SOURCE WATER ASSESSMENT REPORT

Summary of Analysis

City of Aumsville
Aumsville, Oregon
Marion County
PWS #4100065

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1. Introduction

The Source Water Assessment Program, mandated by the 1996 Amendments to the Safe Drinking Water Act, requires that states provide the information needed by public water systems to develop drinking water protection plans if they choose. That information includes the identification of the area most critical to maintaining safe drinking water, i.e., the Drinking Water Protection Area, an inventory of potential sources of contamination within the Drinking Water Protection Area, and an assessment of the relative threat that these potential sources pose to the water system.

The intent of this report is to present our conclusions regarding the source water assessment analysis for your water system. It is our hope that this information will be used as a basis for reducing the risk of contamination to your water source through the development of a voluntary Drinking Water Protection Plan (DWPP). Should you decided to proceed with the development of a DWPP, this document can serve as the foundation for the plan. If, however, a more in depth analysis of the local hydrogeology, water system susceptibility, and/or the water system specific assumptions is needed to help promote the development of a DWPP, a more comprehensive assessment analysis can be made available to you by contacting either the DHS Project Manager or the DHS Drinking Water Program Groundwater Coordinator.

The methodology that the Source Water Assessment results are based on is included in the attached Appendix Materials (see "Source Water Assessment Methodology"). This section includes a discussion of the source water assessment project; groundwater basics; and the processes involved with conducting the delineation, sensitivity analysis, potential contaminant source inventory, and overall water system susceptibility. Therefore, it is our intention that the assessment results, identified in this portion of the report, be used in conjunction with the methodology and rational presented in the Appendix Materials. For instance, if questions arise regarding our conclusions with respect to a specific element of the assessment (i.e. type of delineation used, aquifer sensitivity, well construction sensitivity, etc.), the methodology that lead to our conclusions can be reviewed in the Appendix Materials for further clarification.

We believe public awareness is a powerful tool for protecting drinking water and that the information provided in this report will help you increase local awareness regarding land use activities and local drinking water quality. We have also included a groundwater fact sheet and a list of Oregon specific drinking water protection information and resources in Appendices as well.

2. Water System Background

The Aumsville is a publicly-owned water system located in Marion County serving approximately 2,585 people through 1000 connections. Drinking water is supplied by four wells: Boones Park Well #1, Boones Park Well #3, the Tower Well (Well #2), and the Reservoir Well (Well #4). No water treatment is considered necessary at this time.

2.1 Location of the Drinking Water Sources

We have located your drinking water wells using a Trimble GeoExplorer II Global Positioning System (GPS) unit. The data has been differentially corrected to remove some of the common positioning errors. The location of the source(s), with the corresponding Drinking Water Protection Area, has been placed in a Geographic Information System (GIS) layer and projected onto a USGS 7.5 minute topographic map that is included within this report. In order to be consistent with the topographic map, the projection uses the NAD1927 datum. The latitude and longitude values given on the map and below, however, reflect a projection in the more commonly used WGS1984 datum.

Data collection specifics include:

- 150 individual measurements,
- linked to a minimum of four satellites,
- a PDOP of less than 6 (pertains to precision of measurement), and
- a signal to noise ratio of greater than 5.

The raw data was subjected to differential correction using the PATHFINDER software. The location data for your drinking water source(s) using the WGS84 datum is as follows:

Source	Latitude	Longitude
Well #1 (Boones Park) – Source AA	44° 50' 28.414" N	122° 52' 35.386" W
Well #3 (Boones Park) – Source AB	44° 50' 28.778" N	122° 52' 45.131" W
Well #2 (Tower) – Source BA	44° 50' 29.310" N	122° 52' 12.090" W
Well #4 (Reservoir) – Source CA	44° 50' 28.062" N	122° 51' 50.447" W

2.2 Source Construction

The well reports for the wells are provided in the Appendix Materials and are discussed as follows.

Boones Park Well #1

Boones Park Well #1 was originally drilled in 1969 to a depth of 60 feet with groundwater encountered in the interval between 25 and 45 feet. The shallow aquifer had a low yield so in August 1973 this well was deepened as a 12-inch hole to 80 feet followed by a 10-inch hole to a total depth of 447 feet. Ten-inch steel casing was installed from the surface to 302 feet; 8-inch steel casing was installed from 301 to 366 feet and 7-inch steel casing was installed from 365 to 440 feet. Water was first encountered at 80 feet and the casing was perforated from 80-94 feet, from 140-190 feet, and from 301-440 feet. The perforated sections of the casing are likely open to several different aquifers since the materials between the water-bearing zones (clay and shale) are low permeability. The static water level (depth to water in the well when the pump is at rest) was reported as 14 feet. Cement and bentonite was placed in the annular space between the existing 12-inch casing and the 10-inch casing to a depth of 80 feet to serve as a casing seal. This seal is not considered adequate since multiple water bearing zones are connected. At a minimum, the seal should be placed to eliminate the inflow from aquifers above 200 feet.

Boones Park Well #3

Boones Park Well #3 drilled in January 1983. A 16-inch hole was drilled to 66 feet then 12-inch steel casing was installed to a depth of 242 feet followed by 10-inch steel casing to 272 feet and 10-inch open borehole to the completed depth of 320 feet. Water was first found at 5 feet and an adequate quantity of groundwater was apparently encountered in the open-hole interval from 272 feet to the bottom on the borehole at 320 feet. The static water level was reported as 11 feet. Cement was placed in the annular space between the 16-inch borehole and the 12-inch casing to a depth of 66 feet to serve as a casing seal. In addition, cement grout plugs were placed from 232-242 feet and from 262-272 feet to seal the casing in "rock". This seal for Well #3 is considered adequate.

Tower Well #2

The Tower Well (Well #2) was drilled in June 1958 to a total depth of 100 feet. An 8-inch casing was installed from the surface to 99 feet. The well log reports that water was identified throughout the gravel formation from 4 to 100 feet although it was most abundant between 41-51 feet, 63-68½ feet and 85-95 feet. The casing was perforated in the intervals between 40-70 feet and between 83-90 feet. The static water level was reported as 11 feet. A casing seal is not present for this well and is therefore not considered adequate.

Reservoir Well #4

The Reservoir Well (Well #4) was drilled in 1990 to a total depth of 460 feet. The borehole consists of a 12-inch hole from 0-45 feet, an 8-inch hole from 45-180 feet, a 10-inch hole from 180 to 230 feet and an 8-inch hole from 230-460 feet. Water was first encountered in the interval between 9 and 49 feet (with a static water level of 4 feet) and was also encountered between 180 and 230 feet. Eight-inch steel casing was installed from the surface to 178 feet and a 5 9/16-inch liner was installed from 165-178 feet. A six-inch diameter screen was installed from 178 to 228½ feet through the second water bearing zone and an additional section of 6-inch liner was placed from 228 to 235 feet. The bottom of the borehole (from 236 to 460 feet was sealed off with alternating layers of gravel and "grout plug". The static water level recorded in the well from the lower water bearing zone was 27 feet. Cement was placed in the annular space between the 12-inch borehole and the 8-inch casing to a depth of 45 feet to serve as a casing seal.

The casing seal does not extend below the upper water bearing zone and is therefore not considered adequate. At a minimum, the seal should be placed into the next significant clay layer at 96 feet.

In 1995, Reservoir Well #4 was amended and additional perforations were placed in the well casing from 157 to 162 feet. In 2002, a 6-inch casing liner was added between 7 feet above surface and 157 feet below surface. An additional screened interval was added between 157 and 162 feet and a 6-inch liner was added between 162 and 169 to connect with the existing 6-inch liner.

2.3 Nature and Characteristics of the Aquifer

The aquifers supplying drinking water to Aumsville's Water System Wells consist of sand and gravel layers within the alluvial fan and braided stream deposits of the Willamette Valley Lowland Aquifer System and basalt layers of the Columbia River Basalt group. The general hydrogeologic setting and aquifer characteristics for each well are discussed in this section.

The surface soils in the Aumsville area are underlain by approximately 80 to 100 feet of the Willamette Aquifer unit which consists of relatively thin (10-20 foot) layers of consolidated silty gravel, gravel and clay, clay, sand and gravel, and sand. The Willamette Confining Unit consisting of blue to grey consolidated clay and silt (often called "shale" by well drillers) with occasional layers of fine sand and gravel underlies the Willamette Aquifer Unit and extends to between 260 and 300 feet below the surface. The Willamette Confining Unit is underlain by the Columbia River Basalt group ("basalt" or "rock" on the well logs) which includes interbeds of consolidated sedimentary material ("shale" in the well reports).

Groundwater is found in each of these units. Aumsville's wells are screened in and pump from these various units as further discussed below. Groundwater in the Willamette Aquifer is generally encountered within 10 to 30 feet of the surface and is unconfined to semi-confined indicating that the water table is not separated from the surface by a consistent layer of low permeability materials. Although most of the Willamette Confining Unit consists of low permeability materials, thin layers of sand and gravel can produce adequate quantities of water for production wells. Groundwater in the Willamette Confining Unit and in the underlying Basalt Unit is generally confined meaning there are persistent materials of low permeability separating the aquifer from the surface.

As described in the well construction discussion above, the depth to first water encountered in Boones Park Well #1, Boones Park Well #3, and Reservoir Well #4 is deeper than the static water level after well completion. This implies that the groundwater is under pressure and that the aquifer should be considered confined, i.e., there are persistent materials of low permeability separating the aquifer from the surface. The aquifer materials and confining unit lithology for these three wells is provided in Table 2.1.

Table 2.1 Aquifer Characteristics for Aumsville's Wells					
Well	**Perforated/ screened/ open hole interval (feet below surface)**	**Well log description of water bearing zone**	**Aquifer**	**Aquifer Type**	**Confining unit lithology and depth (in feet below surface)**
Boones Park Well #1	80-94'	sandstone and gravel	Willamette Confining Unit	Confined	"tan clay" from 50-80'
Boones Park Well #1	140-190'	shale with sand layers	Willamette Confining Unit	Confined	"tan clay" from 50-80' "grey blue clay" from 95-140'
Boones Park Well #1	301-440'	basalt and shale layers	Basalt Unit	Confined	"tan clay" from 50-80' "grey blue clay" from 95-140' "shale" from 185-297'
Boones Park Well #3	272-320'	rock	Basalt Unit (assumed)	Confined	Multiple "clay" layers between 84 and 263 feet. Total combined thickness of 97 feet.
Tower Well #2	40-70' and 83-97'	Sand and gravel with clay pressed into it	Willamette Aquifer	Unconfined	None – unconfined
Reservoir Well #4	157-162'	Clay with claystone and sand	Willamette Confining Unit	Confined	Multiple "clay" layers between 74 and 154 feet. Total combined thickness of 59 feet.
Reservoir Well #4	178-228 ½'	Dark grey clay or shale with occasional stripes of fine black sand (175-207'); clay and clay with claystone, (207-230')	Willamette Confining Unit	Confined	Multiple "clay" layers between 74 and 154 feet. Total combined thickness of 59 feet.

3. Delineation Results

The purpose of the Drinking Water Protection Area (DWPA) delineation is to identify the area at the surface which overlies the critical portion of the aquifer that's supplying groundwater to the water system's well(s) and/or spring(s). Therefore, DHS Drinking Water Program staff have collected and reviewed data for the purpose of delineating the DWPA for your water system. The area included in the DWPA is designed to approximate the next 10 or 15 years of groundwater supply for the water system, depending on delineation method, and is shown in the Appendix Materials as Figure 1. We have enhanced the usefulness of the DWPA map by identifying additional five-year, two-year, and one-year "Time-Of-Travel Zones" inside the DWPA.

The scope of work for this portion of the assessment included interviewing the water system operator, researching written reports, reviewing well logs, and establishing a base map of the delineated area. Based on the service population and the potential for mutual interference of the wells (see Appendix Materials for explanation of delineation process), the delineation of the DWPA for the wells was accomplished using RESSQC, an analytical model included in the WHPA (Wellhead Protection Area) software (Blandford and Huyakorn, 1991). The aquifer characteristics for Boones Park Well #1, Tower Well #2, and Reservoir Well #4 were similar and these wells were modeled as a wellfield. Boones Park Well #3 is completed in a deeper aquifer and was modeled separately. The resulting combined DWPA for the Aumsville's wells is shown in the Appendix Materials as Figure 1. Specific information regarding the parameters used in the delineation process including; the delineation method, estimated pump rate, and aquifer characteristics can be found in "Parameters Used in Delineation Model" in the Appendix Materials.

4. Sensitivity Analysis Results

After the Drinking Water Protection Area (DWPA) has been identified, aquifer susceptibility to potential contaminant sources inside the DWPA can be evaluated. Aquifer susceptibility is dependent on two factors, the natural environment's characteristics that permit migration of a contaminant into the aquifer (i.e., aquifer sensitivity) and the presence, distribution, and nature of the potential contaminant sources within the DWPA. It should be understood that the public water system's drinking water source cannot be susceptible to contamination, even if potential contaminant sources are present, unless the aquifer or the constructed source water intake are sensitive to contamination. Therefore, the intent of the sensitivity analysis is to identify those areas within the DWPA where the aquifer is most sensitive to contamination. The analysis is based on data collected or generated during the DWPA delineation process and is designed to meet the needs of other existing or developing programs such as Monitoring Waivers and the Groundwater Rule.

The results of the sensitivity analysis are provided in the tables that follow. Information and sensitivity ratings regarding the aquifers and water quality are provided in Table 4.1 while information and sensitivity ratings regarding the wells and their construction are provided in Table 4.2. A clarification of the ratings is provided as comments where appropriate.

Based on this analysis, the drinking water source for each of the wells is considered highly sensitive to contamination. This determination is based on high soil sensitivity in the protection area, past detections of coliform, improper well construction, setback deficiencies, and age of the wells (for Boones Park Well #1 and the Tower Well). Also contributing to a high sensitivity for the Tower Well #2 (only) is the unconfined nature of the aquifer and a past detection of an organic chemical (tetrachloroethene). In addition, the moderate Infiltration Potential score for the aquifer and low level nitrate detections contribute to moderate overall water systems sensitivity. Sensitivity Analysis Tables follow, beginning on the next page.

Table 4.1 Aquifer Sensitivity Analysis				
	Sensitivity (High/Moderate/Low) and Comments			
Parameter	**Boones Well #1**	**Boones Well #3**	**Tower Well #2**	**Reservoir Well #4**
Depth to first water-bearing zone (WBZ) below casing seal.	80 feet	272 feet	5 feet	45 feet (Well is screened in WBZ that starts at 175 feet but casing seal doesn't penetrate upper WBZ)
Aquifer characteristics and hydraulic nature.	**Low** confined	**Low** confined	**High** unconfined	**Low** confined
Overburden thickness and characteristics.	**Low** "tan clay" from 50-80' "grey blue clay" from 95-140'	**Low** Multiple "clay" layers between 84 and 263 feet. Total combined thickness of 97 feet.	**High** None	**Low** Multiple "clay" layers between 74 and 154 feet. Total combined thickness of 59 feet.
Highest soil sensitivity in Protection Area.	**High**	**High**	**High**	**High**
Traverse potential score (10 = High).	**Low** Score = 1	**Low** Score = 1	**Moderate** Score = 5	**Low** Score = 2
Infiltration potential score (10 = High).	**Moderate** Score = 5	**Moderate** Score = 5	**Moderate** Score = 7	**Moderate** Score = 6
Organic chemical detections.	**Low** None	**Low** None	**High** Tetrachloroethene (0.0013 mg/L) detected 3/27/1990	**Low** None
Inorganic chemical detections.	**Low** None	**Low** None	**Low** None	**Low** None
Source related coliform detections.	**High** Coliform detected in water system 6/1999 thru 4/2002. Source unknown. Not detected since 4/2002	**High**	**High**	**High**

Table 4.1 Aquifer Sensitivity Analysis (continued)				
Nitrate concentrations (Drinking Water Standard = 10 mg/L).	**Moderate** Up to 2.2 mg/L on 11/10/97	**Moderate** ND to 1.1 mg/L	**Moderate** 1.7 to 3.8 mg/L Since 1995	**Moderate** 0.8 to 1.0 since 2000
Fractured bedrock near surface in Protection Area.	**Low** None	**Low** None	**Low** None	**Low** None
Other wells score (Significant Risk = 400).	**Low** Score = 138	**Low** Score = 138	**Low** Score = 138	**Low** Score = 141
Surface water within 500 feet of wellhead.	**Low** None	**Low** None	**Low** None	**Low** None
Other: Sodium exceeding 20 mg/L[1]	Sodium up to 49.3 mg/L	Sodium up to 95.4 mg/L	Sodium up to 2.7 mg/L	Sodium up to 20.7 mg/L

1. It is recommended that if the sodium content exceeds 20 mg/L that the system notify its customers so that anyone who is on a prescribed low-sodium diet can notify their doctor of this source of sodium in their diet.

Table 4.2 Well Construction Sensitivity Analysis.				
	Sensitivity (High/Moderate/Low) and Comments			
Parameter	Boones Well #1	Boones Well #3	Tower Well #2	Reservoir Well #4
Casing depth (ft).	440 feet	99 feet	272 feet	235 feet
Casing seal depth (ft).	80 feet	none	66 feet	45 feet
Well construction setback deficiencies from site visit.	High Well seal should be placed into confining layer	High Well should be sealed	Moderate Concrete slab cracked per 9/97 sanitary survey	High Well seal should be placed into confining unit. Doesn't meet 100 foot setback for sewer lines and chemical storage areas.
Well report information missing or unknown.	Low No	Low No	Low No	Low No
Casing seal information missing or unknown.	Low No	Low No	High Casing seal missing	Low No
Casing seal material.	Low Cement/ bentonite	Low Cement	High Casing seal missing	Low Cement
Well open to multiple aquifers (commingling suspected).	High Yes	Low No	Low No	Low No
Casing seal construction.	High Not appropriate depth; recommend minimum of 200 feet deep	Low Adequate	High Casing seal missing	High Not appropriate depth; recommend minimum of 96 feet deep
Age of Well.	High 1973	Low 1983	High 1958	Low 1990/2002

5. Potential Contaminant Source Inventory

An inventory of potential contamination sources was performed within the Drinking Water Protection Area and the results are shown in Figure 2 in the Appendix Materials. The primary intent of the inventory was to identify and locate significant potential contaminant sources of concern. This inventory was conducted by reviewing applicable state and federal regulatory databases and land use maps, interviewing persons knowledgeable of the area, and conducting a windshield survey by driving through the drinking water protection area to field locate and verify as many of the potential contaminant source activities as possible. It is important to remember the sites and areas identified are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

5.1 Potential Contaminant Sources within the Two-Year Time-of-Travel Zone for the Wells

The delineated two-year time of travel zone is primarily dominated by residential and commercial land uses. Thirteen potential contaminant source locations (Reference Numbers 1-5, 8, 9, 15-19, and 25) on Figure 2 and Table 2 in the Appendix) were identified in the combined two-year time-of-travel zones for the wells and include high density housing areas, sewer lines, transportation corridors, the Marion County Public Works shop, a park, several businesses that may handle, use or store hazardous materials including several auto repair shops, a gas station, a cabinet shop, a fire station, and a home-based machine shop. The potential contaminant sources within the two-year time-of-travel all pose a relatively higher to moderate risk to the drinking water supply with the exception of the fire station, which presents a lower risk. One of the potential contaminant sources, the sewer lines, has a high risk of transmitting micro-organisms to the groundwater.

5.2 Potential Contaminant Sources within the Five-Year and Ten-Year Time-of-Travel Zones for the Wells

The drinking water protection area within the five-year and fifteen-year time-of-travel zones is mixed between residential and commercial land uses within the city limits and agricultural land uses outside of the city. Twenty additional potential contaminant source locations were identified in this area which are detailed on Table 2 in the Appendix and include an auto repair shops, a gas station, a concrete plant, an industrial facility, several clinics, a transfer station, apartments, several home-based machine shops, a land application area for treated effluent, crop areas, grazing animal areas, and the railroad transportation corridor. The potential contaminant sources within the five-year and fifteen-year time-of-travel all pose relatively higher to moderate

risk to the drinking water supply with the exception of apartments and non-irrigated crops which present a lower risk. Area-wide potential sources such as the residential areas and transportation corridors extend from the two-year time-of-travel zone into the fifteen-year time-of-travel zone. These land uses occur throughout the drinking water protection area and are shown on Figure 2 in the location nearest to the well.

6. Susceptibility of the Drinking Water Source

In general, Potential Contaminant Sources (PCSs) within the shorter time-of-travel zones pose a greater risk than those in the longer time-of-travel zones. Also of concern is the location and distribution of these sources with respect to high and moderately sensitive areas. Overlaying the PCS location map (Figure 2 in Appendix Materials) on top of the sensitivity map for the water system provides a tool to determine the susceptibility of the community's drinking water supply to contamination from each PCS (see Figure 3 in Appendix Materials).

6.1 Aquifer Susceptibility to Potential Contaminant Sources Inside the Drinking Water Protection Area.

Table 6.1, indicates the relationship between potential contaminant source risk, aquifer sensitivity, and estimated contaminant arrival time at the well, wellfield, and/or spring. The community can use the PCS location numbers on the inventory map in conjunction with the displayed aquifer sensitivity and relative risk rankings for each PCS from Table 2 in the Appendix Materials to identify the susceptibility of the drinking water source to contamination from each PCS and take steps to reduce the risk accordingly.

We have attempted to quantify the relative susceptibility of the water system with regard to the PCSs present in the Drinking Water Protection Area (DWPA) using Table 6.1. Across the top of the table, each Time-of-Travel (TOT) zone is subdivided to account for areas of high, moderate, and low sensitivity that may exist between each TOT. Potential contaminant source risk categories (high, moderate, and low) are listed down the left hand side of the table. The relative aquifer susceptibility to each PCS is demonstrated by the shading of each cell in the table. Cells that are shaded dark gray indicate a highly-susceptible condition, light gray shaded cells indicate a moderately-susceptible condition, and white cells indicate conditions of low susceptibility. The number in each cell indicates the number of potential contaminant sources that meet the conditions for that cell. Cells that do not contain a number indicate that there are no known potential contaminant sources that meet the conditions for the cell. Potential contaminant sources that meet the specific criteria for a cell in Table 6.1 can be identified by reviewing Table 2 in the Appendix Materials. The number of potential contaminant sources is totaled across the bottom of the table.

Table 6.1. Aumsville Boone 1 Well Susceptibility as a Function of PCS Risk, TOT Zone, and Aquifer Sensitivity.									
	2-Yr TOT			2- to 5-Yr TOT			5- to 10-Yr TOT		
	High	Mod	Low	High	Mod	Low	High	Mod	Low
High Risk PCSs									
Moderate Risk PCSs		1	1		1			5	
Low Risk PCSs			1			1			
Total PCSs	4	1	2	3	1	1	4	5	0

Table 6.1. Aumsville Boone 3 Well Susceptibility as a Function of PCS Risk, TOT Zone, and Aquifer Sensitivity.									
	2-Yr TOT			2- to 5-Yr TOT			5- to 10-Yr TOT		
	High	Mod	Low	High	Mod	Low	High	Mod	Low
High Risk PCSs									
Moderate Risk PCSs									1
Low Risk PCSs				1					1
Total PCSs	6	0	0	7	0	0	7	0	2

Table 6.1. Aumsville Tower Well Susceptibility as a Function of PCS Risk, TOT Zone, and Aquifer Sensitivity.									
	2-Yr TOT			2- to 5-Yr TOT			5- to 10-Yr TOT		
	High	Mod	Low	High	Mod	Low	High	Mod	Low
High Risk PCSs									
Moderate Risk PCSs					2			4	2
Low Risk PCSs	1								
Total PCSs	9	1	0	5	2	0	4	6	2

Table 6.1. Aumsville Reservoir Well Susceptibility as a Function of PCS Risk, TOT Zone, and Aquifer Sensitivity.									
	2-Yr TOT			2- to 5-Yr TOT			5- to 10-Yr TOT		
	High	Mod	Low	High	Mod	Low	High	Mod	Low
High Risk PCSs									
Moderate Risk PCSs		5			2			2	
Low Risk PCSs									
Total PCSs	0	5	0	0	2	0	2	2	0

The distribution of high, moderate, and low sensitivity areas inside the Drinking Water Protection Area can be determined using either soil sensitivity (permeability) or the mapped distribution of Traverse Potential (TP) or Infiltration Potential (IP). Based the analysis in Chapter 4, the drinking water source for each of the wells is considered highly sensitive to potential contamination. In the case of the Aumsville water system we have decided to rely upon soil permeability to prioritize the areas of highest sensitivity. The distribution of soils with high, moderate and low sensitivity within the Drinking Water Protection Area is shown on Figure 3 in the appendix materials.

During the potential contaminant source inventory, a total of 33 potential contaminant source locations and 83 potential contaminant sources were identified inside the DWPAs. If any of these potential contaminant sources have been identified as an area-wide source, they have been evaluated with respect to each time-of-travel zone in which they occur. As a result, the total number of potential contaminant sources evaluated in the above susceptibility tables may exceed the number identified on the potential contaminant source inventory map (Figure 2 of the Appendix Materials).

As indicated in the above tables, 28 potential contaminant sources occur inside the 2-year TOTs, 21 sources fall between the 2- and 5-year TOTs, and 34 sources have been identified between the 5- and 10-year TOTs. Of the potential contaminant sources identified inside the 2-year TOTs, seven are of high-risk, 19 are of moderate-risk, and two are of low-risk. Based on the analysis results shown in the relative susceptibility table, we consider the City of Aumsville to be highly susceptible to all of the high- and many of the moderate-risk potential contaminant sources identified inside the 2-year TOTs (Potential contaminant Source Reference No. 1-5, 16-19, and 25 on Figure 3 in the Appendix Materials). **Therefore we recommend that these potential contaminant sources not only be addressed in any Drinking Water Protection Plan but also in any Water System Emergency Response Plan.**

The water supply also appears to be highly susceptible to all of the remaining high-risk and many of the moderate-risk potential contaminant sources identified between the 2- and 10-year TOT zones. As a result of this analysis, we recommend that the water system develop a Drinking Water Protection Plan that addresses all high- and moderate-risk potential contaminant sources

within the DWPA, beginning with those sources which represent the greatest susceptibility risk. At a minimum, the water system should work with representatives from those PCSs posing a moderate- to high-susceptibility risk within the DWPA to (1) determine the level of environmental protection employed in the day-to-day operations of the facility and (2) identify any reasonable Best Management Practices that will lead to an overall reduction of contamination risk.

6.2 Water System Susceptibility to Viral Contaminant Sources within the Two-Year Time-of-Travel Zone.

The area within the two-year TOT roughly identifies the next two years of groundwater supply for the water system. The two-year time frame is used as a conservative estimate of the survival time for some viruses. **Based on the assessment results, the drinking water source is considered highly sensitive. Therefore, we consider the Aumsville's water supply susceptible to viral contamination since a viral source (sewer lines) was identified inside the two-year TOT for each well.** Regardless of the outcome of this assessment, it is in the water system's best interest to reduce the potential for future viral contamination through compliance with all Oregon Department of Human Services setback standards related to public drinking water supply sources

7. Conclusions

The Aumsville water system draws water from sand and gravel layers within the alluvial fan and braided stream deposits of the Willamette Valley Lowland Aquifer System and basalt layers of the Columbia River Basalt group. Assessment results indicate that the water system would be moderately to highly sensitive to a contamination event inside the identified Drinking Water Protection Area. The presence of several high- and moderate-risk potential contaminant sources within the protection area was confirmed through a potential contaminant source inventory. Under a "worst case" scenario, where it is assumed that nothing is being done to protect groundwater quality at the identified potential contaminant sources, the assessment results indicate that the water system would be highly susceptible to several of the identified potential contaminant sources. In addition, the assessment results indicate that, at this time, the water system is considered susceptible to viral contamination.

8. Recommended Use of the Source Water Assessment Report

The costs associated with contaminated drinking water are high. Developing an approach to protect that resource, such as a Drinking Water Protection Plan, can reduce the potential for contamination of the local drinking water supply. This report contains a summary of the local geology and well construction issues as they pertain to the quality of your drinking water source. We have identified the area we believe to be most critical to preserving your water quality (the Drinking Water Protection Area) and have identified potential sources of contamination within that area. In addition, we provide you with recommendations, i.e., Best Management Practices, regarding the proper use and practices associated with some common potential contamination sources (See "BMPs for Activities Commonly Found in Drinking Water Protection Areas" in the Appendix Materials). We believe public awareness is a powerful tool for protecting drinking water and that the information provided in this report will help you increase local awareness regarding the relationship between land use activities and drinking water quality. To that end, the process for developing a Drinking Water Protection Plan can be summarized as follows:

Assessment Phase (Source Water Assessment Provided by DHS and DEQ)

- Delineate the area that serves as the source of the public water supply (Drinking Water Protection Area (DWPA))
- Inventory the potential risks or sources of contamination within the DWPA
- Determine the areas most susceptible to contamination

Protection Phase (performed by the water system or community)

- Assemble a local Drinking Water Protection Team
- Enhance the Source Water Assessment if necessary
- Develop a plan to reduce the risk of contamination (protect the resource)
- Develop a contingency plan to address the potential loss of the drinking water supply
- Certify (optional) and implement the Drinking Water Protection Plan

The assessment phase was funded by the federal Safe Drinking Water Act. Its purpose is to supply the water system with the information necessary to develop a Drinking Water Protection Plan. In Oregon, development of a protection plan is voluntary.

Prior to moving into the protection phase, DEQ recommends the inventory presented in this document be reviewed in detail to clarify the presence, location, operational practices, actual risks, etc., of the identified facilities and land use activities. The Source Water Assessment (SWA) inventory should be regarded as a preliminary review of potential sources of contamination within the drinking water protection area. Resources within the community

should be used to do an "enhanced inventory" to refine this preliminary list of potential contaminant sources.

It is also important to remember that not all of the inventoried activities will need to be addressed if you choose to develop a Drinking Water Protection Plan. When developing a protection plan, potential contaminant sources which pose little or no threat to your drinking water supply can be screened out. For example, if any of the land use activities are conducted in a manner that already significantly reduces the risk of a contamination release, the facility would not need to re-evaluate their practices based on drinking water protection "management". One of the goals for developing a plan based on the inventory results is to address those land use activities that do pose high or moderate risks to your public water supply. The system should target these facilities with greater levels of education and technical assistance to minimize the risk of contamination.

Limited technical assistance is available through the DEQ and Drinking Water Program at DHS for water systems that choose to move beyond the assessments and voluntarily develop a Drinking Water Protection Plan. By using the results of the assessment, the water system/community can form a Drinking Water Protection Team comprised of individuals that have a stake in the plan's implementation.

Forming a local team to help with the development of a protection plan is very important. Oregon's drinking water protection approach relies upon the concept of "community based protection", as are many other water quality programs. This simply refers to the concept of allowing local control and decision-making to implement the water quality protection effort. Community-based protection is successful only with significant local citizen stakeholder involvement. Community-based protection can draw on the knowledge and successful adaptive practices within the area. Landowners generally know best how to achieve water resource restoration and protection as long as a thorough explanation of the problem is provided, the objectives to solve the problem are clearly defined, and technical assistance is available.

In community-based protection, citizens have more control and are therefore more likely to participate in the program and be more willing to assist with the educational and outreach effort which will make the plan successful. We recommend that the protection plan be developed so as to minimize any burdens on individual property owners, but maximize the equity in responsibility for reducing the risks of future contamination.

Protecting the drinking water supply in a community can also be a very effective way to encourage all citizens to participate in issues which directly affect everyone in that community. This often leads to more public involvement in other significant local decisions concerning future livability issues, e.g., land use planning. In communities already developing and implementing Drinking Water Protection Plans, the process has served to bring many diverse interests together on a common goal and strengthen the local rural and urban relationships through communication and increased understanding. The risks and sources of water quality problems are not only from industries, farmers, and managed forest, but every individual living, commuting, and working in that area.

Communities/water systems interested in developing Drinking Water Protection Plans may contact the Department of Environmental Quality (503-229-5413) or the DHS Drinking Water Program (541-726-2587) for further information.

Appendix Materials

References

Figures

Inventory of Potential Contaminant Sources

Well Reports

Parameters Used in Delineation Model

Groundwater Fact Sheet

BMPs for Activities Commonly found in Drinking Water Protection Areas

Drinking Water Protection in Oregon

Source Water Assessment Methodology

Additional copies of the Appendix materials are available upon written request to the following address:

Groundwater Coordinator
Drinking Water Program
Department of Human Services
444 A Street
Springfield, OR 97477

References

Blandford, T. N. and Huyakorn, P. S., 1991. WHPA: A Modular Semi-Analytical Model for the Delineation of Wellhead Protection Areas. U.S. Environmental Protection Agency Contract No. 68-08-0003.

Gannett, M.W. and Caldwell, R.R., 1998. Geologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington. U.S. Geological Survey Professional Paper 1424-A, 32p.

McFarland, W.D., 1983. A Description of Aquifer Units in Western Oregon. U.S. Geological Survey Open-File Report 82-165.

National Oceanic and Atmospheric Administration (NOAA), 1982. Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1951 - 80 Oregon, Climatography of the United States No. 81 (By State).

Stewart, S. and Nelson, D., 1996. Oregon Wellhead Protection Program Guidance Manual. Oregon Department of Environmental Quality (available at http://www.deq.state.or.us/wq/dwp/dwphome.htm).

Stewart, S. and Nelson, D., 1999. Oregon Source Water Assessment Plan. Oregon Department of Environmental Quality.

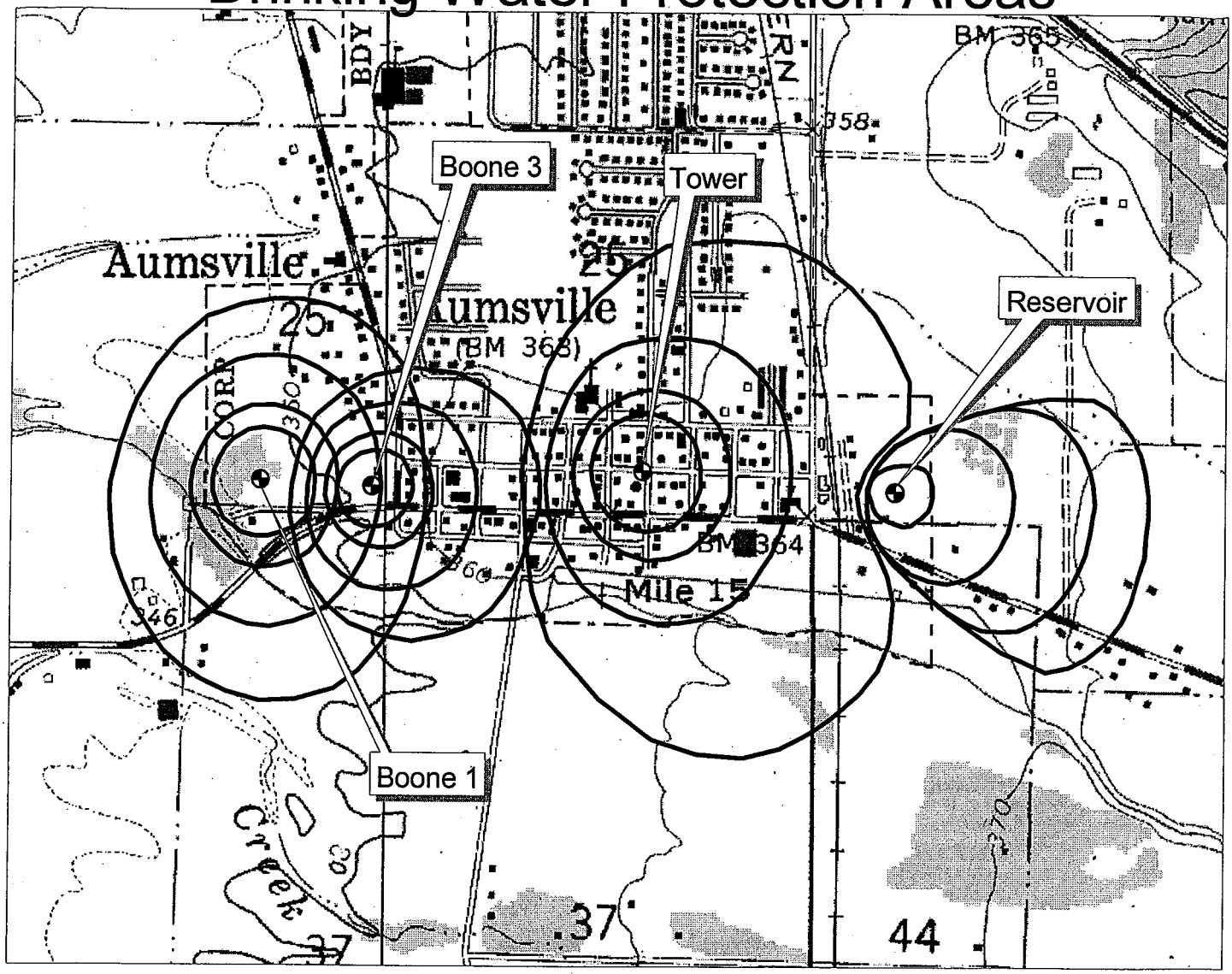
USDA and Soil Conservation Service, 1972. Soil Survey of Marion County Area, Oregon.

Walker, G.W. and MacLeod, N.S., 1991. Geologic Map of Oregon. U.S. Geological Survey.

Woodward, D.G., Gannett, M.W. and Vaccaro, J.J., 1998. Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington, U.S. Geological Survey Professional Paper 1424-B, 82p.

City of Aumsville
Drinking Water Protection Areas

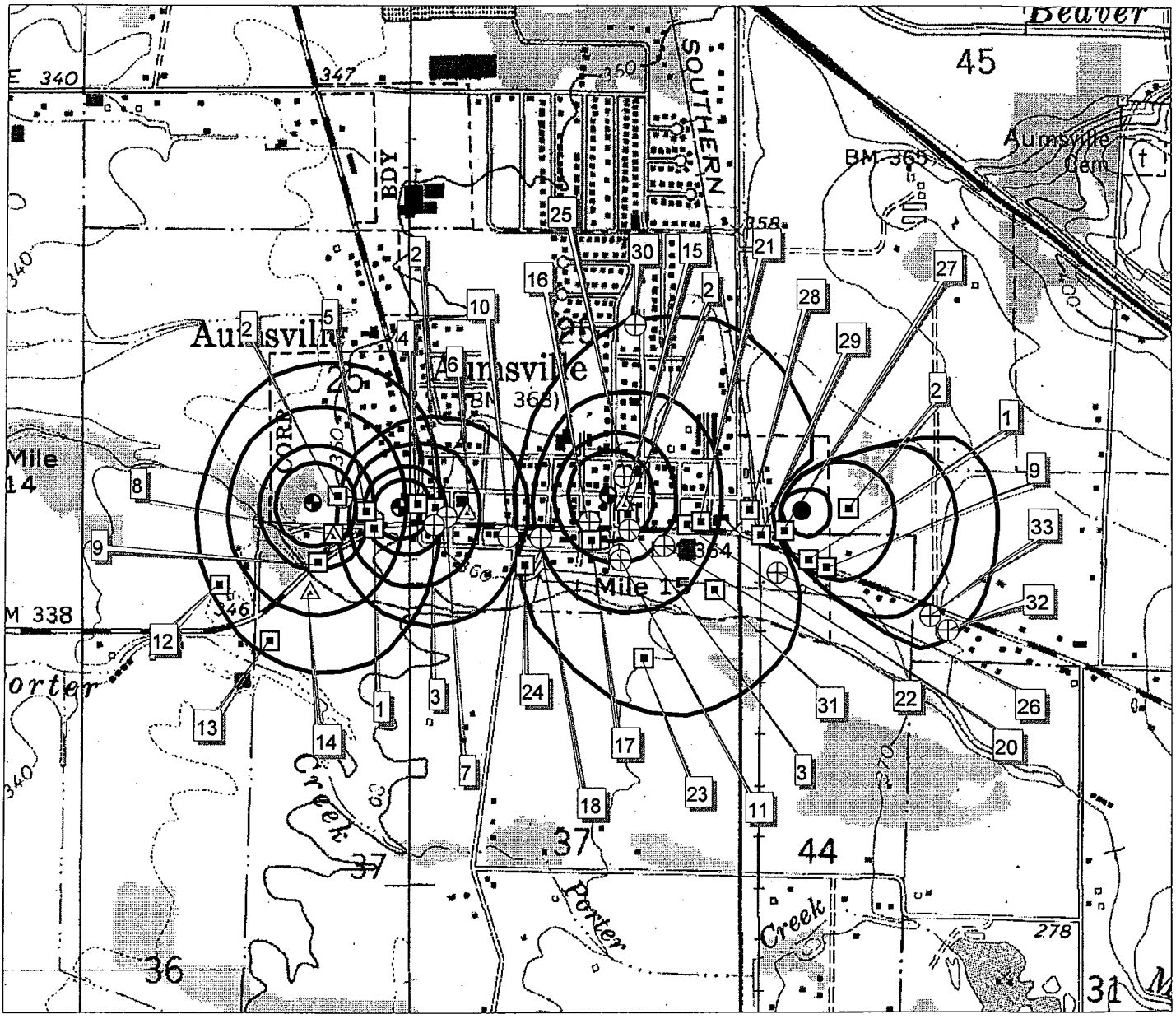
Figure 1



Drinking Water Protection Areas with the 1-, 2-, 5- and 10-year time-of-travel for groundwater to move through the aquifer to the wells shown. The Reservoir, Tower and Boone 1 wells produce from the Willamette Lowland Aquifer (WA); the Boone 3 well produces from the Columbia River Basalt (CRB)
Delineated using the RESSQC 2-d analytical model.
Model Parameters:
Permeability (ft/day): WA = 5.9; CRB = 24
Thickness (ft): WA = 62; CRB = 23
Direction of flow: WA and CRB = N60-90W
Gradient: WA and CRB = 0.005
Pumprates (ft3/day): Boone 1 = 14660; Boone 2 = 7350; Tower = 16820; Reservoir = 5220
Delineated by: Dennis Nelson RG1224
Drinking Water Program
Oregon Department of Human Services
August 20, 2004
PWS#4100065

Well Locations (WGS1984 datum):
Boone 1: 44°50'28.414"N 122°52'35.386"W
Boone 3: 44°50'28.778"N 122°52'45.131"W
Tower 2: 44°50'29.310"N 122°52'12.090"W
Reservoir 4: 44°50'28.062"N 122°51'50.447"W
T8S R2W Sec 25 and T8S R1W Sec 30
USGS Stayton and Turner 7.5-minute topographic quadrangles
Marion County

Figure 2: City of Aumsville Potential Contaminant Sources



Drinking Water Protection Area (DWPA) 1, 2, 5, and 10 year Time of Travel (TOT) Delineated Using the RESSQC 2-d analytical model.

Prepared by: Kylee Godfrey
Project Manager: JH
Reviewed by: DN RG# 1224
File# 4100065

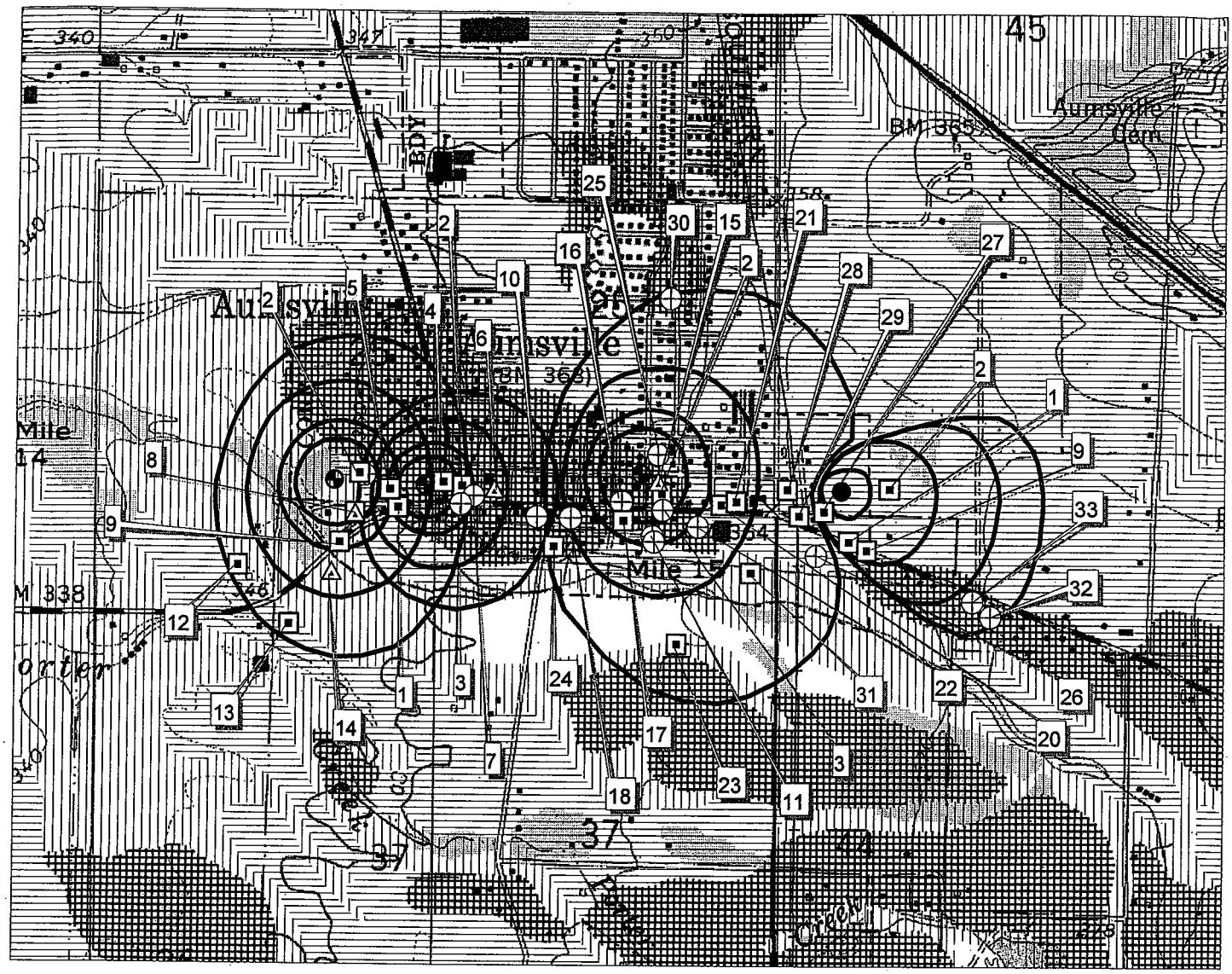
N

Potential Contaminant Sources
- ⊕ **Higher Relative Risk**
- ▣ **Moderate Relative Risk**
- △ **Low Relative Risk**

Note: Sites and areas noted in this figure are potential sources of contamination to the drinking water identified by Oregon drinking water protection staff. Environmental contamination is not likely to occur when chemicals are used and managed properly.

Numbers indicate potential contaminant sources which are explained in the Appendix.

Figure 3: City of Aumsville Drinking Water Source Susceptibility



Scale 1: 15,000

Drinking Water Protection Area (DWPA) 1, 2, 5, and 10 Year Time of Travel (TOT) RESSQC 2-d analytical model.

Potential Contaminant Sources

- ⊕ **Higher Relative Risk**
- ▣ **Moderate Relative Risk**
- △ **Low Relative Risk**

Sensitivity Analysis

- **High Soil Sensitivity**
- **Medium Soil Sensitivity**
- **Low Soil Sensitivity**

Note: Sites and areas noted in this figure are potential sources of contamination to the drinking water as identified by Oregon Drinking Water Protection Staff.
Environmental contamination is not likely to occur when chemicals are used and managed properly.

Features or activities that are identified as high or moderate risk that occur within an area designated as high or moderate sensitivity pose a greater risk to drinking water quality than those in areas of low sensitivity.

Numbers indicate potential contaminant sources indexed to the Appendix.

N

APPENDIX C - INVENTORY OF POTENTIAL CONTAMINANT SOURCES
AUMSVILLE, CITY OF - PWS # 4100065
OREGON SOURCE WATER ASSESSMENT

Inventory Results

Table 1. Summary of Potential Contaminant Sources by Land Use

Table 2. Inventory Results - List of Potential Contaminant Sources

Table 3. Results of Regulatory Database Search

Notes for Tables:

Sites and areas identified in these Tables are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

Total number of sources listed in Table 1 in the DWPA may not add up to the total number of potential contaminants sources in Table 2 because more than one type of potential contaminant source may be present at any given facility.

Data collected by Sue Gries Oregon DEQ on 11/24/2004.

Acronyms:

AST - Aboveground Storage Tank
DC - DEQ's Dry Cleaner database
DEQ - Oregon Department of Environmental Quality
DWPA - Drinking Water Protection Area
ECSI - DEQ's Environmental Cleanup Site Information database
HWIMSY - DEQ's Hazardous Waste Information Management System database
LUST - DEQ's Leaking Underground Storage Tank database
NPDES - National Pollution Discharge Elimination System
PCS - Potential Contaminant Source
PWS - Public Water System
SFM - State Fire Marshall's database of hazardous materials
SIS - DEQ's Source Information System database (includes WPCF & NPDES permits)
SWMS - DEQ's Solid Waste Management System database
UST - DEQ's Underground Storage Tank database or Underground Storage Tank
WPCF - Water Pollution Control Facility
WRD - Oregon Water Resources Division database for water rights information

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100065 AUMSVILLE, CITY OF

Residential/Municipal Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Airport - Maintenance/Fueling Area		Higher	0
Apartments and Condominiums		Lower	1
Campgrounds/RV Parks	(1)	Lower	0
Cemeteries - Pre-1945		Moderate	0
Drinking Water Treatment Plants		Moderate	0
Fire Station		Lower	1
Fire Training Facilities		Moderate	0
Golf Courses		Moderate	0
Housing - High Density (> 1 House/0.5 acres)		Moderate	4
Landfill/Dumps	(1)	Higher	0
Lawn Care - Highly Maintained Areas		Moderate	0
Motor Pools		Moderate	0
Parks		Moderate	2
Railroad Yards/Maintenance/Fueling Areas		Higher	0
Schools		Lower	0
Septic Systems - High Density (> 1 system/acre)	(1)	Higher	0
Sewer Lines - Close Proximity to PWS	(1)	Higher	3
Utility Stations - Maintenance Transformer Storage		Higher	0
Waste Transfer/Recycling Stations	(1)	Moderate	1
Wastewater Treatment Plants/Collection Stations	(1)	Moderate	0
Other			0

NOTES:
Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.
(1) - Potential source of microbial contamination
(2) - Drip irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation
(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100065 AUMSVILLE, CITY OF

Commercial/Industrial Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Automobiles - Body Shops		Higher	0
Automobiles - Car Washes		Moderate	0
Automobiles - Gas Stations		Higher	2
Automobiles - Repair Shops		Higher	3
Boat Services/Repair/Refinishing		Higher	0
Cement/Concrete Plants		Moderate	1
Chemical/Petroleum Processing/Storage		Higher	1
Dry Cleaners		Higher	0
Electrical/Electronic Manufacturing		Higher	0
Fleet/Trucking/Bus Terminals		Higher	0
Food Processing		Moderate	0
Furniture/Lumber/Parts Stores		Moderate	0
Home Manufacturing		Higher	0
Junk/Scrap/Salvage Yards		Higher	0
Machine Shops		Higher	0
Medical/Vet Offices	(1)	Moderate	2
Metal Plating/Finishing/Fabrication		Higher	0
Mines/Gravel Pits		Higher	0
Office Buildings/Complexes		Lower	0
Parking Lots/Malls (> 50 Spaces)		Higher	0
Photo Processing/Printing		Higher	0
Plastics/Synthetics Producer		Higher	0
Research Laboratories		Higher	1
RV/Mini Storage		Lower	0
Wood Preserving/Treating		Higher	1
Wood/Pulp/Paper Processing and Mills		Higher	0
Other			0

NOTES:
Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.
(1) - Potential source of microbial contamination
(2) - Drip irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation
(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100065 AUMSVILLE, CITY OF

Agricultural/Forest Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Auction Lots	(1)	Higher	0
Boarding Stables	(1)	Moderate	1
Confined Animal Feeding Operations (CAFOs)	(1)	Higher	0
Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)	(2)	Moderate	1
Crops - Nonirrigated (inc. Christmas trees, grains, grass seed, pasture)		Lower	1
Farm Machinery Repair		Higher	0
Grazing Animals (> 5 large animals or equivalent/acre)	(1)	Moderate	2
Lagoons/Liquid Wastes	(1)	Higher	0
Land Application Sites	(1)	Moderate	1
Managed Forest Land - Broadcast Fertilized Areas		Lower	0
Managed Forest Land - Clearcut Harvest (< 35 yrs.)		Moderate	0
Managed Forest Land - Partial Harvest (< 10 yrs.)		Moderate	0
Managed Forest Land - Road Density (> 2 mi./sq. mi.)		Moderate	0
Pesticide/Fertilizer/Petroleum Storage, Handling, Mixing, & Cleaning Ar		Higher	0
Recent Burn Areas (< 10 yrs.)		Lower	0
Managed Forest Lands - Status Unknown		Moderate	0
Other			0

NOTES:
Sites and areas identified in this Table are only potential sources of contamination to the drinking water.
Environmental contamination is not likely to occur when contaminants are used and managed properly.
(1) - Potential source of microbial contamination
(2) - Drip irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation
(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100065 AUMSVILLE, CITY OF

Miscellaneous Land Uses

Potential Contamination Source	Notes	Relative Risk Level	Total in DWPA
Above Ground Storage Tanks - Excluding Water		Moderate	3
Channel Alterations - Heavy		Lower	0
Combined Sewer Outfalls	(1)	Lower	0
Stormwater Outfalls	(1)	Lower	0
Composting Facilities	(1)	Moderate	0
Historic Gas Stations		Higher	0
Historic Waste Dumps/Landfills	(1)	Higher	0
Homesteads - Rural - Machine Shops/Equipment Maintenance		Higher	5
Homesteads - Rural - Septic Systems (< 1/acre)	(1)(3)	Lower	0
Injection/Dry Wells, Sumps - Class V UICs	(1)	Higher	0
Kennels (> 20 Pens)	(1)	Lower	0
Military Installations		Higher	0
Random Dump Sites		Moderate	0
River Recreation - Heavy Use (inc. campgrounds)	(1)	Lower	0
Sludge Disposal Areas	(1)	Moderate	0
Stormwater Retention Basins	(1)	Moderate	0
Transmission Lines - Right-of-Ways		Lower	0
Transportation - Freeways/State Highways/Other Heavy Use Roads		Moderate	5
Transportation - Railroads		Moderate	1
Transportation - Right-Of-Ways - Herbicide Use Areas		Moderate	0
Transportation - River Traffic - Heavy		Lower	0
Transportation - Stream Crossing - Perennial		Lower	0
UST - Confirmed Leaking Tanks - DEQ List		Higher	1
UST - Decommissioned/Inactive		Lower	0
UST - Nonregulated Tanks (< 1,100 gals or Large Heating Oil Tanks)		Higher	0
UST - Not Upgraded and/or Registered Tanks		Higher	0
UST - Upgraded/Registered - Active		Lower	1
UST - Status Unknown		Higher	2
Upstream Reservoirs/Dams		Lower	0
Wells/Abandoned Wells		Higher	0
Large Capacity Septic Systems (serves > 20 people) - Class V UICs	(1)	Higher	0
Construction/Demolition Areas		Moderate	0
Other			1
Other: - County Shop		Moderate	1

NOTES:
Sites and areas identified in this Table are only potential sources of contamination to the drinking water.
Environmental contamination is not likely to occur when contaminants are used and managed properly.
(1) - Potential source of microbial contamination
(2) - Drip irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation
(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 1. SUMMARY OF POTENTIAL CONTAMINANT SOURCES BY LAND USE

PWS # 4100065 AUMSVILLE, CITY OF

Other: - unknown operation	Moderate	1

NOTES:
Sites and areas identified in this Table are only potential sources of contamination to the drinking water.
Environmental contamination is not likely to occur when contaminants are used and managed properly.
(1) - Potential source of microbial contamination
(2) - Drip irrigated crops, such as vineyards and some vegetables, are considered lower risk than spray irrigation
(3) - For groundwater public water systems, septic systems located within the 2-year time-of-travel (TOT) are considered moderate risks.

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100065 AUMSVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
1	Transportation - Freeways/State Highways/Other Heavy Use Roads	Main Street	Runs Through DWPA	Aumsville	Field-Observation	Within the 2-yr TOT	Moderate	Vehicle use increases the risk for leaks or spills of fuel & other haz. materials. Road building, maintenance & use can increase erosion/slope failure causing turbidity. Over-application or improper handling of pesticides/fertilizers may impact water.	
	Transportation - Freeways/State Highways/Other Heavy Use Roads						Moderate	Vehicle use increases the risk for leaks or spills of fuel & other haz. materials. Road building, maintenance & use can increase erosion/slope failure causing turbidity. Over-application or improper handling of pesticides/fertilizers may impact water.	Aumsville is located within the Stayton-Sublimity Groundwater Limited Area which restricts future use (pumping) of the aquifer. Contact Oregon Water Resources Department for more information.
2	Housing - High Density (> 1 House/0.5 acres)	High Density Housing	Throughout DWPA	Aumsville	Field-Observation	Within the 2-yr TOT	Moderate	Improper use, storage, and disposal of household chemicals may impact the drinking water supply. Stormwater run-off or infiltration may carry contaminants to drinking water supply.	
	Housing - High Density (> 1 House/0.5 acres)						Moderate	Improper use, storage, and disposal of household chemicals may impact the drinking water supply. Stormwater run-off or infiltration may carry contaminants to drinking water supply.	
	Housing - High Density (> 1 House/0.5 acres)						Moderate	Improper use, storage, and disposal of household chemicals may impact the drinking water supply. Stormwater run-off or infiltration may carry contaminants to drinking water supply.	
	Housing - High Density (> 1 House/0.5 acres)		Within City of Aumsville				Moderate	Improper use, storage, and disposal of household chemicals may impact the drinking water supply. Stormwater run-off or infiltration may carry contaminants to drinking water supply.	

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100065 AUMSVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
3	Sewer Lines - Close Proximity to PWS	Sewer Lines	Throughout DWPA	Aumsville	Field-Observation	Within the 2-yr TOT	Higher	If not properly designed, installed, and maintained, sewer lines can impact drinking water, especially adjacent to a waterbody or within the 2-year time-of-travel zone for drinking water wells.	
	Sewer Lines - Close Proximity to PWS						Higher	If not properly designed, installed, and maintained, sewer lines can impact drinking water, especially adjacent to a waterbody or within the 2-year time-of-travel zone for drinking water wells.	
	Sewer Lines - Close Proximity to PWS		11th Street		Interview		Higher	If not properly designed, installed, and maintained, sewer lines can impact drinking water, especially adjacent to a waterbody or within the 2-year time-of-travel zone for drinking water wells.	
4	Transportation - Freeways/State Highways/Other Heavy Use Roads	Highway	Runs through DWPA	Aumsville	Field-Observation	Within the 2-yr TOT	Moderate	Vehicle use increases the risk for leaks or spills of fuel & other haz. materials. Road building, maintenance & use can increase erosion/slope failure causing turbidity. Over-application or improper handling of pesticides/fertilizers may impact water.	
5	Parks	Porter Boone Park	Main Street	Aumsville	Field-Observation	Within the 2-yr TOT	Moderate	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may cause transport of contaminants through runoff. Heavy use along edge of waterbody may contribute to erosion, causing turbidity.	
	Parks						Moderate	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may cause transport of contaminants through runoff. Heavy use along edge of waterbody may contribute to erosion, causing turbidity.	

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100065 AUMSVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
6	Apartments and Condominiums	Apartments	10th and Main Street	Aumsville	Field-Observation	Between 2-yr and 5-yr TOT	Lower	Improper use, storage, and disposal of household and facility maintenance chemicals may impact the drinking water supply. Stormwater run-off or infiltration may carry contaminants to water supply.	
7	UST - Status Unknown	Verizon NW	10th and Main Street	Aumsville	Field-Observation	Between 2-yr and 5-yr TOT	Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
8	UST - Upgraded/Registered - Active	Marion County Public Works	Mill Creek Road	Aumsville	Database (2) Field-Observation	Between 5-yr and 15-yr TOT	Lower	Spills or improper handling during tank filling or product distribution may impact the drinking water supply.	On septic. Also listed as "Aumsville District Shop"
	UST - Upgraded/Registered - Active					Within the 2-yr TOT	Lower	Spills or improper handling during tank filling or product distribution may impact the drinking water supply.	On septic. Also listed as "Aumsville District Shop"
	Other - County Shop					Between 5-yr and 15-yr TOT	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	On septic. Also listed as "Aumsville District Shop"
	Other - County Shop					Within the 2-yr TOT	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	On septic. Also listed as "Aumsville District Shop"

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100065 AUMSVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
9	Transportation - Freeways/State Highways/Other Heavy Use Roads	Mill Creek Road	Runs through DWPA	Aumsville	Field-Observation	Within the 2-yr TOT	Moderate	Vehicle use increases the risk for leaks or spills of fuel & other haz. materials. Road building, maintenance & use can increase erosion/slope failure causing turbidity. Over-application or improper handling of pesticides/fertilizers may impact water.	
	Transportation - Freeways/State Highways/Other Heavy Use Roads						Moderate	Vehicle use increases the risk for leaks or spills of fuel & other haz. materials. Road building, maintenance & use can increase erosion/slope failure causing turbidity. Over-application or improper handling of pesticides/fertilizers may impact water.	
10	UST - Confirmed Leaking Tanks - DEQ List	M&M Mart #7	810 Main Street	Aumsville	Database (2) Field-Observation	Between 5-yr and 15-yr TOT	Higher	Existing contamination from spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Also listed as "Aumsville Shell"
	Automobiles - Gas Stations						Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	Also listed as "Aumsville Shell"
11	Homesteads - Rural - Machine Shops/Equipment Maintenance	Home Machine Shop	Washington Street	Aumsville	Field-Observation	Between 5-yr and 15-yr TOT	Higher	Spills, leaks, or improper handling of solvents, fuels, and other materials or chemicals during transportation, use, storage and disposal may impact the drinking water supply.	
12	Grazing Animals (> 5 large animals or equivalent/acre)	Nichol Herford Ranch	Mill Creek Road	Aumsville	Field-Observation	Between 5-yr and 15-yr TOT	Moderate	Improper storage and management of animal wastes may impact drinking water supply. Concentrated livestock may contribute to erosion and sedimentation of surface water bodies.	
	Above Ground Storage Tanks - Excluding Water						Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100065 AUMSVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
13	Grazing Animals (> 5 large animals or equivalent/acre)	Running Brook Farms	Mill Creek Road	Aumsville	Field-Observation	Between 5-yr and 15-yr TOT	Moderate	Improper storage and management of animal wastes may impact drinking water supply. Concentrated livestock may contribute to erosion and sedimentation of surface water bodies.	Main portion of operation appears to be outside of the DWPA.
	Boarding Stables						Moderate	Improper storage and management of animal wastes and wastewater in areas of concentrated livestock may impact drinking water.	Main portion of operation appears to be outside of the DWPA.
14	Crops - Nonirrigated (inc. Christmas trees, grains, grass seed, pasture)	Crops - non-irrigated	South of Well	Aumsville	Field-Observation	Between 2-yr and 5-yr TOT	Lower	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Some agricultural practices may result in excess sediments discharging to surface waters, but non-irrigated crops are generally considered to be a low risk.	
15	Fire Station	Aumsville Rural Fire District	5th and Church	Aumsville	Field-Observation	Within the 2-yr TOT	Lower	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100065 AUMSVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
16	Research Laboratories	City of Aumsville	Main Street	Aumsville	Database (2) Field-Observation	Within the 2-yr TOT	Moderate	Spills, leaks, or improper handling of laboratory chemicals and wastes during transportation, use, storage and disposal may impact the drinking water supply.	Also listed as "Aumsville Central Office" and "Verizon NW" on regulatory databases. Risk reduced to Moderate because SFM database indicates "laboratory chemicals" present on site.
	Above Ground Storage Tanks - Excluding Water						Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Also listed as "Aumsville Central Office" and "Verizon NW" on regulatory databases. Risk reduced to Moderate because SFM database indicates "laboratory chemicals" present on site.
	UST - Status Unknown						Higher	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	Also listed as "Aumsville Central Office" and "Verizon NW" on regulatory databases. Risk reduced to Moderate because SFM database indicates "laboratory chemicals" present on site.
17	Wood Preserving/Treating	Emmons Cabinet Shop	Main Street	Aumsville	Database (2) Field-Observation	Within the 2-yr TOT	Moderate	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	No longer there, currently Doug Woodward Heating Risk reduced to Moderate because the cabinet shop is no longer in operation.

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100065 AUMSVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
18	Automobiles - Gas Stations	Aumsville Shell Food Mart	Main Street	Aumsville	Database (2) Field-Observation	Within the 2-yr TOT	Higher	Spills, leaks, or improper handling of fuels and other materials during transportation, transfer, and storage may impact the drinking water supply.	Also listed in regulatory databases as "Main Street Mini-Mart, Inc." and "Don Priddy's Auto Repair".
	Automobiles - Repair Shops						Higher	Spills, leaks, or improper handling of automotive fluids, solvents, and repair materials during transportation, use, storage and disposal may impact the drinking water supply.	Also listed in regulatory databases as "Main Street Mini-Mart, Inc." and "Don Priddy's Auto Repair".
19	Homesteads - Rural - Machine Shops/Equipment Maintenance	Home Machine Shop	5th Street	Aumsville	Field-Observation	Within the 2-yr TOT	Higher	Spills, leaks, or improper handling of solvents, fuels, and other materials or chemicals during transportation, use, storage and disposal may impact the drinking water supply.	
20	Medical/Vet Offices	Aumsville Animal Clinic	Main Street	Aumsville	Field-Observation	Between 2-yr and 5-yr TOT	Moderate	Spills, leaks, or improper handling of x-ray, biological, chemical, and radioactive wastes and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
21	Medical/Vet Offices	Aumsville Medical Clinic	Main Street	Aumsville	Field-Observation	Between 2-yr and 5-yr TOT	Moderate	Spills, leaks, or improper handling of x-ray, biological, chemical, and radioactive wastes and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
22	Automobiles - Repair Shops	B-G Service Center	Main Street	Aumsville	Database (2) Field-Observation	Between 2-yr and 5-yr TOT	Higher	Spills, leaks, or improper handling of automotive fluids, solvents, and repair materials during transportation, use, storage and disposal may impact the drinking water supply.	Trucks parked in adjacent lot.

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100065 AUMSVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
23	Land Application Sites	Land Application Area	South of Well	Aumsville	Interview	Between 5-yr and 15-yr TOT	Moderate	Improper management of sludge and wastewater may impact drinking water supply.	Treated effluent applied.
24	Cement/Concrete Plants	Capitol Concrete Construction	8th Street	Aumsville	Database (2) Field-Observation	Between 5-yr and 15-yr TOT	Moderate	Spills, leaks, or improper handling of chemicals and high turbidity wastewaters during transportation, use, storage and disposal may impact the drinking water supply.	
25	Automobiles - Repair Shops	Rays Small Engine Repair	5th Street	Aumsville	Field-Observation	Within the 2-yr TOT	Higher	Spills, leaks, or improper handling of automotive fluids, solvents, and repair materials during transportation, use, storage and disposal may impact the drinking water supply.	
26	Chemical/Petroleum Processing/Storage	Ektron Industries	Mill Creek Road	Aumsville	Database (2) Field-Observation	Between 5-yr and 15-yr TOT	Higher	Spills, leaks, or improper handling of chemicals and other materials during transportation, use, storage and disposal may impact the drinking water supply.	
	Other - State Cleanup Site (ECSI)						Higher	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100065 AUMSVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
27	Above Ground Storage Tanks - Excluding Water	Santiam Sanitation Service	Mill Creek Road	Aumsville	Database (2) Field-Observation	Between 5-yr and 15-yr TOT	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Above Ground Storage Tanks - Excluding Water					Within the 2-yr TOT	Moderate	Spills, leaks, or improper handling of stored materials may impact the drinking water supply.	
	Waste Transfer/Recycling Stations					Between 5-yr and 15-yr TOT	Moderate	Improper management of water contacting waste material may impact the drinking water supply.	
	Waste Transfer/Recycling Stations					Within the 2-yr TOT	Moderate	Improper management of water contacting waste material may impact the drinking water supply.	
28	Other - unknown operation	Unknown Operation	1st Street	Aumsville	Field-Observation	Between 5-yr and 15-yr TOT	Moderate	The impacts of this potential contaminant source will be addressed during the enhanced inventory.	Unknown operations - needs verification.
29	Transportation - Railroads	Railroad	Runs Through DWPA	Aumsville	Field-Observation	Between 5-yr and 15-yr TOT	Moderate	Rail transport elevates the risk for leaks/spills of fuel & other haz. materials. Installation/maintenance of tracks may increase erosion & slope failure causing turbidity. Over-application/improper handling of pesticides may impact the water supply.	
30	Homesteads - Rural - Machine Shops/Equipment Maintenance	Home Machine Shop	5th Street	Aumsville	Field-Observation	Between 5-yr and 15-yr TOT	Higher	Spills, leaks, or improper handling of solvents, fuels, and other materials or chemicals during transportation, use, storage and disposal may impact the drinking water supply.	

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 2. INVENTORY RESULTS - LIST OF POTENTIAL CONTAMINANT SOURCES

PWS# 4100065 AUMSVILLE, CITY OF

Reference No. (See Figure)	Potential Contaminant Source Type	Name	Approximate Location	City	Method for Listing	Proximity to Sensitive Areas	Relative Risk Level (1)	Potential Impacts	Comments
31	Crops - Irrigated (inc. orchards, vineyards, nurseries, greenhouses)	Irrigated Crops	South of the well	Aumsville	Field-Observation	Between 5-yr and 15-yr TOT	Moderate	Over-application or improper handling of pesticides/fertilizers may impact drinking water. Excessive irrigation may transport contaminants or sediments to groundwater/surface water through runoff. Drip-irrigated crops are considered to be a low risk.	
32	Homesteads - Rural - Machine Shops/Equipment Maintenance	Home Machine Shop	Mill Creek Road	Aumsville	Field-Observation	Between 5-yr and 15-yr TOT	Higher	Spills, leaks, or improper handling of solvents, fuels, and other materials or chemicals during transportation, use, storage and disposal may impact the drinking water supply.	
33	Homesteads - Rural - Machine Shops/Equipment Maintenance	Home Machine Shop	Mill Creek Road	Aumsville	Field-Observation	Between 5-yr and 15-yr TOT	Higher	Spills, leaks, or improper handling of solvents, fuels, and other materials or chemicals during transportation, use, storage and disposal may impact the drinking water supply.	

Note: Sites and areas identified in this Table are only potential sources of contamination to the drinking water. Environmental contamination is not likely to occur when contaminants are used and managed properly.

(1) Where multiple potential contaminant sources exist at a site, the highest level of risk is used.

(2) See Table 3 for database listings (if necessary).

TABLE 3. RESULTS OF REGULATORY DATABASE SEARCH

PWS# 4100065 AUMSVILLE, CITY OF

Reference No. (1)	Name	Database Listings (2)
8	Marion County Public Works	SFM - Diesel Fuel stored in Underground Tank
		SFM - Gasoline stored in Underground Tank
		SFM - Hydraulic Oil stored in Steel Drum
		SFM - Lubricating Oil stored in Steel Drum
		SFM - Transmission Oil stored in Steel Drum
		UST list with a status of 2 UST(s) upgraded and 0 not upgraded to DEQ 1998 technical standards.
		SFM - Antifreeze stored in Steel Drum
10	M&M Mart #7	SFM - Gasoline Unleaded Regular stored in Underground Tank
		SFM - Gasoline Unleaded Super stored in Underground Tank
		SFM - Gasoline Unleaded Plus stored in Underground Tank
		LUST cleanup initiated on 6/3/1992. PWS should verify cleanup progress.
		UST list with a status of 3 UST(s) upgraded and 0 not upgraded to DEQ 1998 technical standards.
16	City of Aumsville	SFM - Diesel Fuel stored in Aboveground Tank
		SFM - Gasoline stored in Aboveground Tank
		SFM - Laboratory Chemicals stored in Plastic Bottle, Jug, Bucket
		SFM - Lead Acid Batteries-wet stored in Other
		SFM - Sodium Hypochlorite stored in Carboy
		UST list-PWS needs to verify tank permit status
17	Emmons Cabinet Shop	SFM - Contact Cement stored in Can

Notes: (1) See Table 2 and Figure. (2) For State Fire Marshals (SFM) list, information on materials in a gaseous-form is not presented since gaseous compounds rarely pose a threat to groundwater or surface water.

TABLE 3. RESULTS OF REGULATORY DATABASE SEARCH

PWS# 4100065 AUMSVILLE, CITY OF

Reference No. (1)	Name	Database Listings (2)
18	Aumsville Shell Food Mart	SFM - Gasoline stored in Underground Tank
		UST list with a status of 3 UST(s) upgraded and 0 not upgraded to DEQ 1998 technical standards.
		LUST list with unknown status
22	B-G Service Center	UST list-PWS needs to verify tank permit status
24	Capitol Concrete Construction	SFM - Diesel Fuel stored in Aboveground Tank
		SFM - Gasoline stored in Aboveground Tank
26	Ektron Industires	SFM - Paint Polyurethane stored in Can
		SFM - Waste Paint stored in Steel Drum
		SFM - Powder Coating/dust stored in Box
		SFM - Lacquer Wash stored in Steel Drum
		SFM - Iridite stored in Tank Inside Building
		HWIMSY list as a conditionally exempt generator.
		ECSI site with no further state action required.
		SFM - Reducer Polane stored in Steel Drum
27	Santiam Sanitation Service	UST list-PWS needs to verify tank permit status
		SFM - Automatic Transmission Fluid stored in Steel Drum
		SFM - Diesel Fuel stored in Aboveground Tank
		SFM - Hydraulic Oil stored in Steel Drum
		SFM - Motor Oil stored in Steel Drum
		SFM - Used Motor Oil stored in Aboveground Tank
		SIS list with a GEN12Z NPDES for stormwater from industrial activities.

Notes: (1) See Table 2 and Figure. (2) For State Fire Marshals (SFM) list, information on materials in a gaseous-form is not presented since gaseous compounds rarely pose a threat to groundwater or surface water.

MART 10912

cd dd

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

WATER WELL REPORT
STATE OF OREGON
(Please type or print)

RECEIVED
AUG 17 1973
STATE ENGINEER
SALEM, OREGON

State Well No. 8S/2W-25
State Permit No. G6861

Do not write above this line

Mart..... 10912 Well #2 Boone Park Well

(1) OWNER:
Name City Of Aumsville
Address Aumsville, Ore.

(2) TYPE OF WORK (check):
New Well ☐ Deepening ☒ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☒ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

CASING INSTALLED:
Threaded ☐ Welded ☒

12" Diam. from 0 ft. to 50 ft. Gage .250
10" Diam. from 0 ft. to 302 ft. Gage .250
8" Diam. from 301 ft. to 366 ft. Gage .250
7" O.D. 365 ft. 440 ft. .188

PERFORATIONS:
Perforated? ☐ Yes ☐ No
Type of perforator used Mills 80 ft - 195'
Size of perforations 3/8 in. by 4 in.
120 perforations from 80' ft. to 94 ft.
200 perforations from 140' ft. to 190 ft.
60 perforations from 301' ft. to 365 ft.
38 365' 440'

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Stettler
Yield: 320 gal./min. with 125 ft. drawdown after 36 hrs.
" " " "
" " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement & bentonite
Well sealed from land surface to 80 ft.
Diameter of well bore to bottom of seal 12 in.
Diameter of well bore below seal 10 in.
Number of sacks of cement used in well seal 10 sacks
Number of sacks of bentonite used in well seal 3 sacks
Brand name of bentonite National
Number of pounds of bentonite per 100 gallons of water lbs./100 gals.
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Marion Driller's well number 643
SE ¼ SE ¼ Section 25 T. 8S R. 2W W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 80 ft.
Static level 14 ft. below land surface. Date 8/1/73
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 10
Depth drilled 447 ft. Depth of completed well 447 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. *Report each change in position of Static Water Level and indicate principal water-bearing strata.*

MATERIAL	From	To	SWL
Exhisting well(12")	0'	60'	13'
Tan clay	60'	80'	
Sandstone & gravel	80'	95'	
Clay (grey-blue)	95'	140'	
Shale with sand layers	140'	195'	10'
Shale (soft-blue)	185'	280'	
Shale (brown)	280'	297'	
Basalt (hard)	297'	302'	10'
Shale (blue)	302'	307'	
Basalt (med. hard)	307'	313'	
Shale (green & blue)	313'	385'	10'
Shale (hard grey)	385'	400'	
Pea gravel	400'	401'	
Shale (hard & gritty	401'	447'	10'
Grouted in area between exhisting 12" casing and 10" casing from 80' level to ground level.			

Work started 5/13/73 19 Completed 8/1/73 19
Date well drilling machine moved off of well 8/1/73 19

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Pete J. Tolmasoff (Drilling Machine Operator) Date 8/15/, 19 73
Drilling Machine Operator's License No. 320

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Pete Tolmasoff Well Drilling (Person, firm or corporation) (Type or print)
Address Turner, Ore.
[Signed] Pete J. Tolmasoff (Water Well Contractor)
Contractor's License No. 410 Date 8/15, 19 73

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45658-119

Boone's Well #1
Mart 10912

NOTICE TO WATER WELL CONTRACTOR: The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED
MAY 2 1969
STATE ENGINEER
SALEM OREGON

MARI.....

WATER WELL REPORT

STATE OF OREGON
(Please type or print)
(Do not write above this line)

State Well No. 8/2W-25cd

State Permit No. .....

(1) OWNER:

Name City Of Aumsville

Address Aumsville, Ore.

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☒ Other ☐

CASING INSTALLED:

Threaded ☐ Welded ☒

12 " Diam. from 0 ft. to 52 ft. Gage .250

" Diam. from ..... ft. to ..... ft. Gage .....

" Diam. from ..... ft. to ..... ft. Gage .....

PERFORATIONS:

Perforated? ☒ Yes ☐ No.

Type of perforator used Mills

Size of perforations ½ in. by 4 in.

250 perforations from 31 ft. to 51 ft.

..... perforations from ..... ft. to ..... ft.

..... perforations from ..... ft. to ..... ft.

..... perforations from ..... ft. to ..... ft.

..... perforations from ..... ft. to ..... ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☒ No

Manufacturer's Name .....

Type ..... Model No. .....

Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.

Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.

(8) WATER LEVEL: Completed well.

Static level 10 ft. below land surface Date 4/29/69

Artesian pressure ..... lbs. per square inch Date .....

(9) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?

Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.

" " " "

" " " "

Baller test 20 gal./min. with 25 ft. drawdown after 1 hrs.

Artesian flow ..... g.p.m. Date .....

Temperature of water ..... Was a chemical analysis made? ☐ Yes ☒ No

(10) CONSTRUCTION:

Well seal—Material used Bentonite slurry

Depth of seal drilled in 30 ft.

Diameter of well bore to bottom of seal 12 in.

Were any loose strata cemented off? ☐ Yes ☒ No Depth .....

Was a drive shoe used? ☒ Yes ☐ No

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? ..... depth of strata .....

Method of sealing strata off .....

Was well gravel packed? ☐ Yes ☒ No Size of gravel: .....

Gravel placed from ..... ft. to ..... ft.

(11) LOCATION OF WELL:

County Marion Driller's well number 364

SE ¼ SW ¼ Section 25 T. 8S R. 2W W.M.

Bearing and distance from section or subdivision corner .....

(12) WELL LOG:

Diameter of well below casing 10

Depth drilled 60 ft. Depth of completed well 60 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level as drilling proceeds. Note drilling rates.

MATERIAL	From	To	SWL
Top soil	0'	3'	
Clay (firm-brown)	3'	5'	
Clay & cobbles (packed)	5'	11'	
Cement gravel	11'	20'	
Clay & gravel (packed)	20'	25'	
Cement gravel	25'	30'	10
Silted gravel	30'	35'	10'
Clay & gravel (packed)	35'	40'	
Silted gravel	40'	45'	10'
Clay & gravel (soft)	45'	50'	
Tan clay (soft)	50'	60'	

Work started 4/24/69 19 Completed 4/29/69 19

Date well drilling machine moved off of well 4/29/69 19

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Pete Tolmasoff (Drilling Machine Operator) Date 4/30/69 19.....

Drilling Machine Operator's License No. 320

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Pete Tolmasoff Well Drilling (Person, firm or corporation) (Type or print)

Address Turner, Ore.

[Signed] Pete Tolmasoff (Water Well Contractor)

Contractor's License No. 410 Date 4/30/69, 19.....

(USE ADDITIONAL SHEETS IF NECESSARY)

Boones Park
Well #1

Deepened See MARI 10912

MARI 10911

New log sent to RWH request NARI.....

RECEIVED
JUL 8 1983
WATER RESOURCES DEPT.
SALEM, OREGON

NARI 20669

State Well No. 8S/2W-25cbc

State Permit No. CA

WATER WELL REPORT
STATE OF OREGON

Revised Log

Boones Park Well 3

(1) OWNER:
Name City Of Aumsville
Address P.O. Box 227
City Aumsville State OR. 97325

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☒ Driven ☐
Rotary Mud ☒ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:
Steel ☒ Plastic ☐
Threaded ☐ Welded ☒

12" Diam. from +1 ft. to 242 ft. Gauge .375
10" Diam. from +1 ft. to 272 ft. Gauge .250

LINER INSTALLED:
" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level

[redacted] pump test made? ☒ Yes ☐ No If yes, by whom? Driller
[redacted] 500 gal/min. with 118 ft. drawdown after 4 hrs.
" 500 " 148 " 27½ "
Air test gal/min. with drill stem at ft. hrs.
Bailer test gal/min. with ft. drawdown after hrs.
[redacted]esian flow g.p.m.
[redacted]perature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Special standards: Yes ☐ No ☒
Well seal—Material used Cement Grout
Well sealed from land surface to 66 ft.
Diameter of well bore to bottom of seal 16 in.
Diameter of well bore below seal 12 in.
Number of sacks of cement used in well seal 82 sacks
How was cement grout placed? Pumped from 66 ft. Also cement grout plugs from 232 to 242 ft. and 262 to 272 ft. to seal casing in rock.
Was pump installed? no Type HP Depth ft.
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Marion Driller's well number
S.E. ¼ S.W. ¼ Section 25 T. 8 S. R. 2 W. W.M.
Tax Lot # Lot Blk Subdivision
Address at well location: Aumsville City Park

(11) WATER LEVEL: Completed well.
Depth at which water was first found 5 ft.
Static level 11 ft. below land surface. Date 1-27-83
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 10"
Depth drilled 320 ft. Depth of completed well 320 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Top soil	0	1	
Gravel	1	25	
Gravel with clay	25	61	
Clay	61	70	
Gravel Clay	70	84	
Clay	84	122	
Sand some Gravel	122	133	
Clay	133	146	
Sand	146	152	
Clay	152	160	
Sand with clay	160	166	
Clay with sandseens	166	182	
Clay sticky	182	187	
Clay with sandseens	187	196	
Clay	196	203	
Sandy clay	203	210	
Clay	210	224	
Sandy clay	224	237	
Rock	237	251	
Claystone	251	252	
Clay sticky	252	263	
Rock	263	271	
Rock water bearing	271	320	

Work started Nov. 30, 82 Completed Jan. 25, 1983
Date well drilling machine moved off of well Jan. 25, 1983

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] (Drilling Machine Operator) Date , 19
Drilling Machine Operator's License No.

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Donnelly Drilling Co. (Person, firm or corporation) (Type or print)
Address P.O. Box 5, Aurora, OR. 97002
[Signed] David Donnelly (Water Well Contractor)
Contractor's License No. 806 Date 7-6, 19 83

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP-12658-690

Boones Well #3
NARI 20669

ORIGINAL
File Original and Duplicate with the STATE ENGINEER, SALEM, OREGON

MARI.....

WATER WELL REPORT
STATE OF OREGON

State Well No. 8/2W-25R

G1143

State Permit No. G-1051

(1) OWNER:
Name: City of Aumsville
Address: Aumsville, Oregon

(2) LOCATION OF WELL:
Well #3
County: Marion — Owner's number, if any—
SE ¼ SE ¼ Section 25 T. 8 S R. 2 W W.M.
Bearing and distance from section or subdivision corner
Lot 4, Block 11 Merrifield's Addition

(3) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):
[redacted]stic ☐ Industrial ☐ Municipal ☒
[redacted]ation ☐ Test Well ☐ Other ☐

(5) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☒
8 5/8" Diam. from 1-0 ft. to 99 ft. Gage 277
_____" Diam. from _____ ft. to _____ ft. Gage _____
_____" Diam. from _____ ft. to _____ ft. Gage _____

(7) PERFORATIONS:
Perforated? ☒ Yes ☐ No
Type of perforator used Mills
SIZE of perforations 3/8 in. by 2 in.
279 perforations from 40 ft. to 70 ft.
90 perforations from 83 ft. to 97 ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

(8) SCREENS:
Well screen installed ☐ Yes ☒ No
[redacted]turer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ Set from _____ ft. to _____ ft.
[redacted] _____ Slot size _____ Set from _____ ft. to _____ ft.

(9) CONSTRUCTION:
[redacted]ell gravel packed? ☐ Yes ☒ No Size of gravel: _____
Gravel placed from _____ ft. to _____ ft.
Was a surface seal provided? ☐ Yes ☐ No To what depth? _____ ft.
Material used in seal—
Did any strata contain unusable water? ☐ Yes ☐ No
Type of water? surface Depth of strata
Method of sealing strata off casing

(10) WATER LEVELS:
Static level 11 ft. below land surface Date 6/21/58
Artesian pressure _____ lbs. per square inch Date _____

Log Accepted by:
[Signed] Town of Aumsville 7-2 58
(Owner)
Irvin Hylquest Recorder

(11) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom?

Yield:	135	gal./min. with	78	ft. drawdown after	21 hrs.
"	130	"	60	"	1 "
"	120	"	52	"	1 "
Bailer test	100	gal./min. with	41½	ft. drawdown after	1 hrs.

Artesian flow _____ g.p.m. Date _____
Temperature of water 55 Was a chemical analysis made? ☐ Yes ☒ No

(12) WELL LOG:
Diameter of well 8 inches.
Depth drilled 100 ft. Depth of completed well 100 ft.

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top soil & silt	0	4
Sand & gravel with clay pressed into it	4	70
Decomposed [redacted] pumice ash	70	82
Sand & gravel with yellow clay pressed into it	82	98
Less gravel & more yellow clay	98	100
Water in all gravel formation though most abundant between	41~~8~~	51
	~~63~~	~~68½~~
	~~85~~	~~95~~
We believe the gravel below 82 ft to be older than the Stayton lava		

RECEIVED
MAR 1 [illegible]
STATE ENGINEER
SALEM, OREGON

Work started June 17 19 58 Completed June 26 19 58

(13) PUMP:
Manufacturer's Name _____
Type: _____ H.P. _____

Well Driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Harry A. Robinson (Person, firm, or corporation) (Type or print)
Address 2214 N. Front, Salem, Ore.
Driller's well number 8/2W-25 R1
[Signed] Harry A. Robinson (Well Driller)
License No. 22 Date 6/30, 19 58.

(USE ADDITIONAL SHEETS IF NECESSARY)

Tower Well #2
MARI 15908

STATE OF OREGON

WATER WELL REPORT
(as required by ORS 537.765)

RECEIVED
OCT 05 1990
WATER RESOURCES DEPT.
SALEM, OREGON

Mar. 16312 8S/1W/30CC

(START CARD) # 19138

(1) OWNER:
Name CITY OF AUMSVILLE Well Number
Address 595 MAIN ST.
City AUMSVILLE State ORE Zip 97325

(2) TYPE OF WORK:
☑ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD
☑ Rotary Air ☐ Rotary Mud ☑ Cable PAGE #1
☐ Other

(4) PROPOSED USE:
☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☑ Other MUNICIPAL

(5) BORE HOLE CONSTRUCTION:
Special Construction approval Yes ☐ No ☑ Depth of Completed Well ____ ft.
Explosives used Yes ☐ No ☑ Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
12"	0'	45'	CEMENT	0'	45'	35 SACKS
8"	45'	180'				
10"	180'	230'				
8"	230'	460'				

How was seal placed: Method ☐ A ☐ B ☑ C ☐ D ☐ E
☐ Other
Backfill placed from 460 ft. to 300 ft. Material 3/4" GRAVEL
Gravel placed from 230 ft. to 178 ft. Size of gravel 1/2" - 1 1/2"

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	8"	+2'	180'	.260	☑	☐	☑	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	5 9/16"	165'	178'	106A.	☑	☐	☑	☐
	5 9/16"	228.5	235'	106A	☑	☐	☑	☐

Final location of shoe(s) 178'

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☑ Screens Type V-SLOT Material 304 S.STEEL

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
178'	228.5'	50			TELE-6"	☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☑ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.
200	100'		24 HRS.
150	81'		6 HRS.

Temperature of water 56° Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County MARION Latitude ____ ° Longitude ____
Township 8S N or S, Range 1W E or W, WM.
Section 30 SW ¼ SW ¼
Tax Lot ____ Lot ____ Block ____ Subdivision ____
Street Address of Well (or nearest address) 9613 MILL CREEK RD, AUMSVILLE

(10) STATIC WATER LEVEL:
27 ft. below land surface. Date 9-10-90
Artesian pressure ____ lb. per square inch. Date ____

(11) WATER BEARING ZONES:
Depth at which water was first found 9'

From	To	Estimated Flow Rate	SWL
9' ~~surface~~	49'	50 GPM	4'
180'	230'	200 GPM	27'

(12) WELL LOG: Ground elevation

Material	From	To	SWL
BROWN CLAY W/SMALL GRAVEL	0'	1'	
BROWN CLAY	1'	3'	
GRAVEL W/ CLAY	3'	9'	
GRAVEL, W. BEARING, W/BR. CLAY	9'	39'	4'
BROWN CLAY W/ GRAVEL	39'	49'	↓
LIGHT-BROWN CLAY W/SMALL GRAV.	49'	54'	
LT-BROWN SANDY CLAY	54'	74'	
BROWN CLAY -DENSER	74'	78'	
BROWN CLAY W/STREAKS OF LOOSE GRAVEL	78'	96'	
BROWN CLAY	96'	101'	
BROWN W/BLUE-GRAY CLAY	101'	149'	
DARK-GRAY CLAY	149'	154'	
GRAY CLAY W/CLAYSTONE + SAND	154'	169'	
DARK GRAY CLAY OR SHALE	169'	175'	
DARK GRAY CLAY OR SHALE W/ OCCASSIONAL STRIPS OF FINE BLACK SAND -W.B.	175'	207'	27'
GRAY CLAY -DENSE	207'	210'	
GRAY CLAY LESS DENSE - POSSIBLY BEARING WATER	210'	222'	27'
DARK GRAY CLAY W/ CLAYSTONE	222	230'	

Date started MAY 21, 1990 Completed SEPT. 21, '90

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. all work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 633
Signed Michael Waldrop Date ~~Sept~~ OCT. 6, '90

ORIGINAL & FIRST COPY - WATER RESOURCES DEPARTMENT SECOND COPY - CONSTRUCTOR THIRD COPY - CUSTOMER 9809C 3/88

Reservoir well #4

RECEIVED

STATE OF OREGON

WATER WELL REPORT
(as required by ORS 537.765)

OCT 05 1990

(START CARD) # 19138

(1) OWNER:
Well Number: WATER RESOURCES DEPT.
Name: CITY OF AUMSVILLE
Address: SALEM, OREG
City: State: Zip:

(2) TYPE OF WORK:
☐ New Well ☐ Deepen ☐ Recondition ☐ Abandon

(3) DRILL METHOD
☐ Rotary Air ☐ Rotary Mud ☐ Cable PAGE #2
☐ Other

(4) PROPOSED USE:
☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☐ No Depth of Completed Well ____ ft.
Explosives used ☐ Yes ☐ No Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other
Backfill placed from ____ ft. to ____ ft. Material
Gravel placed from ____ ft. to ____ ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.

Temperature of water Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Latitude Longitude
Township N or S, Range E or W, WM.
Section ¼ ¼
Tax Lot Lot Block Subdivision
Street Address of Well (or nearest address)

(10) STATIC WATER LEVEL:
____ ft. below land surface. Date
Artesian pressure ____ lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found

From	To	Estimated Flow Rate	SWL

(12) WELL LOG:
Ground elevation

Material	From	To	SWL
BLUE-GRAY CLAY - STICKY	230'	236'	
BLUE CLAYSTONE	236'	237'	
GRAY CLAY W/TAN STREAKS	237'	249'	
BROWN CLAY - VERY DENSE. W/ STREAKS OF CLAYSTONE	249'	259'	
RED CLAY - DENSE	259'	266'	
RED W/GRAY CLAY	266'	275'	
RED, GREEN, BROWN SHALE	275'	282'	
DARK GRAY SHALE	282'	285'	
BASALT, BLACK + HARD	285'	433'	
BLUE CLAY	433'	460'	
- GRAVEL PLACED FROM 460'-435';			
- GROUTED FROM 435'-420'			
- GRAVEL PLACED FROM 420'-300'			
- GROUT PLUG " 300'-280'			
- GRAVEL " 280'-240'			
- GROUT PLUG " 240'-236'			

basalt

Date started Completed

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. all work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

Signed Michael Muldoon WWC Number 633
Date 10-8-90

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Reservoir well #4

6

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

RECEIVED OVER THE COUNTER OCT 10 1995 WATER RESOURCES DEPT

RECEIVED MAR 2000

085/01W/30CC

(START CARD) # 69331

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number SALEM
Name City of Aumsville
Address 595 Main St.
City Aumsville State Ore. Zip 97325

(2) TYPE OF WORK
☐ New Well ☐ Deepening ☑ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☐ Rotary Air ☐ Rotary Mud ☑ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☑ Other Municipal

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☐ No Depth of Completed Well ____ ft.
Explosives used ☐ Yes ☒ No Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
			N/A			

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☐ Other
Backfill placed from ____ ft. to ____ ft. Material
Gravel placed from ____ ft. to ____ ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:					☐	☐	☐	☐
N/A					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:
☑ Perforations Method Mills Knife
☐ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
157'	162'	1/4"x1½"	88			☑	☐
						☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.
	N/A		

Temperature of water ____ Depth Artesian Flow Found ____
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Marion Latitude ____ Longitude ____
Township 8S N or S Range 1W E or W. WM.
Section 30 SW 1/4 SW 1/4
Tax Lot 1100 Lot ____ Block ____ Subdivision ____
Street Address of Well (or nearest address) 9613 Mill Creek Rd. SE Aumsville, Ore.

(10) STATIC WATER LEVEL:
30 ft. below land surface. Date 8-30-95
Artesian pressure ____ lb. per square inch. Date ____

(11) WATER BEARING ZONES:
Depth at which water was first found ____

From	To	Estimated Flow Rate	SWL
		N/A	

(12) WELL LOG:
Ground Elevation ____

Material	From	To	SWL
N/A			

Date started Aug. 25, 1995 Completed Aug. 25, 1995

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 633/1273
Signed Michael Wallwork Date 10-5-95

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

Reservoir well #4

MARI 56796

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)
Instructions for completing this report are on the last page of this form.

WELL I.D. # L 56264
START CARD # 149409

(1) LAND OWNER Well Number
Name CITY OF AUMSVILLE
Address 595 MAIN ST.
City AUMSVILLE State OR Zip 97325

(2) TYPE OF WORK
☐ New Well ☐ Deepening ☒ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☐ Rotary Air ☐ Rotary Mud ☒ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
☐ Domestic ☒ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☒ No Depth of Completed Well 237 ft.
Explosives used ☐ Yes ☒ No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
8"	0	237	ORIGINAL			
			SEE MARI 16312			

How was seal placed: Method ☐A ☐B ☐C ☐D ☐E
☒ Other ORIGINAL
Backfill placed from ft. to ft. Material
Gravel placed from 181 ft. to 96 ft. Size of gravel 8/12 CSS

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	6"	-7	157	.250	☒	☐	☒	☐
	6"	162	169	.250	☒	☐	☒	☐

Drive Shoe used ☐ Inside ☐ Outside ☐ None
Final location of shoe(s) NOT USED

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☒ Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
157	162	.040		6"	P.S.	☐	☒
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☒ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
133	94		1 hr.
123	104		4hr.

Temperature of water 56° Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County MARION Latitude Longitude
Township 8S N or S Range 1W E or W. WM.
Section 30 SW 1/4 SW 1/4
Tax Lot 1100 Lot Block Subdivision
Street Address of Well (or nearest address) 9313 MAIN ST. AUMSVILLE, OR 97325

(10) STATIC WATER LEVEL:
37 ft. below land surface. Date 8-23-02
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES:
Depth at which water was first found ORIGINAL

From	To	Estimated Flow Rate	SWL
ORIGINAL	SEE MARI	16312	

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
THIS WELL WAS RECONDITIONED TO CORRECT A PROBLEM OF PUMPING DEBRIS UP BEHIND THE RISER PIPE.			
ORIGINAL PRODUCTION/SCREENED PORTION OF WELL UNCHANGED.			
Westerberg Drilling, Inc. 36728 S. Kropf Rd. Molalla, OR 97038			

Date started 8-5-02 Completed 8-20-02

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 688
Signed Steven N. Stuebe Date 9-2-02

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER

Reservoir Well #4

Parameters Used in Delineation Model – For Boones Park Well #1, Tower Well #2, and Reservoir Well #4

Delineation Method: ☒ Analytical ☐ Calculated Fixed Radius ☐ Enhanced CFR
☐ Numerical ☐ Hydrogeologic Mapping ☐ Analytic Element

Pump Rate[1] (Q in gpm): 76 gpm (14,658 ft^3/day) for Boones Park Well #1
87.4 gpm (16,815 ft^3/day) for Tower Well #2
27.1 gpm (5,220 ft^3/day) for Reservoir Well #4

Source: ☐ System ☒ Water Resources Dept ☐ Comparable Community
☐ Pump Capacity ☐ Population Estimate ☐ 90% of Safe Yield

Nature of the Aquifer: ☐ Unknown ☒ Unconfined (Well #2)
☐ Semi-confined ☒ Confined (Well #1 and Well #4)

Aquifer name: Sand and gravel layers within the Willamette Valley Lowland Aquifer System and basalt layers of the Columbia River Basalt group.

Confining Unit lithology: Multiple clay layers and shale - see Table 2.1
Depth to Confining Unit: 50 feet for Boones Park Well #1, none for Tower Well #2, 74 feet for Reservoir Well #4
Confining Unit thickness: >30 feet for Boones Park Well #1, none for Tower Well #2, total of 59 feet for Reservoir Well #4
Depth to Aquifer: 140 feet for Boones Park Well #1, 11 feet for Tower Well #2, 175 feet for Reservoir Well #4

Aquifer Characteristics:

Lithology: **Varies – see Table 2.1**

☐ Unknown ☐ Sandy Silt ☒ Layered Volcanic Rocks
☒ Sand ☒ Sand & Gravel ☐ Fractured Volcanic Rocks
☐ Gravel ☐ Cobbles/Gravel ☒ Fractured Sedimentary Rocks

Thickness (b): Varies – used an average of 62 feet for the model
Effective Porosity (n): Varies between 0.21 and 0.25
Hydraulic Conductivity (Permeability): Used average of 5.9 ft/day
☐ Estimated from lithology ☒ Specific Capacity (Well Report)
☐ Published Report ☐ Aquifer Test
Hydraulic Gradient: 0.005 Flow Direction: 160° +/- 20°
☒ Published Report ☐ Graphical Solution ☐ Estimate
☐ Field Measurements ☐ Model Results

Other High Capacity Wells Accounted for: None

1. Groundwater models used do not allow for variable pump rates, e.g., pumps turning off and on. Therefore, we must calculate an average continuous pump rate over a 24-hour period. Pump rate, therefore, represents average daily use of highest three months divided by 1440 minutes/day to obtain gallons/minute value.

Parameters Used in Delineation Model – For Boones Park Well #3

Delineation Method: ☒ Analytical ☐ Calculated Fixed Radius ☐ Enhanced CFR
☐ Numerical ☐ Hydrogeologic Mapping ☐ Analytic Element

Pump Rate[1] (Q in gpm): 38.2 gpm (7,352 ft^3/day) for Boones Park Well #3

Source: ☐ System ☒ Water Resources Dept ☐ Comparable Community
☐ Pump Capacity ☐ Population Estimate ☐ 90% of Safe Yield

Nature of the Aquifer: ☐ Unknown ☐ Unconfined
☐ Semi-confined ☒ Confined

Aquifer name: Basalt layers of the Columbia River Basalt group.
Confining Unit lithology: Multiple clay layers between 84 and 263 feet
Depth to Confining Unit: 84 feet
Confining Unit thickness: Total combined thickness of 97 feet
Depth to Aquifer: 272 feet

Aquifer Characteristics:
Lithology:
☐ Unknown ☐ Sandy Silt ☒ Layered Volcanic Rocks
☐ Sand ☐ Sand & Gravel ☐ Fractured Volcanic Rocks
☐ Gravel ☐ Cobbles/Gravel ☐ Fractured Sedimentary Rocks
☐ Other: _____

Thickness (b): 23 feet

Effective Porosity (n): 0.15

Hydraulic Conductivity (Permeability): Used average of 24 ft/day
☐ Estimated from lithology ☒ Specific Capacity (Well Report)
☐ Published Report ☐ Aquifer Test

Hydraulic Gradient: 0.005 Flow Direction: 160° +/- 20°
☒ Published Report ☐ Graphical Solution ☐ Estimate
☐ Field Measurements ☐ Model Results

Other High Capacity Wells Accounted for: None

1. Groundwater models used do not allow for variable pump rates, e.g., pumps turning off and on. Therefore, we must calculate an average continuous pump rate over a 24-hour period. Pump rate, therefore, represents average daily use of highest three months divided by 1440 minutes/day to obtain gallons/minute value.