaluation of the effects of actual pumping upon measurable groundwater levels to refine the WHPAs, if necessary.

Figure 2 illustrates the 6-month, 5-year, and 10-year WHPAs assuming continuous pumping of Well 3 at an annual withdrawal rate of 1,000 gpm for 8 hours each day of the year.

Contaminant Assessment

RH2 reviewed the current Washington State Department of Ecology (Ecology) database for known and suspected contaminants and potential generators of hazardous wastes within the 10-year WHPA for Well 3. One facility (shown on **Figure 2**), the Jiffy Lube property, is within the 5-year WHPA. Ecology lists the site as a small waste generator, based on its permitted temporary storage of waste lubricants and oils at its facility.

Susceptibility Assessment

The susceptibility assessment evaluates the potential for the source aquifer to become contaminated from surficial sources of contamination. The potential corresponds to depth of the source aquifer, well pumping rates, and distance from contaminant sources. Preliminary findings in this report indicate that the source aquifer likely has low to moderate susceptibility. The completed susceptibility form for Well 3 is attached.

Updating the WHPP

This WHPP is provided as part of Stanwood's application to DOH for source approval, and includes technical support for WHPA delineation and identification of potential contaminant sources within the WHPAs. Stanwood has prepared a contingency plan for providing alternate drinking water sources if contamination does occur, and an emergency response plan for coordination with local emergency responders for appropriate spill or incident response measures (refer to the Stanwood WHPP Contingency Plan and Stanwood WHPP and Emergency Response Plan sections).

The WHPP provides Stanwood with a tool to regulate land uses within WHPAs. Stanwood may consider restricting some land uses or require additional levels of protection for some land uses to minimize risk to the source aquifer. Consequently, the delineation of the WHPAs may be refined periodically as data are developed to improve the value of the WHPP and also establish appropriate levels of notifications and land use restrictions, if necessary.

Long-term use of the source wells, observation of actual pumping rates, and improved understanding of local groundwater levels during active well operation may be used to refine the initial WHPAs based on actual effects of groundwater withdrawal on the source aquifer and the area of the WHPAs. As groundwater and pumping data are developed over time, the WHPAs may be modified concurrently with periodic inventories of contaminant sources.

Stanwood WHPP Contingency Plan

Drinking water rules require public water systems to develop contingency plans "for the location and provisions of alternate drinking water supplies for each public water system in the event of well or well field contamination" (WHPP Guidance Document, DOH 331-018). In the State of Washington, contingency plans are required in water system plans (WAC 246-290-100) and small water system management programs (WAC 246-290-410).

As part of its comprehensive water system plan, Stanwood has prepared a water shortage plan that establishes the approach for distribution of water from its several sources to serve the needs of the facility in case of loss of a source to well contamination.

Stanwood WHPP Emergency Response Plan

The DOH requires purveyors to coordinate emergency spill response planning with local emergency responders (e.g., Stanwood fire department), Ecology – Spill Operations Section, the Department of Community Development’s Emergency Management Program, the local county health department, and any local emergency planning committees. Stanwood must determine if any changes in spill response procedures are necessary to protect groundwater in the WHPA, which is entirely located on City property.

Stanwood has prepared an emergency response plan as part of its facility operations plan. Stanwood emergency response plan would include the WHPA surrounding Well 3.

Risk of Spills

Highway 532 traverses the Well 3 WHPAs. A paved entrance road 268th Street NW provides access to the well and also traverses the WHPAs. Any accidentally released petroleum fuels or transported chemicals not collected by emergency responders would likely run off along the paved road and into adjacent surface water ditches, where subsequent collection could occur before any significant risk to vertical migration into the source aquifer occurred.



WELL NO. 3 DURING TESTING



TEMPORARY PIPE CONNECTION TO CATCH BASIN OVERFLOW IN DITCH



TEMPORARY PIPE ENTERING CULVERT



OUTFALL WHEN PUMPING 1,000 GPM



OUTFALL AND CHURCH CREEK WHEN PUMPING 1,000 GPM

BASIS OF BEARING

POINT	DESCRIPTION	NORTHING	EASTING
①	FOUND 1/2" REBAR W/CAP LEONARD LS# 8932	2,455,524.52'	3,277,198.74'
②	FOUND PUNCH MARK IN 1/2" REBAR IN 4"x4" CONC. MON UP 0.5', 9/19/06 N 1/4 COR 29-32-4	2,455,623.34'	3,277,048.09'
③	FOUND NAIL IN CONC. IN 2" IRON PIPE IN CONC. MON IN CASE, DOWN 1.9', 9/19/06 (SHOWN ON THE VICINITY MAP ON DWG NO. 601)	2,455,119.63'	3,277,249.63'

HORIZONTAL DATUM
NAD 83/91

COORDINATES ASSOCIATED WITH THIS DRAWING ARE PROJECT COORDINATES WHICH MAY BE CONVERTED TO STATE PLANE GRID COORDINATES BY SUBTRACTING 2,000,000 FEET, THEN MULTIPLYING BY 0.99994166437. THE INITIAL COORDINATE CONVERSION WAS PERFORMED USING LEICA SKI-PRO V. 3. 0 SOFTWARE.

VERTICAL DATUM: NAVD 88

ORIGINATING BENCHMARK: SNOWHISH COUNTY SURVEY CONTROL MONUMENT NO. 1659, A BRASS DISK IN TOP OF A ROUND CONCRETE MONUMENT FLUSH WITH THE GROUND IN THE NORTHEAST QUADRANT OF THE INTERSECTION OF S.R. 532 AND 64TH AVENUE NW. ELEVATION = 127.76 FEET

④ TBM H-2 - TOP OF RAILROAD SPIKE IN THE SOUTH FACE OF UTILITY POLE ON THE NORTH SIDE OF 268TH ST. NW., ±54 FEET NORTHERLY OF NE CORNER OF SITE. ELEVATION = 98.90 FEET

SURVEY NOTES

- PRIMARY CONTROL POINTS AND ACCESSIBLE MONUMENT POSITIONS WERE FIELD MEASURED UTILIZING GLOBAL POSITIONING SYSTEM (GPS) SURVEY TECHNIQUES USING LEICA SR 9500 EQUIPMENT. MONUMENT POSITIONS THAT WERE NOT DIRECTLY OBSERVED USING GPS SURVEY TECHNIQUES WERE TIED INTO THE CONTROL POINTS UTILIZING LEICA ELECTRONIC TOTAL STATIONS FOR THE MEASUREMENT OF BOTH ANGLES AND DISTANCES. THIS SURVEY MEETS OR EXCEEDS THE STANDARDS SET BY WAC 332-130-090.
- THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE RESULTS OF A SURVEY MADE IN NOVEMBER 2006 AND CAN ONLY BE CONSIDERED AS INDICATING THE GENERAL CONDITION EXISTING AT THAT TIME.
- UTILITY LOCATIONS SHOWN HEREON ARE BASED UPON AS-BUILT FIELD LOCATION OF EXISTING STRUCTURES, FIELD LOCATION OF UTILITIES BASED ON LOCATOR PAINT MARKINGS AND LOCATIONS BASED ON UTILITY LOCATION MAPS FROM THE UTILITY PURVEYORS. OTHER UTILITIES MAY EXIST. NO SUB-SURFACE EXPLORATION WAS MADE TO VERIFY UTILITY ROUTINGS AND THE ROUTING OF ALL BURIED UTILITIES SHOULD BE CONFIRMED WITH THE UTILITY PURVEYOR AND EXPOSED IN AREAS CRITICAL TO DESIGN FOR VERIFICATION.
- THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION, ELEVATION, AND SIZE OF EXISTING UTILITIES PRIOR TO CONSTRUCTION.

CRITICAL AREAS SETBACKS

150 FOOT TYPE 2 STREAM BUFFER UNDER SMC 17.130.060 CRITICAL AREA REGULATIONS

FOR STREAMS AND WETLANDS, THE BUFFER SHALL BE MEASURED HORIZONTALLY IN A LANDWARD DIRECTION FROM THE ORDINARY HIGH WATER MARK (OHWM) OR WETLAND EDGE, RESPECTIVELY. WHERE LANDS ADJACENT TO A STREAM DISPLAY A CONTINUOUS SLOPE OF 33% OR GREATER, THE BUFFER SHALL INCLUDE SUCH SLOPING AREAS. WHERE THE HORIZONTAL DISTANCE OF THE SLOPING AREA IS GREATER THAN THE REQUIRED STANDARD BUFFER, THE BUFFER SHALL BE EXTENDED TO A POINT 25 FEET BEYOND THE TOP OF THE BANK OF THE SLOPING AREA.

VERTICAL DATUM CONVERSION:

VERTICAL ELEVATIONS ASSOCIATED WITH THIS DRAWING SET ARE PER VERTICAL DATUM NAVD 88, WHICH MAY BE CONVERTED TO NGVD 29 BY SUBTRACTING 3.69 FEET.

E.G. NGVD 29 = NAVD 88 - 3.69'

PLEASE NOTE THAT THIS IS AN APPROXIMATE CONVERSION BASED UPON CONTROL POINT TBM H-2, ④.

LEGEND

EXISTING	PROPERTY LINE
100' TYPE 2 STREAM BUFFER	100' SANITARY BUFFER
CHURCH CREEK (TYPE 2 STREAM)	DITCH
FENCE	INTERMEDIATE CONTOUR (1' SPACING)
402	INDEX CONTOUR (5' SPACING)
560	STORM DRAIN
ASPHALT PAVEMENT	
PROPOSED	TEMPORARY PUMP TEST DISCHARGE LINE

SCALE: 1" = 40'

DRAWING IS FULL SCALE WHEN BAR MEASURES 1"

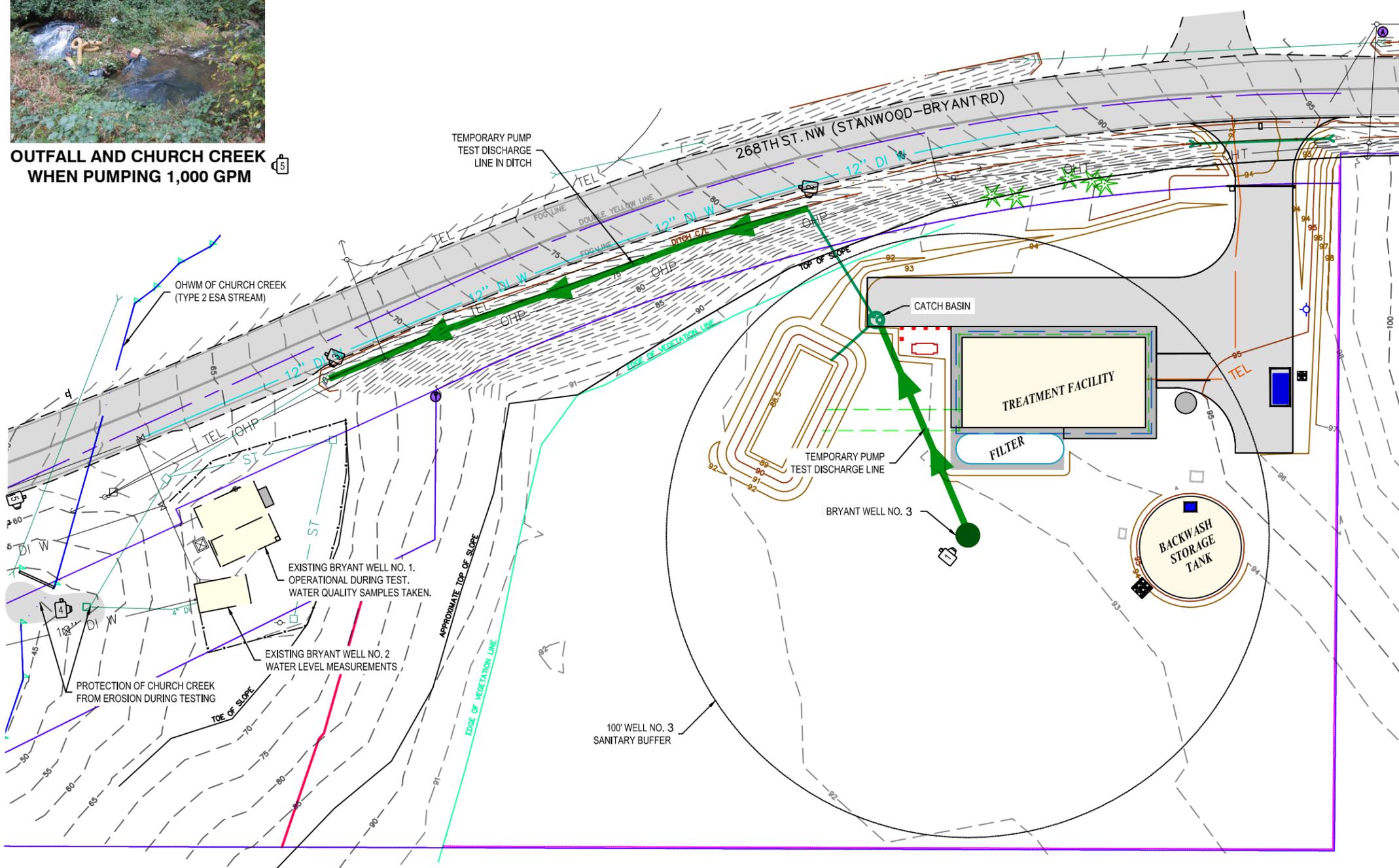
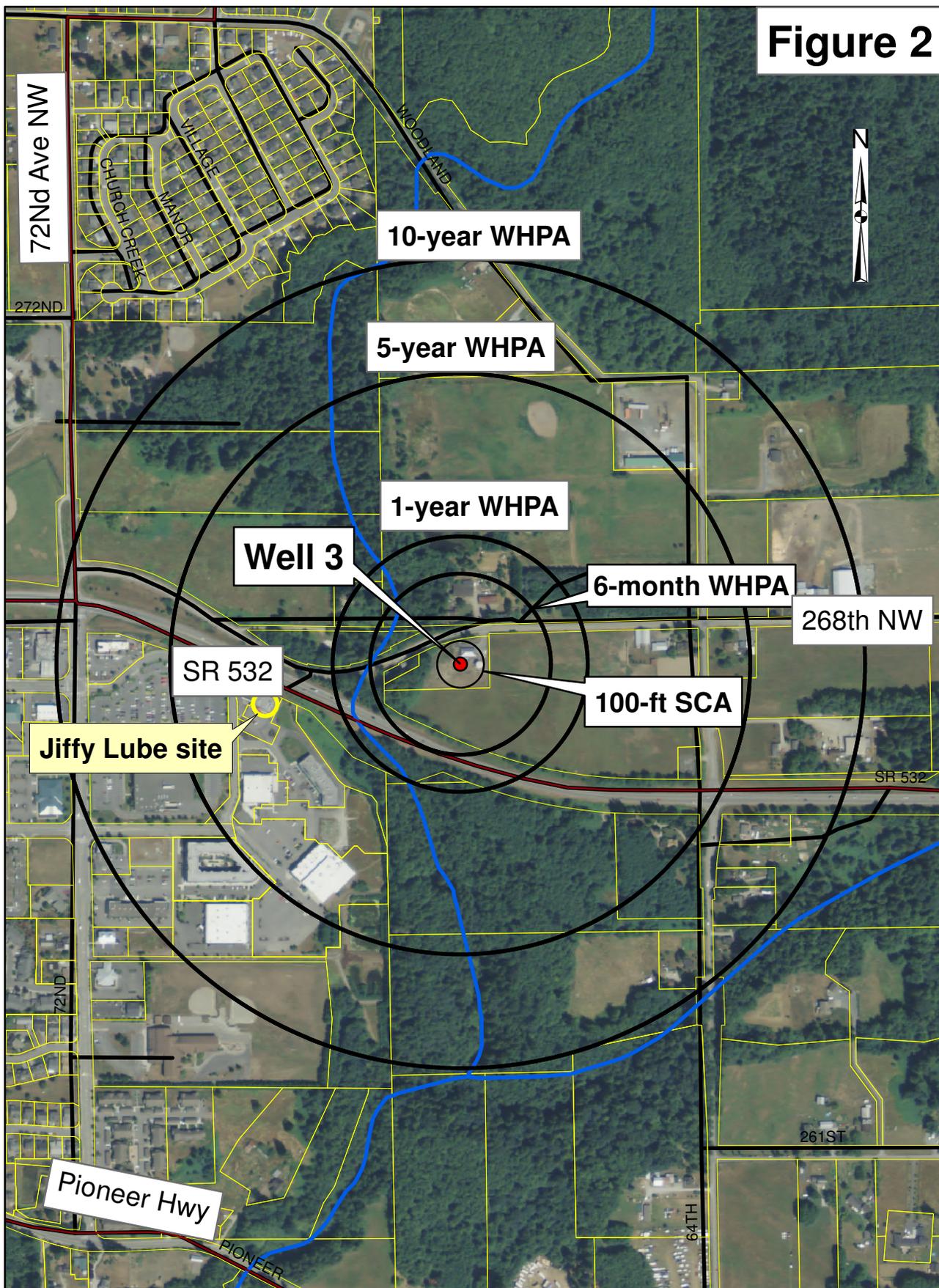


FIGURE 1
BRYANT WELL NO. 3 AQUIFER TESTING SITE PLAN
1" = 40'



Bryant Well 3 Wellhead Protection Areas City of Stanwood



APPENDIX B

DATE

NAME (Business Owner)

ADDRESS

CITY, STATE ZIP

Subject: City of Stanwood Wellhead Protection Program

Dear NAME (Business Owner):

This letter is being sent to notify you of the City of Stanwood Wellhead Protection Program and your location within the wellhead protection area, as required by the Washington State Department of Health (DOH). The City of Stanwood, being an owner of a Group A public water system, is required by the federal Safe Drinking Water Act to maintain a Wellhead Protection Program. The goal of a Wellhead Protection Program is to protect the health of its water customers by preventing contamination of the groundwater that it supplies for drinking water. The City is working with DOH and others to update its Wellhead Protection Program.

The City's active water sources provide drinking water to more than 2,554 customer accounts within the existing water service area. The Bryant Wells are located near the eastern city limits, just north of State Route 532. The Cedarhome Well is located near Cedarhome Elementary School. Hatt Slough Springs, which is currently inactive, is located approximately 2 miles south of the city limits, along Hatt Slough/Stillaguamish River.

The City's initial Wellhead Protection Program efforts were accomplished in 1998 when the *Susceptibility Assessment Survey* for each source was completed. The results of the survey performed by the City and reviewed by DOH assigned a moderate susceptibility rating to Bryant Well No. 1, a high susceptibility rating for Hatt Slough Springs, and a low susceptibility rating for the Cedarhome Well.

The next step in the development of the City's Wellhead Protection Program was the update of the delineated wellhead protection areas for each well. A wellhead protection area is the surface and subsurface area surrounding a well, well field, or spring through which contaminants are likely to pass and eventually be transported into the drinking water system. This is the area around the source that must be managed to protect the water supply from contamination. The wellhead protection areas are subdivided into 6-month 1-year, 5-year, and 10-year time of travel zones. The time of travel refers to the estimated amount of time it will take for water (and contaminants) in that zone to reach the supply source. For example, a 1-year time of travel zone represents an area around the well or well field in which contaminants could reach the well within one year. The delineation of time of travel zones is important because the City then knows how much time it could take a contaminant in a certain area to reach the drinking water supply source.

The time of travel zones for each water source have been defined according to the "Calculated Fixed Radius" (CFR) method developed by DOH, and modified based on recommendations by a licensed hydrogeologist. The results of the wellhead protection area delineations are shown in the attached

NAME

DATE

Page 2

Figure 1. Please note that the wellhead protection area boundaries shown in the figure are subject to change in the future based on further hydrogeologic study.

Upon the updated delineation of the wellhead protection areas, an update to the inventory of known and potential contaminant sources located within the defined wellhead protection areas was accomplished. The inventory efforts revealed several potential sources of contamination located within a broad area around the City's wells, as shown in **Figure 1**. However, 22 were located within the wellhead protection areas. The potential contamination sources were found using the Washington State Department of Ecology (Ecology) Underground Storage Tank lists and the Environmental Protection Agency (EPA) Resource Conservation and Recovery Act (RCRA) facilities register. In addition, during the Susceptibility Assessment of the new Cedarhome Well, multiple area landowners were identified as potential contamination sources for fertilizer and yard chemicals. Facilities with water quality discharge permits were also included in the inventory. One stormwater detention pond was identified in the Cedarhome Well 6-month time-of-travel zone. See **Table 1**, attached, for the inventory of potential sources of contamination.

The activities at your business have the potential to affect the water quality of the City's drinking water source because of your location within the City's wellhead protection area. The inventory findings have been provided to local regulatory agencies and emergency response agencies to make them aware of your business's location within the City's wellhead protection area, as required by DOH.

The purpose of this letter is to inform you of the City's Wellhead Protection Program and your location within the wellhead protection areas. No action is required by you at this time. We hope that your increased awareness of the City's wellhead protection area will make you especially cautious in regard to protecting the drinking water of the City's customers. If you have any questions or concerns regarding protection of the City's groundwater sources, please contact me at (360) 629-9782.

Sincerely,

Kevin Hushagen

Public Works Director
City of Stanwood

Attachment: Figure 1 – Wellhead Protection Areas
Table 1 – Potential Sources of Contamination

DATE

NAME (Emergency Response Agency)

ADDRESS

CITY, STATE ZIP

Subject: City of Stanwood Wellhead Protection Program

Dear NAME (Emergency Response Agency):

This letter is being sent to notify you (an agency that would respond in the event of a spill or contamination of the City's water supply) of the City of Stanwood Wellhead Protection Program, as required by the Washington State Department of Health (DOH). The City of Stanwood, being an owner of a Group A public water system, is required by the federal Safe Drinking Water Act to develop a Wellhead Protection Program. The goal of a Wellhead Protection Program is to protect the health of its water customers by preventing contamination of the groundwater that it supplies for drinking water. The City is working with DOH and others to update its Wellhead Protection Program.

The City's active water sources provide drinking water to more than 2,554 customer accounts within the existing water service area. The Bryant Wells are located near the eastern city limits, just north of State Route 532. The Cedarhome Well is located near Cedarhome Elementary School. Hatt Slough Springs, which is currently inactive, is located approximately 2 miles south of the city limits, along Hatt Slough/Stillaguamish River.

The City's initial Wellhead Protection Program efforts were accomplished in 1998 when the Susceptibility Assessment Survey for each source was completed. The results of the survey performed by the City and reviewed by DOH assigned a moderate susceptibility rating to Bryant Well No. 1, a high susceptibility rating for Hatt Slough Springs, and a low susceptibility rating for the Cedarhome Well.

The next step in the development of the City's Wellhead Protection Program was the update of the delineated wellhead protection areas for each well. A wellhead protection area is the surface and subsurface area surrounding a well, well field, or spring through which contaminants are likely to pass and eventually be transported into the drinking water system. This is the area around the source that must be managed to protect the water supply from contamination. The wellhead protection areas are subdivided into 6-month, 1-year, 5-year, and 10-year time of travel zones. The time of travel refers to the estimated amount of time it will take for water (and contaminants) in that zone to reach the supply source. For example, a 1-year time of travel zone represents an area around the well or well field in which contaminants could reach the well within one year. The delineation of time of travel zones is important because the City then knows how much time it could take a contaminant in a certain area to reach the drinking water supply source.

The time of travel zones for each water source have been defined according to the "Calculated Fixed Radius" (CFR) method developed by DOH, and modified based on recommendations by a licensed hydrogeologist. The results of the wellhead protection area delineations are shown in the attached **Figure 1**. Please note that the wellhead protection area boundaries shown in the figure are subject to change in the future based on further hydrogeologic study.

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An Emergency Response Plan has been developed for the City's water system. The Emergency Response Plan includes a contingency operation plan for the wells and other water system facilities. In summary, the contingency operation plan for the wells in the event of contamination of the water source is to shut down the affected well(s), notify regulatory agencies and customers, and adjust control of other facilities to minimize supply interruption, as required.

If you have any questions or concerns regarding the City's Wellhead Protection Program, please contact me at (360) 629-9782.

Sincerely,

Kevin Hushagen

Public Works Director
City of Stanwood

Attachment: Figure 1 – Wellhead Protection Areas
Table 1 – Potential Sources of Contamination

DATE

NAME (Regulatory Agency)

ADDRESS

CITY, STATE ZIP

Subject: City of Stanwood Wellhead Protection Program

Dear NAME (Regulatory Agency):

This letter is being sent to notify you (an agency that would respond in the event of a spill or contamination of the City's water supply) of the City of Stanwood Wellhead Protection Program, as required by the Washington State Department of Health (DOH). The City of Stanwood, being an owner of a Group A public water system, is required by the federal Safe Drinking Water Act to develop a Wellhead Protection Program. The goal of a Wellhead Protection Program is to protect the health of its water customers by preventing contamination of the groundwater that it supplies for drinking water. The City is working with DOH and others to update its Wellhead Protection Program.

The City's active water sources provide drinking water to more than 2,554 customer accounts within the existing water service area. The Bryant Wells are located near the eastern city limits, just north of State Route 532. The Cedarhome Well is located near Cedarhome Elementary School. Hatt Slough Springs, which is currently inactive, is located approximately 2 miles south of the city limits, along Hatt Slough/Stillaguamish River.

The City's initial Wellhead Protection Program efforts were accomplished in 1998 when the *Susceptibility Assessment Survey* for each source was completed. The results of the survey performed by the City and reviewed by DOH assigned a moderate susceptibility rating to Bryant Well No. 1, a high susceptibility rating for Hatt Slough Springs, and a low susceptibility rating for the Cedarhome Well.

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An Emergency Response Plan has been developed for the water system. The Emergency Response Plan includes a contingency operation plan for the wells and other water system facilities. In summary, the contingency operation plan for the wells in the event of contamination of the water source is to shut down the affected well(s), notify regulatory agencies and customers, and adjust control of other facilities to minimize supply interruption, as required.

If you have any questions or concerns regarding the City's Wellhead Protection Program, please contact me at (360) 629-9782.

Sincerely,

Kevin Hushagen

Public Works Director
City of Stanwood

Attachment: Figure 1 – Wellhead Protection Areas
Table 1 – Potential Sources of Contamination