

Source Water Assessment for
Lake O'The Hills
Anchorage, Alaska

A Hydrogeologic Susceptibility and Vulnerability Analysis

DRINKING WATER PROTECTION PROGRAM REPORT 155

November 2001

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Anchorage, Alaska

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Source Water Assessment for Lake O’The Hills Sources of Public Drinking Water, Anchorage, Alaska

A Hydrogeologic Susceptibility and Vulnerability Analysis

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Drinking Water Protection Program Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The Public Water System for Lake O’The Hills is a Class A (community) water system consisting of two wells in the Anchorage area. Identified potential and current sources of contaminants for Lake O’The Hills include: residential septic systems, dirt or gravel roads, activities associated with parks and recreation trails, approximately 224 acres of residential area, and a public utility corridor. These identified potential and existing sources of contamination are considered sources of bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, synthetic organic chemicals, and other organic chemicals. Overall, the public water sources for Lake O’The Hills received a vulnerability rating of **Low** for bacteria and viruses, volatile organic chemicals, heavy metals, synthetic organic chemicals, and other organic chemicals; and **Medium** for nitrates and/or nitrites.

INTRODUCTION

The purpose of this environmental assessment is to provide public water system owners and/or operators, communities, and local governments with information they can use to preserve the quality of Alaska’s public drinking water supplies. This assessment was completed for the sources of public drinking water serving Lake O’The Hills. This water system consists of two wells in the Anchorage area (see Figure 1). This assessment, known under the Alaska Drinking Water Protection Program as the *Source Water Assessment*, has combined a review of the natural hydrogeologic sensitivity with potential and existing contaminant risks to arrive at an overall vulnerability of the drinking water sources to contamination. This assessment has been completed as a basis for local voluntary protection efforts and to assist agencies in their efforts to reduce risk to this public drinking water supply.

DESCRIPTION OF THE ANCHORAGE AREA, ALASKA

Location

Anchorage, located in southcentral Alaska, encompasses 1,698 square miles of land and 264 square miles of water. The area containing a majority of the urban development, commonly referred to as the Anchorage Bowl, encompasses approximately 180 square miles [Partick, Brabets, and Glass, 1989] and envelopes the low lands of the area. This area is bounded on the east by the Chugach Mountains and the north, west, and south by the Knik and Turnagain Arms of Cook Inlet (Figure 1). In recent times, urban development has extended eastward along the flanks of the Chugach Mountains. This area, known locally as the Anchorage Hillside, contains development at elevations exceeding 3,700 feet in elevation above sea level.



Figure 1. Index map showing the location of Anchorage, Alaska

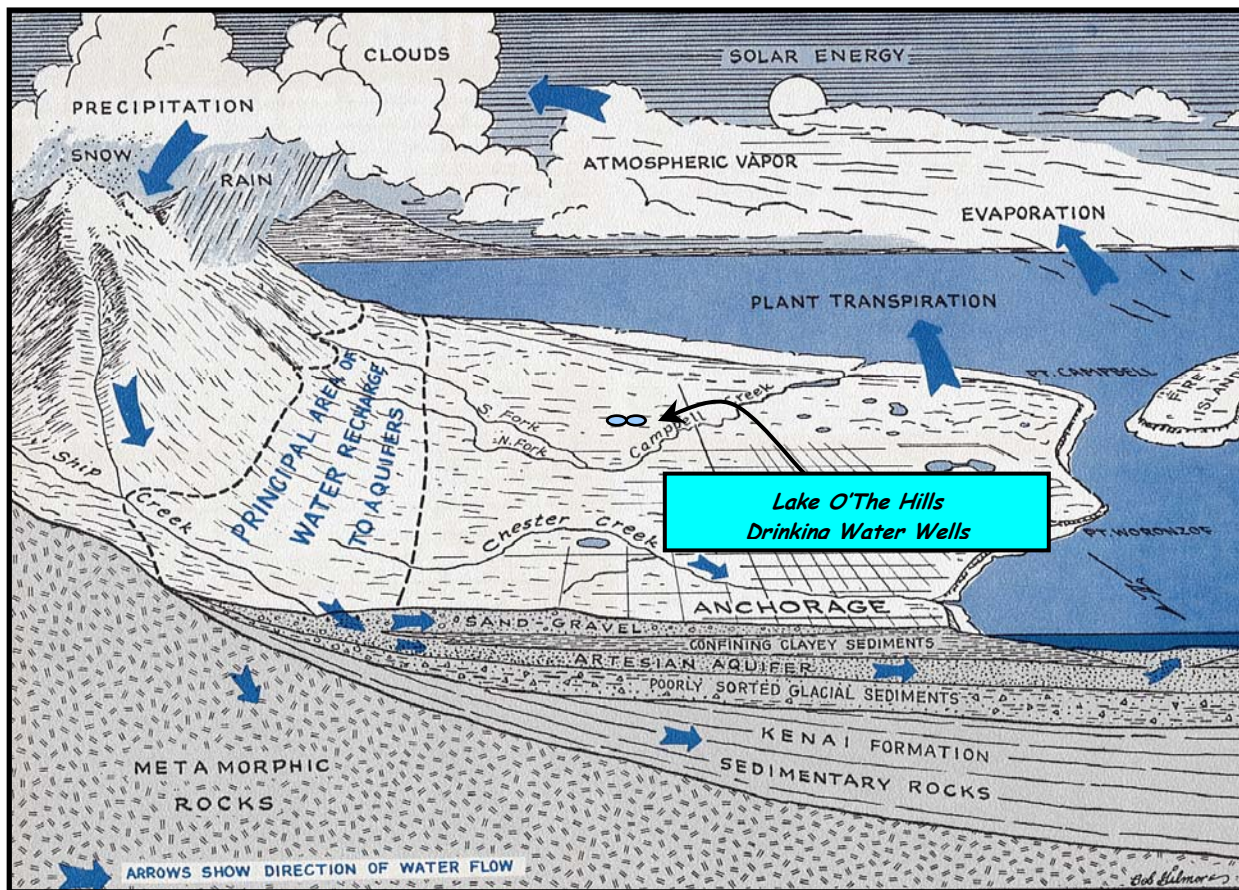


Figure 2. Generalized hydrologic cycle in the Anchorage area [Barnwell, George, Dearborn, Weeks, and Zenone, 1972].

Climate

The Anchorage area climate is somewhat transitional in that it does not experience large daily and annual temperature fluctuations like those experienced in the interior of Alaska nor does it experience high amounts of precipitation typified by gulf coast regions. Mean annual precipitation at the Anchorage International Airport is approximately 16 inches per year. On average, Anchorage receives a total snow accumulation of 69 inches per year. Precipitation generally increases inland toward the Chugach Mountains where annual precipitation may exceed 160 inches per year [Barnwell, George, Dearborn, Weeks, and Zenone, 1972]. Mean daily temperature ranges from 65° F during July to 8° F in January [Western Regional Climate Center, 2000].

Physiography and Groundwater Conditions

Surface elevations in the Anchorage area range from sea level at Knik and Turnagain Arms to well over 5,000 feet in the peaks that bound the area. Glacial moraine and outwash deposits primarily mantle the surface of the Anchorage Bowl.

The backbone of the Chugach Mountains is composed

primarily of metamorphic marine and volcanic rocks (bedrock). These high peaks that bound Anchorage's east-side are flanked with colluvium or slope deposits. These slope deposits eventually grade into the glacial and stream deposits at lower elevations in the Anchorage Bowl.

In the Anchorage area, two principal groundwater flow systems or aquifers exist (see Figure 2). The upper unconfined aquifer or water-table aquifer is separated from a lower confined aquifer system by layers of silty, clayey glacially derived sediments (confining layer) [Ulery and Updike, 1983]. The lower confined aquifer system consists of a series of hydrologically interconnected layers and lenses of gravel, sand and silt that, collectively, form the confined aquifer. The confining layer ranges from 0 to 270 feet thick throughout the Anchorage area and generally thins with increasing distance from Cook Inlet, thus pinching out at the mountain front [Patrick, Brabets, and Glass, 1989].

Water enters or recharges these two aquifer systems in several different ways. Along the front of the Chugach

Mountains, groundwater seeps from fractures in bedrock into the sediments. At these higher elevations, rain and snowmelt also enters the sediments. This area along the mountain front is considered the principal recharge area for wells in the Anchorage area. Precipitation in the low lands may also percolate directly into the ground. Lastly, aquifers may also be recharged by streams where surface water percolates into surrounding permeable sediments (losing reaches of streams). Groundwater flow in the confined aquifer is generally east to west from the mountain front toward Cook Inlet and Turnagain Arm, except in areas where the direction of flow is influenced by large municipal or industrial production wells. The direction of groundwater flow in the upper unconfined aquifer is more variable due to the influence from surficial topography as well as its close connection with surface water bodies.

LAKE O'THE HILLS PUBLIC DRINKING WATER SYSTEM

Lake O'The Hills public water system is a Class A

(community) water system, which is owned and operated by Lake O'The Hills Homeowners Association, of Anchorage. The system consists of two wells, which are located off of Mountain Lake Drive (Tract B, NE1/4, Sec. 23 T12 N R3W) at an elevation of approximately 575 feet above sea level (see Figure 3).

According to the most recent Monitoring Waiver Application (12/28/95) the wells are protected by a pumphouse. The land surface slopes away from the wells and according to the most recent Sanitary Survey (2/4/91) the wells were installed properly, each with a sanitary seal, which may provide protection against contaminants from entering the source waters at the well casings. Well #1 was installed July 10, 1981 to a total depth of 154 feet below ground surface and completed in a 5" well casing. According to the well log the well was screened from 149 to 154 feet below land surface. Well #2 was installed September 24, 1981 to a total depth of 147 feet below land surface and completed in a 6" well casing. According to the well log the well was screened from 139 to 144 feet below land surface. It is not indicated

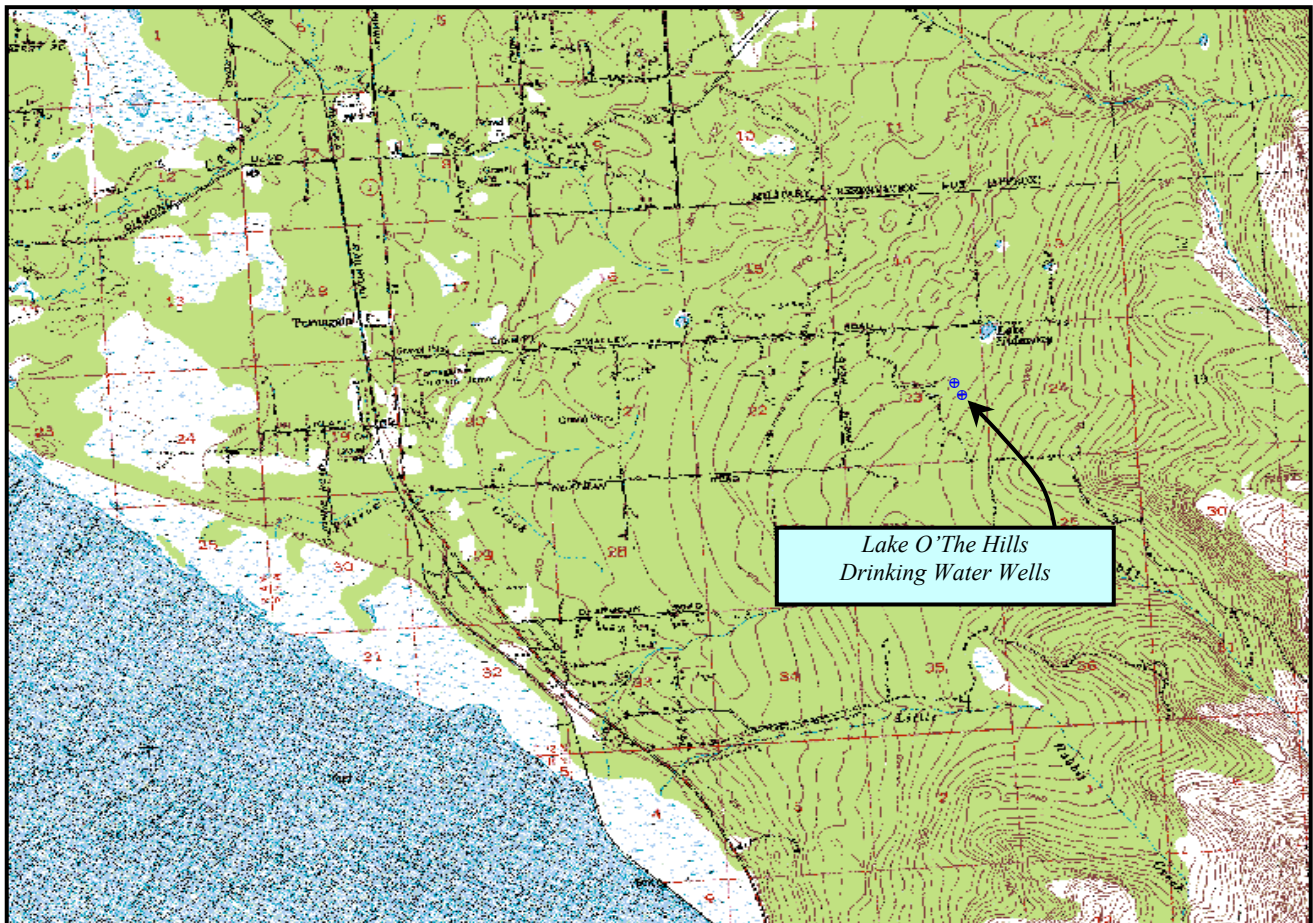


Figure 3. Map showing the location of the drinking water sources for Lake O'The Hills [Base: USGS Anchorage A8].

whether the wells were properly grouted at the time of drilling. Proper grouting provides added protection against contaminants travelling along the well casing and into source waters.

This system operates year round and serves 54 residents through 16 service connection.

ASSESSMENT AND PROTECTION AREA FOR LAKE O'THE HILLS DRINKING WATER SOURCES

The Drinking Water Protection and Assessment Area that has been established for Lake O'The Hills sources of drinking water is the area that is most sensitive to contamination. This area has served as a basis for assessing the risk of the drinking water sources to contamination. The zones around the drinking water sources outline the most critical area for the preservation of the quality of the drinking water for this system. For simplicity, this area will be known as your Drinking Water Protection Area and will serve as the focus for voluntary protection efforts.

Conceptually, groundwater enters the aquifer systems along the front range of the Chugach Mountains (Figure 2) and flows toward Cook Inlet. An analytical calculation was used to calculate the size and shape of the area that contributes water to the well. The input parameters describing the attributes of the aquifer in this calculation were adopted from the U.S. Geological Survey [*Patrick, Brabets, and Glass, 1989*]. This analytical calculation was used as a guide as the first step in establishing the protection area for each public drinking water source in Anchorage. Additional methods were further employed to take into account any uncertainties in groundwater flow and aquifer characteristics to arrive at meaningful and conservative protection areas with respect to public health (Please refer to the Guidance Manual for Class A Public Water Systems for additional information).

The Drinking Water Protection Areas established for wells by the Alaska Department of Environmental Conservation are separated into zones. These zones correspond to a time-of-travel. Time-of-travel is the time required for water to move in the saturated zone of the ground from a specific point to the well. The Drinking Water Protection Area for Lake O'The Hills contains four zones, Zone A through Zone D (See Map 1 in Appendix A). Zone A corresponds to the area between the wells and the distance equal to ¼ of the distance of the 2-year time-of-travel. Depending on where a contaminant source is located within Zone A, travel time for a contaminant to the wells may be on the order of several days to several hours. Zone A also extends downgradient from the wells to take into account the area of the aquifer that is

influenced by pumping of the wells. Zone B corresponds to a time-of-travel of less than two years. Zones C and D correspond to those areas between 5 years and 10 years time-of-travel, respectively.

INVENTORY OF POTENTIAL AND EXISTING CONTAMINANT SOURCES

The Drinking Water Protection Program has completed an inventory of potential and existing sources of contamination within the Drinking Water Protection Area for Lake O'The Hills. This survey was completed through a search of agency records and other publicly available information. Potential sources of contamination to drinking water supplies cover a wide range of categories and types. Potential drinking water contaminants are found within agricultural, residential, commercial, and industrial areas, but can also occur within areas that have little or no development.

For the basis of this assessment and all Class A public water system assessments, six categories of drinking water contaminants were inventoried. They include:

- Bacteria and viruses;
- Nitrates and/or nitrites;
- Volatile organic chemicals;
- Heavy metals, cyanide, and other inorganic chemicals;
- Synthetic organic chemicals; and
- Other organic chemicals.

Maps 2 through 5 in Appendix C depict the Contaminant Source Inventory for Lake O'The Hills. Table 1 in Appendix B lists the inventoried potential sources of contamination within Zones A through D. Below is a summary of the contaminant sources inventoried within the Drinking Water Protection Area for Lake O'The Hills:

- Residential septic systems;
- dirt or gravel roads;
- activities associated with parks and recreation trails;
- approximately 224 acres of residential area;
- a public utility corridor.

These potential and existing contaminant sources present risk for all six categories of drinking water contaminants for Lake O'The Hills sources of public drinking water.

RANKING OF CONTAMINANT RISKS

Potential and existing sources of contamination have been identified, sorted, and ranked according to what type and level of risk they represent. Ranking of contaminant risks for a “potential” or “existing” source of contamination is a function of toxicity and volumes of specific contaminants associated with that source. Contaminant risks are further a function of the number and density of those types of contaminant sources as well as the proximity of those sources to the public drinking water wells.

VULNERABILITY OF LAKE O’THE HILLS DRINKING WATER SOURCES

Vulnerability of a drinking water source to contamination is a combination of two factors:

- natural susceptibility; and
- contaminant risks.

Each of the six categories of drinking water contaminants have been analyzed and an overall vulnerability score of 0 to 100 ultimately assigned:

$$\begin{array}{r}
 \text{Natural Susceptibility (0 – 50 points)} \\
 + \\
 \text{Contaminant Risks (0 – 50 points)} \\
 = \\
 \text{Vulnerability of the} \\
 \text{Drinking Water Source to Contamination (0 – 100).}
 \end{array}$$

A score for the Natural Susceptibility is achieved by analyzing the properties of the well and the aquifer.

$$\begin{array}{r}
 \text{Susceptibility of the Wellhead (0 – 25 Points)} \\
 + \\
 \text{Susceptibility of the Aquifer (0 – 25 Points)} \\
 = \text{Natural Susceptibility (Susceptibility of the Well)} \\
 \text{(0 – 50 Points)}
 \end{array}$$

Based on the information gathered from well logs, the wells serving Lake O’The Hills were completed in a confining aquifer. The depth to the top of the confining unit is approximately 40 feet below land surface. The thickness of the confining layer is suspected to be approximately 60 feet and composed of silty clay, gravelly hardpan with intermittent layers of gravelly clay. This confining layer may provide a protective barrier against the movement of contaminants in the subsurface.

However, near the base of the Chugach Mountains, these clay layers tend to be discontinuous and thin toward the mountains. Therefore, contaminants that enter the subsurface near the base of the mountains may enter the confined aquifer uninhibited by the absence of any protective layer.

Combining the susceptibility of the wellhead and the aquifer to contamination leads to a score (0 – 50 points) and rating of overall Susceptibility of the well to contamination (See Appendix D). Table 1 depicts the overall Susceptibility score and rating for the sources of public drinking water serving Lake O’The Hills.

Table 1. Natural Susceptibility - Susceptibility of the Wellheads and Aquifer to Contamination

	Score	Rating
Susceptibility of the Wellheads	5	Low
Susceptibility of the Aquifer	8	Low
Natural Susceptibility	13	Low

Contaminant risks to a drinking water source depend on the type, number or density, and distribution of contaminant sources. A score (0 – 50 points) and rating of Contaminant Risks (See Appendix D) is assigned based on the findings of the Contaminant Source Inventory (See Appendix B - Table 1 – Table 7). This portion of the analysis examines any existing or historical contamination that has been detected at the drinking water sources through routine sampling. It also reviews contamination that has or may have occurred but has not arrived or been detected at the either well. Table 2 summarizes the Contaminant Risks for each category of drinking water contaminants.

Table 2. Contaminant Risks

Contaminant Risks	Score	Rating
Bacteria and Viruses	22	Medium
Nitrates and/or Nitrites	27	Medium
Volatile Organic Chemicals	12	Low
Heavy Metals, Cyanide, And Other Inorganic Chemicals	12	Low
Synthetic Organic Chemicals	12	Low
Other Organic Chemicals	12	Low

Appendix D contains fourteen charts, which together form the ‘Vulnerability Analysis’ for a Class A public drinking water system. Chart 1 analyzes the ‘Susceptibility of the Wellhead’ to contamination by looking at the construction of the well and its surrounding area. Chart 2 analyzes the ‘Susceptibility of the Aquifer’ to contamination by looking at the naturally occurring attributes of the water source and influences on the groundwater system that might lead to contamination. Chart 3 analyzes ‘Contaminant Risks’ for the drinking water source with respect to bacteria and viruses. The ‘Contaminant Risks’ portion of the analysis considers potential sources of contaminants as well as a review of contamination that has or may have occurred but has not arrived or been detected at the well. Lastly, Chart 4 contains the ‘Vulnerability Analysis for Bacteria and Viruses’. Charts 5 through 14 contain the Contaminant Risks and Vulnerability Analysis for nitrates and nitrites, volatile organic chemicals, heavy metals, synthetic organic chemicals, and other organic chemicals, respectively.

Vulnerability of the drinking water sources to contamination is the combination of susceptibility of the aquifer and the well with contaminant risks. Table 3 contains the overall vulnerability scores (0 – 100) and ratings for each of the six categories of drinking water contaminants (See Appendix D). Note: scores are rounded off to the nearest five.

Table 3. Overall Vulnerability of Lake O’The Hills Public Drinking Water Sources to Contamination by Category

Category	Score	Rating
Bacteria and Viruses	35	Low
Nitrates and Nitrites	40	Medium
Volatile Organic Chemicals	25	Low
Heavy Metals, Cyanide, and Other Inorganic Chemicals	25	Low
Synthetic Organic Chemicals	25	Low
Other Organic Chemicals	25	Low

Tables 2 through 7 in Appendix B contain the ranking of potential and existing sources of contamination with respect to bacteria and viruses, nitrates and/or nitrites, heavy metals, synthetic organic chemicals, and other organic chemicals, respectively.

Overall, contaminant risks for bacteria and viruses are medium with the density of residential areas and residential septic systems driving the increase of contaminant risks. Combining this potential bacteria and viruses contamination risk with the natural susceptibility of the well leads to an overall vulnerability to contamination of low.

Other low potential and existing sources of contamination for bacteria and viruses include activities associated with parks and recreation trails and dirt or gravel roads.

Historical sampling data indicates that no nitrates and/or nitrites have been detected in Lake O’The Hills source waters (See Chart 5 – Contaminant Risks for Nitrates and/or Nitrites in Appendix D). Overall, contaminant risks for nitrates and/or nitrites are medium with the density of residential areas and residential septic systems driving the increase of contaminant risks. Combining this potential nitrates and/or nitrites contamination risk with the natural susceptibility of the well leads to an overall vulnerability to contamination of medium.

Other low potential and existing sources of nitrates and/or nitrites for Lake O’The Hills source waters include activities associated with parks and recreation trails, and dirt or gravel roads.

Overall, contaminant risk for volatile organic chemicals is low with dirt or gravel roads and residential septic

systems driving the increase of contaminant risks. Combining this potential volatile organic chemical contamination risk with the natural susceptibility of the well leads to an overall vulnerability to contamination of low.

Other low potential and existing sources of volatile organic chemicals include activities associated with residential areas and a public utility easement corridor.

A natural gas pipeline transverses the Zone B Protection Area. Natural gas does not pose a threat to drinking water supplies. However, this area is an active public utility corridor. This utility corridor, though not heavily used represents a very low contamination risk from volatile organic chemicals due to activities along the corridor. Overall, this corridor ranks as a low potential source of contamination due to its proximity to Lake O’The Hills sources of public drinking water.

Overall, contaminant risks for heavy metals, cyanide and other inorganic chemicals is low with dirt or gravel roads, residential septic systems and residential areas driving the increase of potential contaminant risks. Combining this potential contaminant risk with the natural susceptibility of the well leads to an overall vulnerability to contamination of low.

Overall, contaminant risks for synthetic organic chemicals and other organic chemicals is low with dirt or gravel roads and residential septic systems driving the increase of potential contaminant risks for both categories. Combining this potential contaminant risk with the natural susceptibility of the well leads to an overall vulnerability to contamination of low.

Other low potential sources of contamination for synthetic organic chemicals and other organic chemicals include activities associated with residential areas.

SUMMARY

A *Source Water Assessment* has been completed for the sources of public drinking water serving Lake O’The Hills. The overall vulnerability of this source to contamination is **Low** for bacteria and viruses, volatile organic chemicals heavy metals, synthetic organic chemicals, and other organic chemicals and **Medium** for nitrates and/or nitrites. This assessment of contaminant risks can be used as a foundation for local voluntary protection efforts as well as a basis for the continuous efforts on the part of Lake O’The Hills to protect public health. It is anticipated that *Source Water Assessments* will be updated every five years to reflect any changes in the vulnerability and/or susceptibility of Lake O’The Hills ’s public drinking water source.

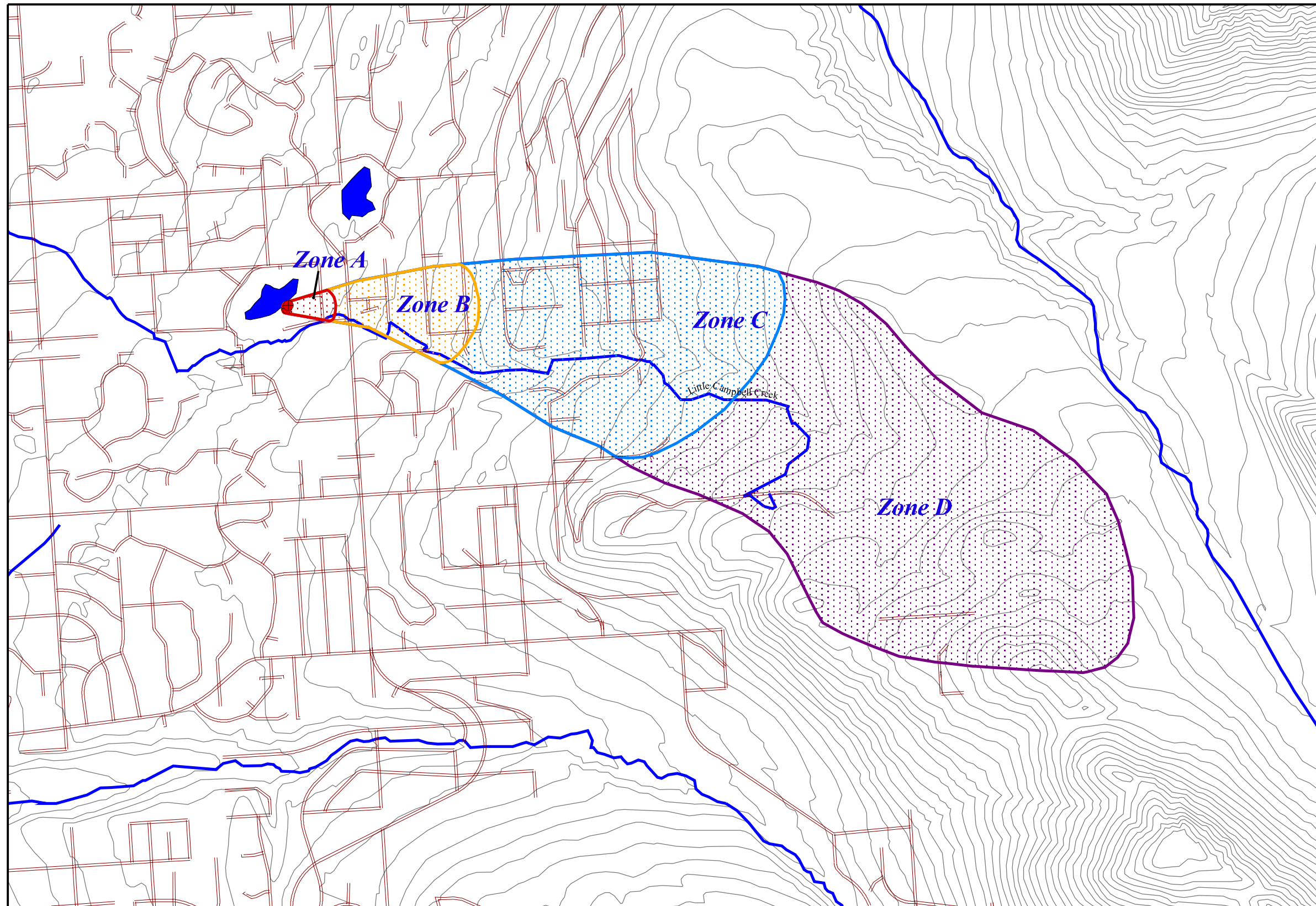
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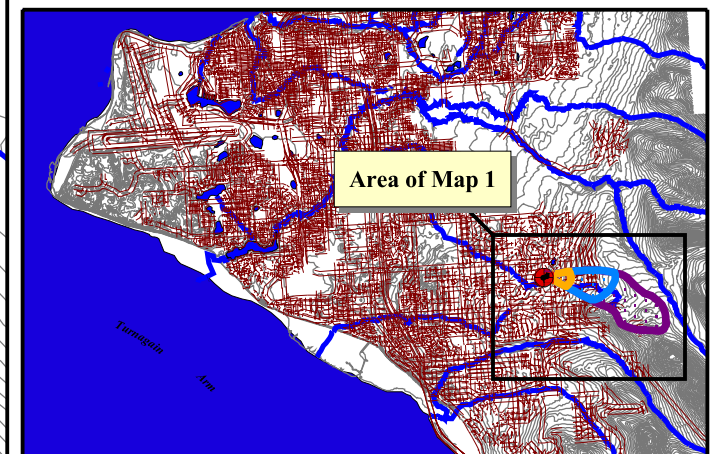
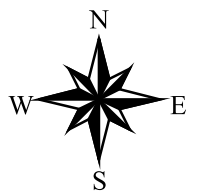
APPENDIX A

Lake O'The Hills Drinking Water Protection Area

Drinking Water Protection Area for Lake O'The Hills



- Lake O' The Hills Wells
- Zone A Protection Area**
 - ▨ Several Months Travel Time
- Zone B Protection Area**
 - ▨ Less Than 2 Years Travel Time
- Zone C Protection Area**
 - ▨ Less Than 5 Years Travel Time
- Zone D Protection Area**
 - ▨ Less Than 10 Years Travel Time
- ▨ MOA Roads
- Lakes and Ponds
- ▬ Streams
- ▬ Elevation Contours



5000 0 5000 Feet

PWSID 213603.001

Map 1

APPENDIX B

Contaminant Source Inventory and Risk Ranking for Lake O'The Hills

Table 1

**Contaminant Source Inventory for
Lake O'The Hills**

PWSID 213603.001

Contaminant Source Category	Contaminant Source ID	CD ID Tag	Zone	Location	Map	Comments
Residential Areas	R1	R1-1	A	6 acres	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	A	West of Mountain Lake Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-7	A	West of Mountain Lake Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-8	A	West of Hillside Drive	2	
Highways and roads, dirt/gravel	X24	X24-1	A	Mountain Lake Circle	3	
Highways and roads, dirt/gravel	X24	X24-2	A	Mountain Lake Drive	3	
Residential Areas	R1	R1-2	B	63 acres	4	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Corner of Hillside Drive and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-21	B	Along Alps Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Along Alps Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Along Chalet Road	2	

Table 1

**Contaminant Source Inventory for
Lake O'The Hills**

PWSID 213603.001

Septic systems (serves one or more single-family homes)	R2	R2-24	B	Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Corner of Hill and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Along Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Along Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-44	B	Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Along Hideaway Street	2	

Table 1

**Contaminant Source Inventory for
Lake O'The Hills**

PWSID 213603.001

Septic systems (serves one or more single-family homes)	R2	R2-46	B	Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-49	B	Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-50	B	Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-51	B	Corner of Klatt and Hideaway	2	
Septic systems (serves one or more single-family homes)	R2	R2-52	B	End of Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-53	B	Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-54	B	Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-56	B	Off of Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-57	B	Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-58	B	Corner of Klatt and Snowline	2	
Septic systems (serves one or more single-family homes)	R2	R2-59	B	Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-60	B	Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-61	B	Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-63	B	Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-64	B	Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-65	B	Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-67	B	Along Snowline Drive	2	
Highways and roads, dirt/gravel	X24	X24-10	B	Hideaway Drive	3	
Highways and roads, dirt/gravel	X24	X24-11	B	Klatt Road	3	
Highways and roads, dirt/gravel	X24	X24-12	B	Snowline Circle	3	

Table 1**Contaminant Source Inventory for
Lake O'The Hills****PWSID 213603.001**

Highways and roads, dirt/gravel	X24	X24-13	B	Snowline Circle	3	
Highways and roads, dirt/gravel	X24	X24-4	B	Hillside Drive	3	
Highways and roads, dirt/gravel	X24	X24-5	B	Alps Ave.	3	
Highways and roads, dirt/gravel	X24	X24-6	B	Chalet Place	3	
Highways and roads, dirt/gravel	X24	X24-7	B	Chalet Court	3	
Highways and roads, dirt/gravel	X24	X24-8	B	Hill Drive	3	
Highways and roads, dirt/gravel	X24	X24-9	B	Soldotna Drive	3	
Public utility easements/corridors	X42	X42-1	B	Along east side of Hillside Drive	3	
Dog walking areas/foot trails	X46	X46-1	B	Along west side of Hillside Drive	3	
Dog walking areas/foot trails	X46	X46-2	B	Along east side of Hillside Drive	3	
Residential Areas	R1	R1-3	C	127 acres	6	
Septic systems (serves one single-family home)	R2	R2's	C	155 septic systems within Zone C	4	
Septic systems (serves one single-family home)	R2	R2-68-223	C	Residential septic systems within Zone C.	4	
Highways and roads, dirt/gravel	X24	X24-14 -31	C	Gravel roads within Zone C	4	
Dog walking areas/foot trails	X46	X46-3	C	East side of Zone C	4	

Table 2

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Bacteria and Viruses**

PWSID 213603.001

Contaminant Source Type	Contaminant Source ID	CS ID Tag	Zone	Risk Ranking for Analysis	Overall Rank After Analysis	Location	Map Number	Comments
Septic systems (serves one or more single-family homes)	R2	R2-6	A	Very Low	1	West of Mountain Lake Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-7	A	Very Low	2	West of Mountain Lake Road	2	
Residential Areas	R1	R1-1	A	Low	3	6 acres	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	A	Very Low	4	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Very Low	5	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Very Low	6	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Very Low	7	West of Hillside Drive	2	
Residential Areas	R1	R1-2	B	Low	8	63 acres	4	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Very Low	9	Corner of Hillside Drive and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Very Low	10	Along Hillside Drive	2	
Highways and roads, dirt/gravel	X24	X24-1	A	Very Low		Mountain Lake Circle	3	
Highways and roads, dirt/gravel	X24	X24-2	A	Very Low		Mountain Lake Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Very Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Very Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Very Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Very Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Very Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-21	B	Very Low		Along Alps Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Very Low		Along Alps Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Very Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Very Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Very Low		Corner of Hill and Alps Street	2	

Table 2

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Bacteria and Viruses**

PWSID 213603.001

Septic systems (serves one or more single-family homes)	R2	R2-28	B	Very Low		Corner of Hill and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Very Low		Along Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Very Low		Along Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-44	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-49	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-50	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-51	B	Very Low		Corner of Klatt and Hideaway	2	
Septic systems (serves one or more single-family homes)	R2	R2-52	B	Very Low		End of Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-53	B	Very Low		Along Klatt Road	2	

Table 2

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Bacteria and Viruses**

PWSID 213603.001

Septic systems (serves one or more single-family homes)	R2	R2-54	B	Very Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-56	B	Very Low		Off of Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-57	B	Very Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-58	B	Very Low		Corner of Klatt and Snowline	2	
Septic systems (serves one or more single-family homes)	R2	R2-59	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-60	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-61	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-63	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-64	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-65	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-67	B	Very Low		Along Snowline Drive	2	
Highways and roads, dirt/gravel	X24	X24-10	B	Very Low		Hideaway Drive	3	
Highways and roads, dirt/gravel	X24	X24-11	B	Very Low		Klatt Road	3	
Highways and roads, dirt/gravel	X24	X24-12	B	Very Low		Snowline Circle	3	
Highways and roads, dirt/gravel	X24	X24-13	B	Very Low		Snowline Circle	3	
Highways and roads, dirt/gravel	X24	X24-4	B	Very Low		Hillside Drive	3	
Highways and roads, dirt/gravel	X24	X24-5	B	Very Low		Alps Ave.	3	
Highways and roads, dirt/gravel	X24	X24-6	B	Very Low		Chalet Place	3	
Highways and roads, dirt/gravel	X24	X24-7	B	Very Low		Chalet Court	3	
Highways and roads, dirt/gravel	X24	X24-8	B	Very Low		Hill Drive	3	
Highways and roads, dirt/gravel	X24	X24-9	B	Very Low		Soldotna Drive	3	
Dog walking areas/foot trails	X46	X46-1	B	Low		Along west side of Hillside Drive	3	
Dog walking areas/foot trails	X46	X46-2	B	Low		Along east side of Hillside Drive	3	
Residential Areas	R1	R1-3	C	Low		127 acres	6	
Septic systems (serves one single-family home)	R2	R2-68-223	C	Very Low		Residential septic systems within Zone C.	4	
Septic systems (serves one single-family home)	R2	R2's	C	Very Low		155 septic systems within Zone C	4	

Table 2

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Bacteria and Viruses**

PWSID 213603.001

Highways and roads, dirt/gravel	X24	X24-14 -31	C	Very Low		Gravel roads within Zone C	4	
Dog walking areas/foot trails	X46	X46-3	C	Low		East side of Zone C	4	

Table 3

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Nitrates/Nitrites**

PWSID 213603.001

Contaminant Source Type	Contaminant Source ID	CS ID Tag	Zone	Risk Ranking for Analysis	Overall Rank After Analysis	Location	Map Number	Comments
Residential Areas	R1	R1-1	A	Low	1	6 acres	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	A	Very Low	2	West of Mountain Lake Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-7	A	Very Low	3	West of Mountain Lake Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-8	A	Very Low	4	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Very Low	5	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Very Low	6	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Very Low	7	West of Hillside Drive	2	
Residential Areas	R1	R1-2	B	Low	8	63 acres	4	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Very Low	9	Corner of Hillside Drive and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Very Low	10	Along Hillside Drive	2	
Highways and roads, dirt/gravel	X24	X24-1	A	Very Low		Mountain Lake Circle	3	
Highways and roads, dirt/gravel	X24	X24-2	A	Very Low		Mountain Lake Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Very Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Very Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Very Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Very Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Very Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-21	B	Very Low		Along Alps Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Very Low		Along Alps Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Very Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Very Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Very Low		Along Hill Street	2	

Table 3

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Nitrates/Nitrites**

PWSID 213603.001

Septic systems (serves one or more single-family homes)	R2	R2-27	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Very Low		Corner of Hill and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Very Low		Corner of Hill and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Very Low		Along Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Very Low		Along Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-44	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-49	B	Very Low		Along Hideaway Street	2	

Table 3

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Nitrates/Nitrites**

PWSID 213603.001

Septic systems (serves one or more single-family homes)	R2	R2-50	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-51	B	Very Low		Corner of Klatt and Hideaway	2	
Septic systems (serves one or more single-family homes)	R2	R2-52	B	Very Low		End of Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-53	B	Very Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-54	B	Very Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-56	B	Very Low		Off of Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-57	B	Very Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-58	B	Very Low		Corner of Klatt and Snowline	2	
Septic systems (serves one or more single-family homes)	R2	R2-59	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-60	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-61	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-63	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-64	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-65	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-67	B	Very Low		Along Snowline Drive	2	
Highways and roads, dirt/gravel	X24	X24-10	B	Very Low		Hideaway Drive	3	
Highways and roads, dirt/gravel	X24	X24-11	B	Very Low		Klatt Road	3	
Highways and roads, dirt/gravel	X24	X24-12	B	Very Low		Snowline Circle	3	
Highways and roads, dirt/gravel	X24	X24-13	B	Very Low		Snowline Circle	3	
Highways and roads, dirt/gravel	X24	X24-4	B	Very Low		Hillside Drive	3	
Highways and roads, dirt/gravel	X24	X24-5	B	Very Low		Alps Ave.	3	
Highways and roads, dirt/gravel	X24	X24-6	B	Very Low		Chalet Place	3	
Highways and roads, dirt/gravel	X24	X24-7	B	Very Low		Chalet Court	3	
Highways and roads, dirt/gravel	X24	X24-8	B	Very Low		Hill Drive	3	

Table 3

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Nitrates/Nitrites**

PWSID 213603.001

Highways and roads, dirt/gravel	X24	X24-9	B	Very Low		Soldotna Drive	3	
Dog walking areas/foot trails	X46	X46-1	B	Low		Along west side of Hillside Drive	3	
Dog walking areas/foot trails	X46	X46-2	B	Low		Along east side of Hillside Drive	3	
Residential Areas	R1	R1-3	C	Low		127 acres	6	
Septic systems (serves one single-family home)	R2	R2-68-223	C	Very Low		Residential septic systems within Zone C.	4	
Septic systems (serves one single-family home)	R2	R2's	C	Very Low		155 septic systems within Zone C	4	
Highways and roads, dirt/gravel	X24	X24-14 -31	C	Very Low		Gravel roads within Zone C	4	
Dog walking areas/foot trails	X46	X46-3	C	Low		East side of Zone C	4	

Table 4

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Volatile Organic Chemicals**

PWSID 213603.001

Contaminant Source Type	Contaminant Source ID	CS ID Tag	Zone	Risk Ranking for Analysis	Overall Rank After Analysis	Location	Map Number	Comments
Highways and roads, dirt/gravel	X24	X24-1	A	Very Low	1	Mountain Lake Circle	3	
Highways and roads, dirt/gravel	X24	X24-2	A	Very Low	2	Mountain Lake Drive	3	
Highways and roads, dirt/gravel	X24	X24-4	B	Very Low	3	Hillside Drive	3	
Highways and roads, dirt/gravel	X24	X24-5	B	Very Low	4	Alps Ave.	3	
Highways and roads, dirt/gravel	X24	X24-6	B	Very Low	5	Chalet Place	3	
Highways and roads, dirt/gravel	X24	X24-7	B	Very Low	6	Chalet Court	3	
Residential Areas	R1	R1-1	A	Low	7	6 acres	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	A	Very Low	8	West of Mountain Lake Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-7	A	Very Low	9	West of Mountain Lake Road	2	
Residential Areas	R1	R1-2	B	Low	10	63 acres	4	
Septic systems (serves one or more single-family homes)	R2	R2-8	A	Very Low		West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Very Low		West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Very Low		West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Very Low		West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Very Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Very Low		Corner of Hillside Drive and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Very Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Very Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Very Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Very Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Very Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-21	B	Very Low		Along Alps Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Very Low		Along Alps Road	2	

Table 4

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Volatile Organic Chemicals**

PWSID 213603.001

Septic systems (serves one or more single-family homes)	R2	R2-23	B	Very Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Very Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Very Low		Corner of Hill and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Very Low		Corner of Hill and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Very Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Very Low		Along Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Very Low		Along Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-44	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Very Low		Along Hideaway Street	2	

Table 4

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Volatile Organic Chemicals**

PWSID 213603.001

Septic systems (serves one or more single-family homes)	R2	R2-46	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-49	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-50	B	Very Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-51	B	Very Low		Corner of Klatt and Hideaway	2	
Septic systems (serves one or more single-family homes)	R2	R2-52	B	Very Low		End of Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-53	B	Very Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-54	B	Very Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-56	B	Very Low		Off of Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-57	B	Very Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-58	B	Very Low		Corner of Klatt and Snowline	2	
Septic systems (serves one or more single-family homes)	R2	R2-59	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-60	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-61	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-63	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-64	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-65	B	Very Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-67	B	Very Low		Along Snowline Drive	2	
Highways and roads, dirt/gravel	X24	X24-10	B	Very Low		Hideaway Drive	3	
Highways and roads, dirt/gravel	X24	X24-11	B	Very Low		Klatt Road	3	
Highways and roads, dirt/gravel	X24	X24-12	B	Very Low		Snowline Circle	3	
Highways and roads, dirt/gravel	X24	X24-13	B	Very Low		Snowline Circle	3	
Highways and roads, dirt/gravel	X24	X24-8	B	Very Low		Hill Drive	3	

Table 4

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Volatile Organic Chemicals**

PWSID 213603.001

Highways and roads, dirt/gravel	X24	X24-9	B	Very Low		Soldotna Drive	3	
Public utility easements/corridors	X42	X42-1	B	Low		Along east side of Hillside Drive	3	
Residential Areas	R1	R1-3	C	Low		127 acres	6	
Septic systems (serves one single-family home)	R2	R2-68-223	C	Very Low		Residential septic systems within Zone C.	4	
Septic systems (serves one single-family home)	R2	R2's	C	Low		155 septics within Zone C	4	
Septic systems (serves one single-family home)	R2	R2's	C	Very Low		155 septics within Zone C	4	
Highways and roads, dirt/gravel	X24	X24-14 -31	C	Very Low		Gravel roads within Zone C	4	

Table 5

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals**

PWSID 213603.001

Contaminant Source Type	Contaminant Source ID	CS ID Tag	Zone	Risk Ranking for Analysis	Overall Rank After Analysis	Location	Map Number	Comments
Residential Areas	R1	R1-1	A	Low	1	6 acres	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	A	Low	2	West of Mountain Lake Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-7	A	Low	3	West of Mountain Lake Road	2	
Residential Areas	R1	R1-2	B	Low	4	63 acres	4	
Septic systems (serves one or more single-family homes)	R2	R2-8	A	Low	5	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Low	6	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Low	7	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Low	8	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Low	9	Corner of Hillside Drive and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Low	10	Along Hillside Drive	2	
Highways and roads, dirt/gravel	X24	X24-1	A	Very Low		Mountain Lake Circle	3	
Highways and roads, dirt/gravel	X24	X24-2	A	Very Low		Mountain Lake Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-21	B	Low		Along Alps Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Low		Along Alps Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Low		Along Hill Street	2	

Table 5

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals**

PWSID 213603.001

Septic systems (serves one or more single-family homes)	R2	R2-27	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Low		Corner of Hill and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Low		Corner of Hill and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Low		Along Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Low		Along Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-44	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-49	B	Low		Along Hideaway Street	2	

Table 5

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals**

PWSID 213603.001

Septic systems (serves one or more single-family homes)	R2	R2-50	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-51	B	Low		Corner of Klatt and Hideaway	2	
Septic systems (serves one or more single-family homes)	R2	R2-52	B	Low		End of Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-53	B	Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-54	B	Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-56	B	Low		Off of Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-57	B	Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-58	B	Low		Corner of Klatt and Snowline	2	
Septic systems (serves one or more single-family homes)	R2	R2-59	B	Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-60	B	Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-61	B	Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-63	B	Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-64	B	Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-65	B	Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-67	B	Low		Along Snowline Drive	2	
Highways and roads, dirt/gravel	X24	X24-10	B	Very Low		Hideaway Drive	3	
Highways and roads, dirt/gravel	X24	X24-11	B	Very Low		Klatt Road	3	
Highways and roads, dirt/gravel	X24	X24-12	B	Very Low		Snowline Circle	3	
Highways and roads, dirt/gravel	X24	X24-13	B	Very Low		Snowline Circle	3	
Highways and roads, dirt/gravel	X24	X24-4	B	Very Low		Hillside Drive	3	
Highways and roads, dirt/gravel	X24	X24-5	B	Very Low		Alps Ave.	3	
Highways and roads, dirt/gravel	X24	X24-6	B	Very Low		Chalet Place	3	
Highways and roads, dirt/gravel	X24	X24-7	B	Very Low		Chalet Court	3	
Highways and roads, dirt/gravel	X24	X24-8	B	Very Low		Hill Drive	3	

Table 5

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals**

PWSID 213603.001

Highways and roads, dirt/gravel	X24	X24-9	B	Very Low		Soldotna Drive	3	
Residential Areas	R1	R1-3	C	Low		127 acres	6	
Septic systems (serves one single-family home)	R2	R2-68-223	C	Very Low		Residential septic systems within Zone C.	4	
Septic systems (serves one single-family home)	R2	R2's	C	Very Low		155 septic systems within Zone C	4	
Highways and roads, dirt/gravel	X24	X24-14 -31	C	Very Low		Gravel roads within Zone C	4	

Table 6

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Synthetic Organic Chemicals**

PWSID 213603.001

Contaminant Source Type	Contaminant Source ID	CS ID Tag	Zone	Risk Ranking for Analysis	Overall Rank After Analysis	Location	Map Number	Comments
Residential Areas	R1	R1-1	A	Low	1	6 acres	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	A	Low	2	West of Mountain Lake Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-7	A	Low	3	West of Mountain Lake Road	2	
Residential Areas	R1	R1-2	B	Low	4	63 acres	4	
Septic systems (serves one or more single-family homes)	R2	R2-8	A	Low	5	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Low	6	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Low	7	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Low	8	West of Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Low	9	Corner of Hillside Drive and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Low	10	Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Low		Along Hillside Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-21	B	Low		Along Alps Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Low		Along Alps Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Low		Along Chalet Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Low		Corner of Hill and Alps Street	2	

Table 6

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Synthetic Organic Chemicals**

PWSID 213603.001

Septic systems (serves one or more single-family homes)	R2	R2-28	B	Low		Corner of Hill and Alps Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Low		Along Hill Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Low		Along Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Low		Along Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-44	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-49	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-50	B	Low		Along Hideaway Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-51	B	Low		Corner of Klatt and Hideaway	2	

Table 6

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Synthetic Organic Chemicals**

PWSID 213603.001

Septic systems (serves one or more single-family homes)	R2	R2-52	B	Low		End of Soldotna Street	2	
Septic systems (serves one or more single-family homes)	R2	R2-53	B	Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-54	B	Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-56	B	Low		Off of Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-57	B	Low		Along Klatt Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-58	B	Low		Corner of Klatt and Snowline	2	
Septic systems (serves one or more single-family homes)	R2	R2-59	B	Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-60	B	Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-61	B	Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-63	B	Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-64	B	Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-65	B	Low		Along Snowline Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-67	B	Low		Along Snowline Drive	2	
Residential Areas	R1	R1-3	C	Low		127 acres	6	
Septic systems (serves one single-family home)	R2	R2-68-223	C	Very Low		Residential septic systems within Zone C.	4	
Septic systems (serves one single-family home)	R2	R2's	C	Very Low		155 septic systems within Zone C	4	

Table 7

**Contaminant Source Inventory and Risk Ranking for
Lake O'The Hills
Sources of Other Organic Chemicals**

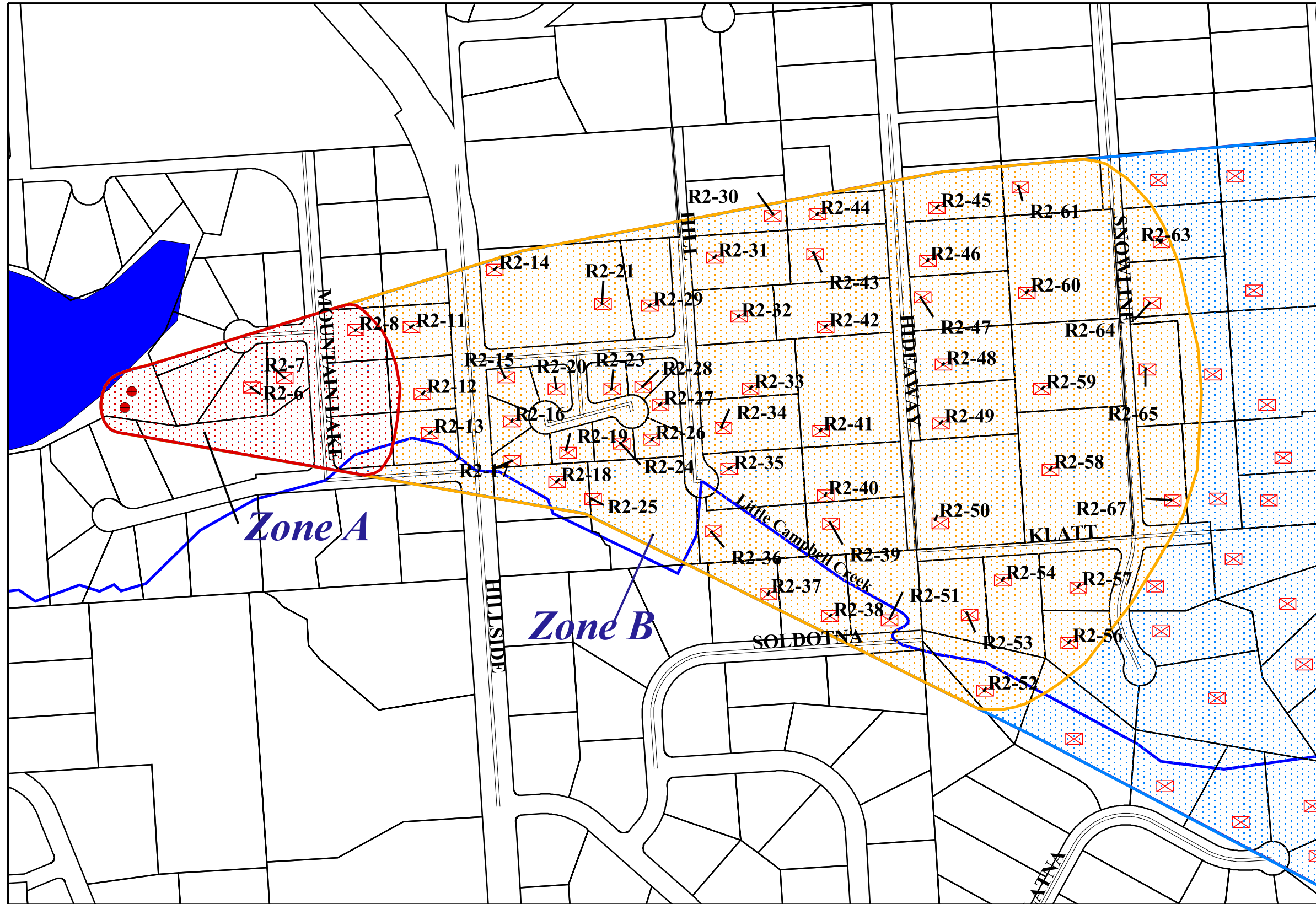
PWSID 213603.001

Contaminant Source Type	Contaminant Source ID	CS ID Tag	Zone	Risk Ranking for Analysis	Overall Rank After Analysis	Location	Map Number	Comments
Residential Areas	R1	R1-1	A	Low	1	6 acres	3	
Highways and roads, dirt/gravel	X24	X24-1	A	Very Low	2	Mountain Lake Circle	3	
Highways and roads, dirt/gravel	X24	X24-2	A	Very Low	3	Mountain Lake Drive	3	
Highways and roads, dirt/gravel	X24	X24-4	B	Very Low	4	Hillside Drive	3	
Highways and roads, dirt/gravel	X24	X24-5	B	Very Low	5	Alps Ave.	3	
Highways and roads, dirt/gravel	X24	X24-6	B	Very Low	6	Chalet Place	3	
Highways and roads, dirt/gravel	X24	X24-7	B	Very Low	7	Chalet Court	3	
Residential Areas	R1	R1-2	B	Low	8	63 acres	4	
Highways and roads, dirt/gravel	X24	X24-8	B	Very Low	9	Hill Drive	3	
Highways and roads, dirt/gravel	X24	X24-11	B	Very Low	10	Klatt Road	3	
Highways and roads, dirt/gravel	X24	X24-10	B	Very Low		Hideaway Drive	3	
Highways and roads, dirt/gravel	X24	X24-12	B	Very Low		Snowline Circle	3	
Highways and roads, dirt/gravel	X24	X24-13	B	Very Low		Snowline Circle	3	
Highways and roads, dirt/gravel	X24	X24-9	B	Very Low		Soldotna Drive	3	
Residential Areas	R1	R1-3	C	Low		127 acres	6	
Septic systems (serves one single-family home)	R2	R2-68-223	C	Very Low		Residential septic systems within Zone C.	4	
Septic systems (serves one single-family home)	R2	R2's	C	Very Low		155 septic systems within Zone C	4	
Highways and roads, dirt/gravel	X24	X24-14 -31	C	Very Low		Gravel roads within Zone C	4	

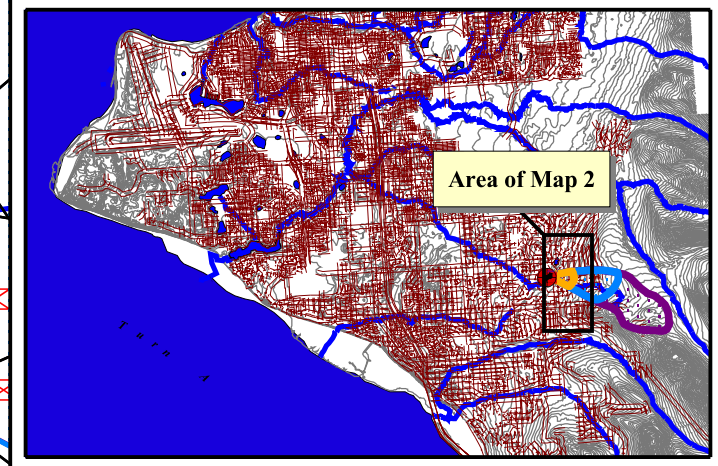
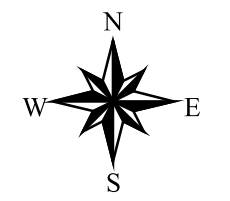
APPENDIX C

Lake O’The Hills Drinking Water Protection Area and Potential & Existing Contaminant Sources

Drinking Water Protection Area for Lake O'The Hills and Potential & Existing Sources of Contamination



- Lake O' The Hills Wells
- Zone A Protection Area
 - Several Months Travel Time
- Zone B Protection Area
 - Less Than 2 Years Travel Time
- Zone C Protection Area
 - Less Than 5 Years Travel Time
- Zone D Protection Area
 - Less Than 10 Years Travel Time
- MOA Land Parcels
- MOA Roads
- ⊗ Septics Systems
- State Parks
- Lakes and Ponds
- Streams

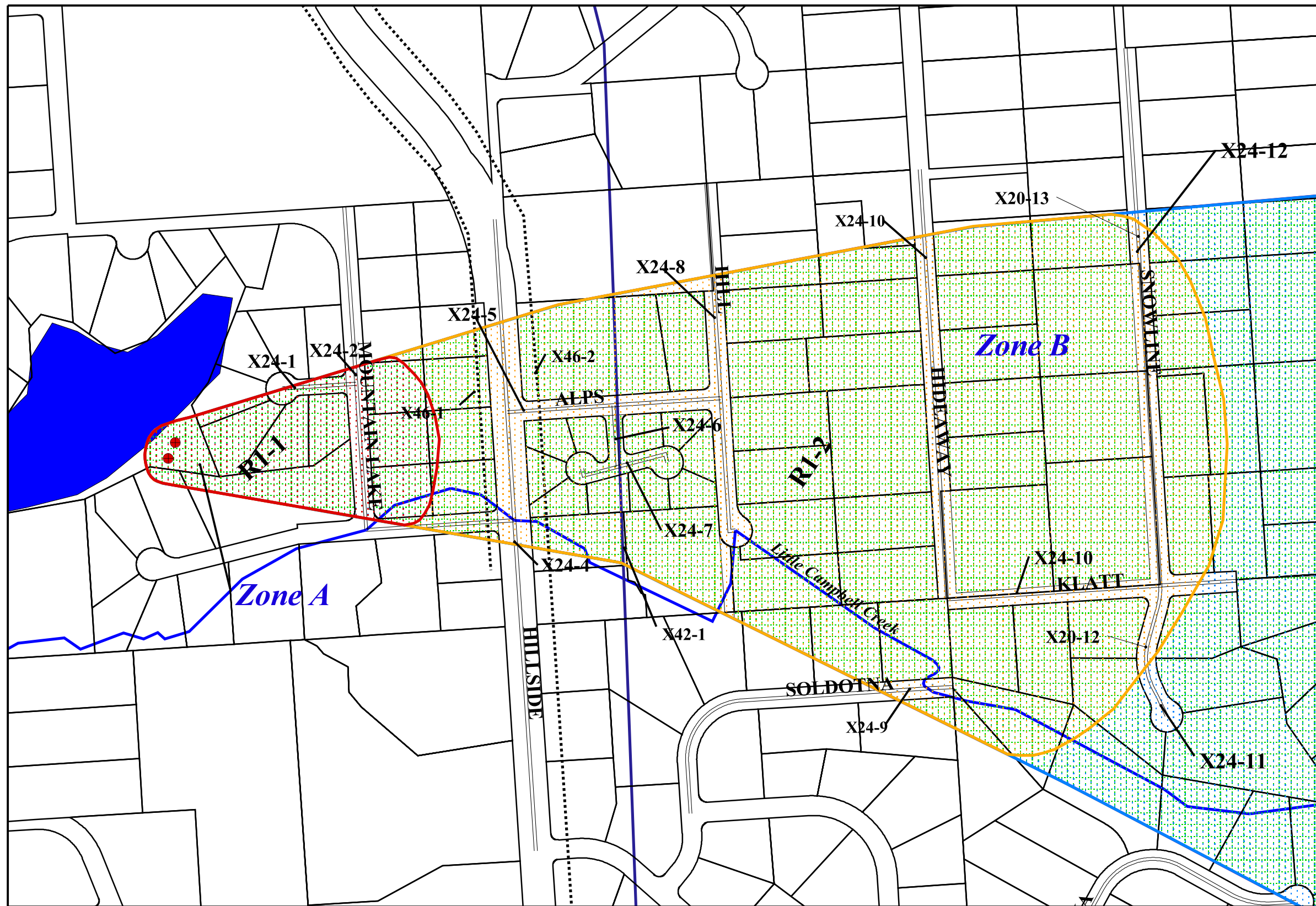


800 0 800 Feet

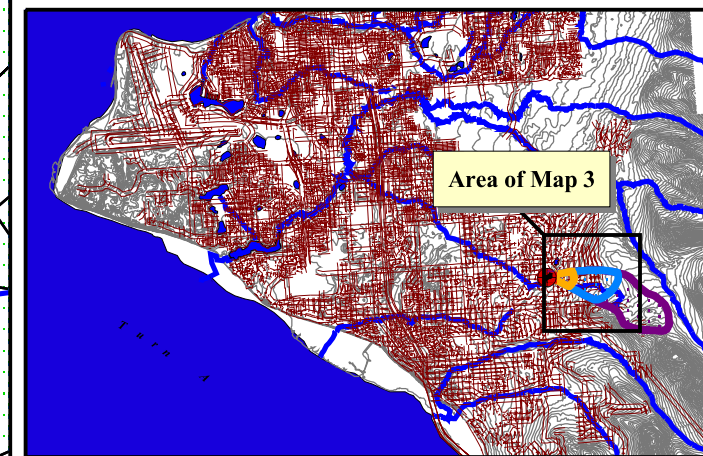
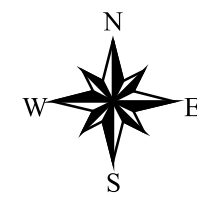
PWSID 213603.001

Map 2

Drinking Water Protection Area for Lake O'The Hills and Potential & Existing Sources of Contamination



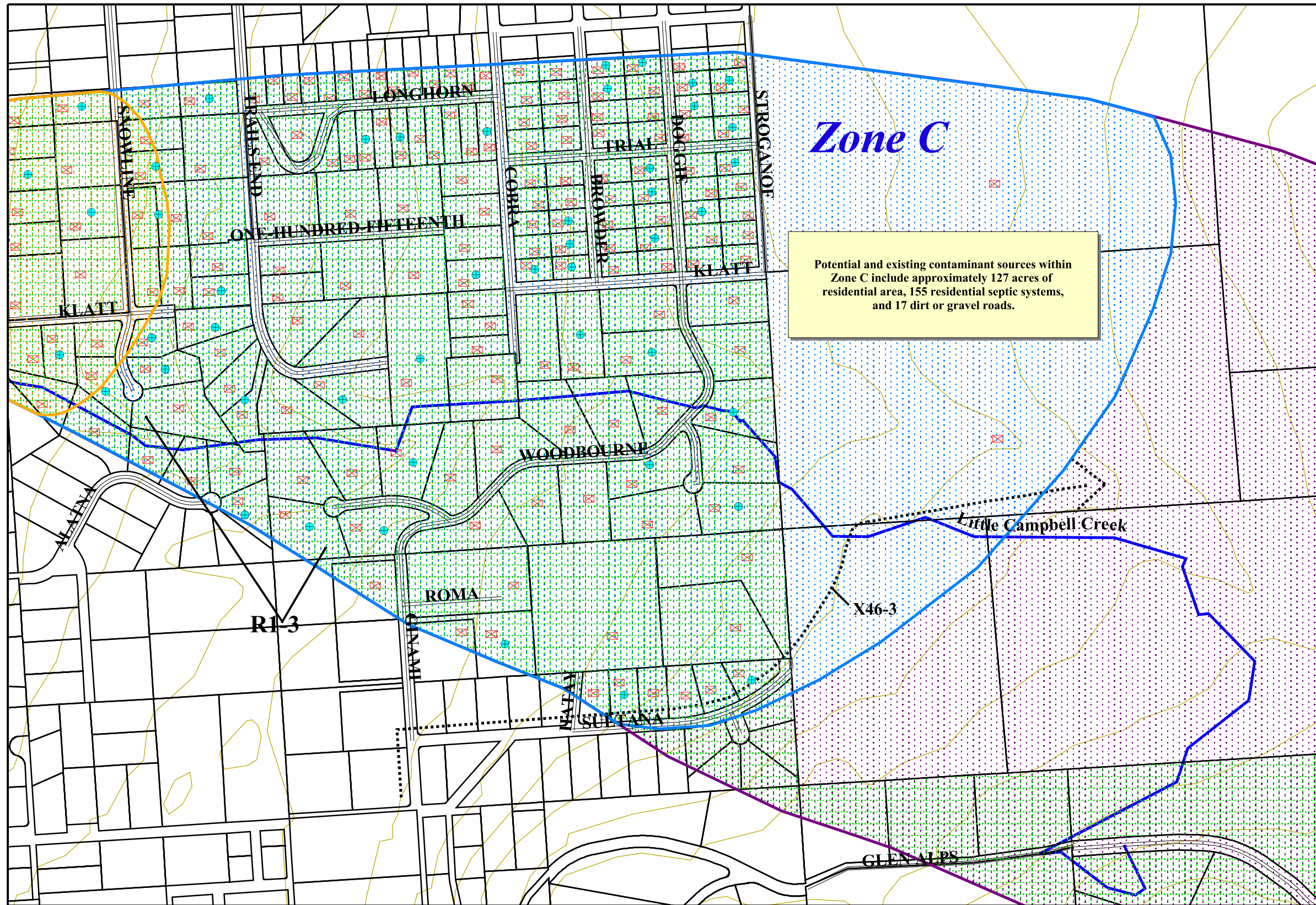
- Lake O' The Hills Wells
- Zone A Protection Area
- Several Months Travel Time
- Zone B Protection Area
- Less Than 2 Years Travel Time
- Zone C Protection Area
- Less Than 5 Years Travel Time
- Zone D Protection Area
- Less Than 10 Years Travel Time
- MOA Land Parcels
- MOA Roads
- 12" Pipline (X28)
- Trails (X46)
- Residential Areas (R1)
- Lakes and Ponds
- Streams



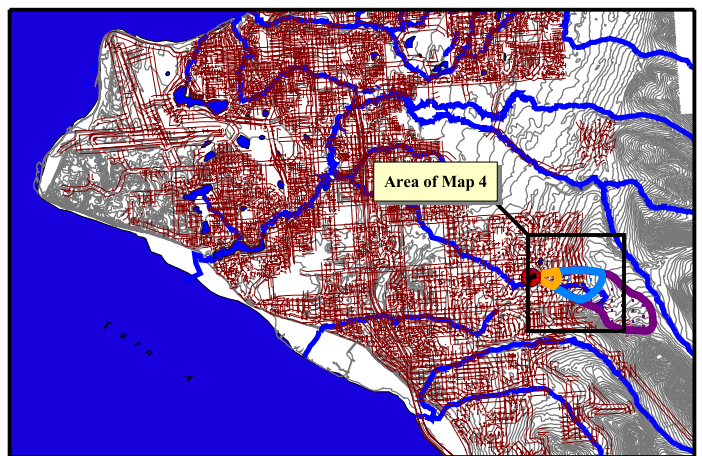
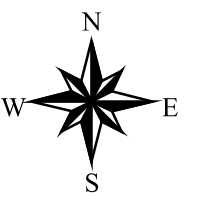
PWSID 213603.001

Map 3

Drinking Water Protection Area for Lake O'The Hills and Potential & Existing Sources of Contamination



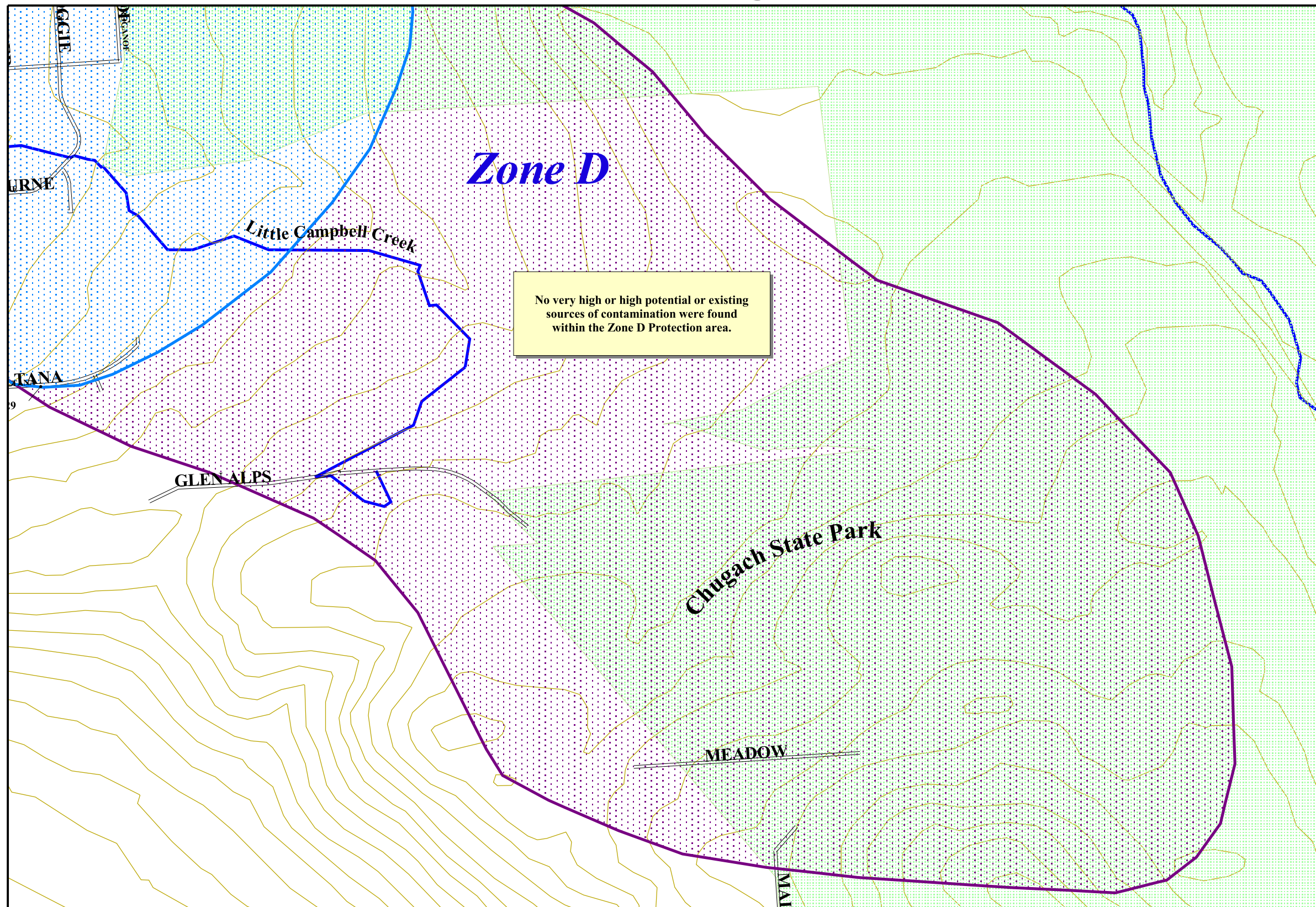
- Lake O' The Hills Wells
- Private Drinking Water Wells
- Zone A Protection Area
- ▨ Several Months Travel Time
- Zone B Protection Area
- ▨ Less Than 2 Years Travel Time
- Zone C Protection Area
- ▨ Less Than 5 Years Travel Time
- Zone D Protection Area
- ▨ Less Than 10 Years Travel Time
- ▨ MOA Roads
- ▨ Residential Areas (R1)
- ▨ Trails (X46)
- ▨ MOA Land Parcels
- ▨ Septics Systems
- ▨ Lakes and Ponds
- ▨ Streams
- ▨ Elevation Contours



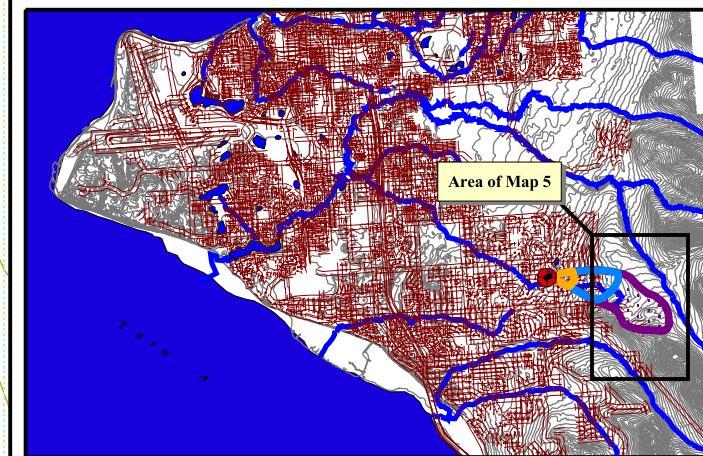
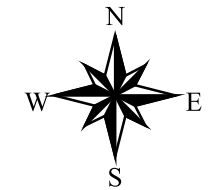
PWSID 213603.001

Map 4

Drinking Water Protection Area for Lake O'The Hills and Potential & Existing Sources of Contamination



- Lake O' The Hills Wells
- Zone A Protection Area
- Several Months Travel Time
- Zone B Protection Area
- Less Than 2 Years Travel Time
- Zone C Protection Area
- Less Than 5 Years Travel Time
- Zone D Protection Area
- Less Than 10 Years Travel Time
- ≡ MOA Roads (X20)
- Chugach State Park
- Elevation Contours
- Streams
- Lakes and Ponds



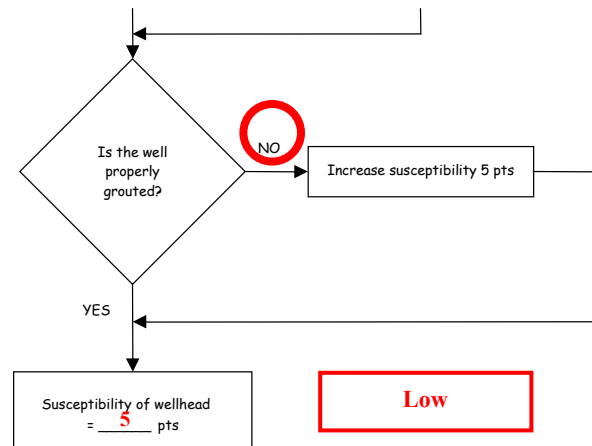
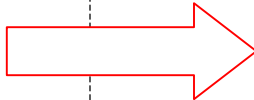
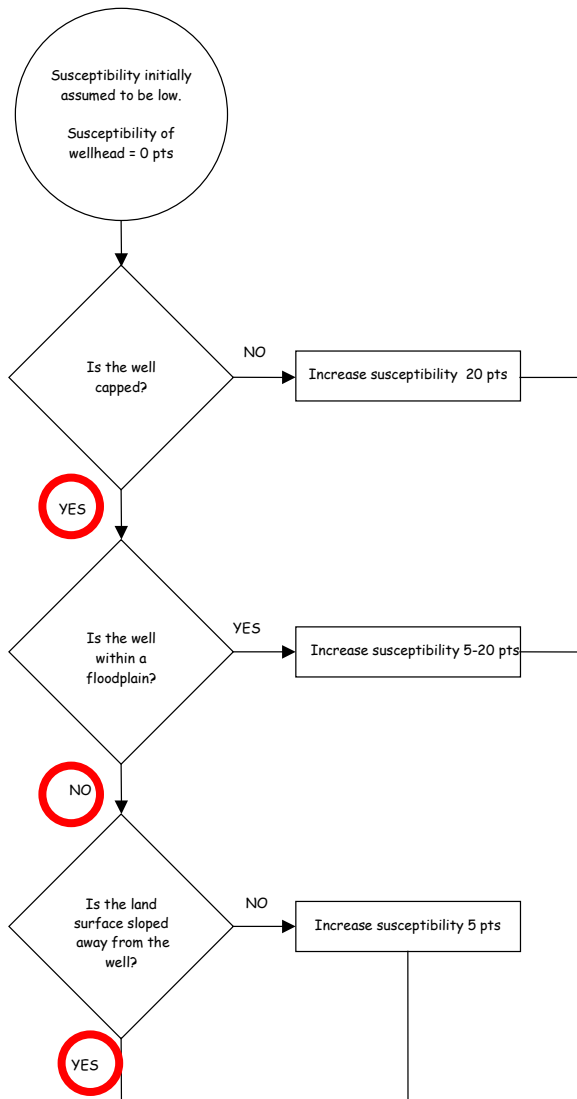
PWSID 213603.001

Map 5

APPENDIX D

Vulnerability Analysis for Lake O’The Hills Public Drinking Water Sources

Chart 1. Susceptibility of the wellhead – Lake O’The Hills Wells



<u>Wellhead Susceptibility Ratings</u>	
20 to 25 pts	very high
15 to < 20 pts	high
10 to < 15 pts	medium
< 10	low

Chart 2. Susceptibility of the aquifer – Lake O’The Hills Wells

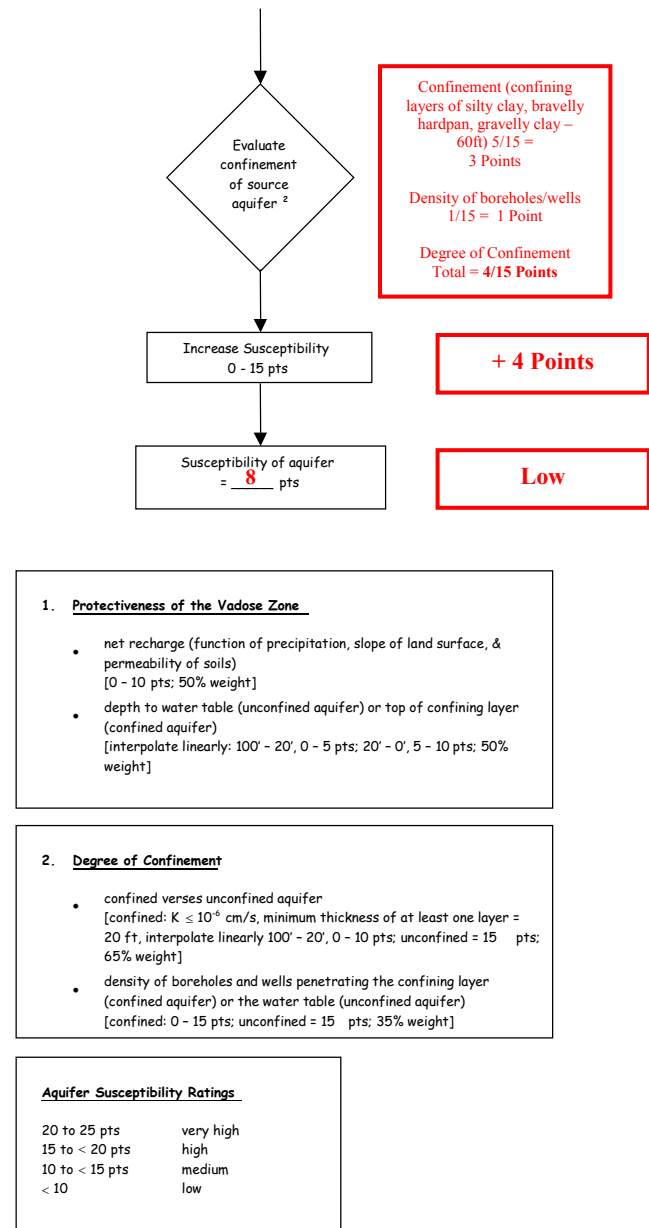
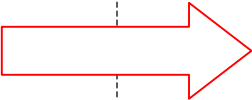
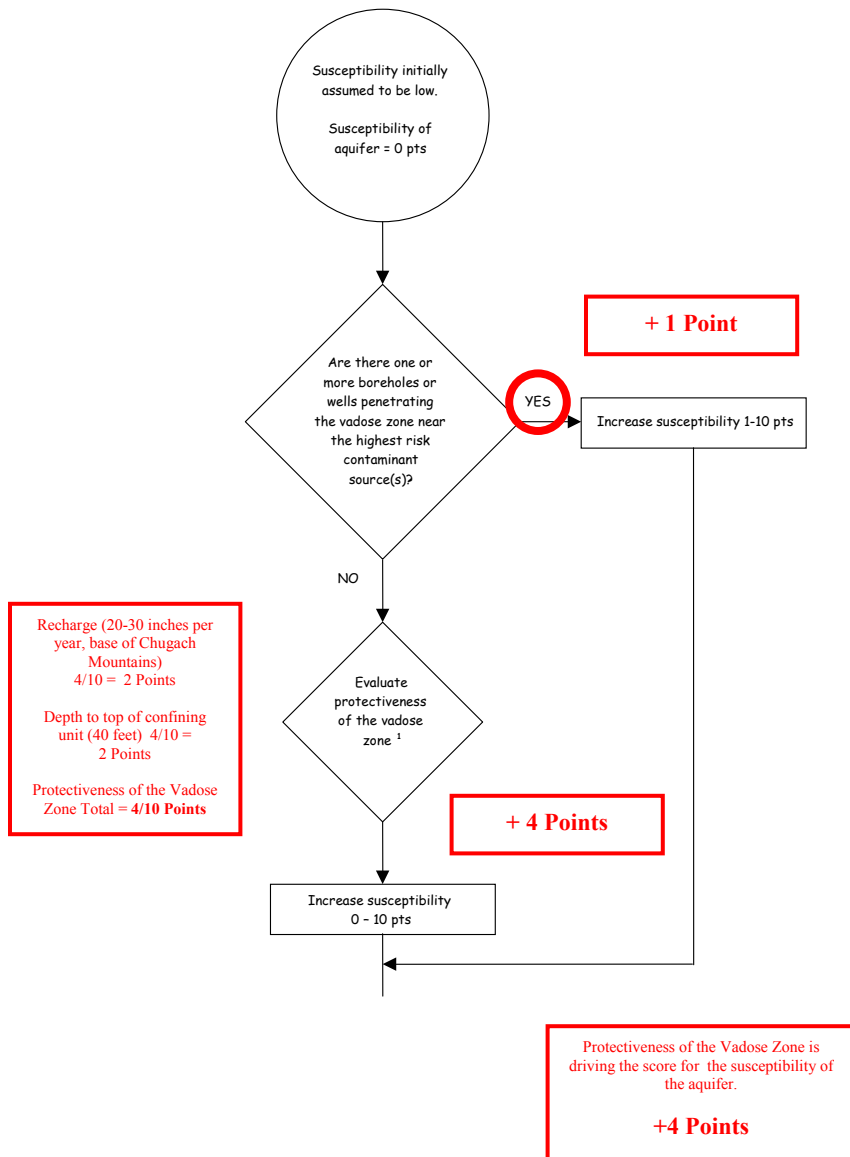


Chart 3. Contaminant risks for Lake O’The Hills Wells – Bacteria & Viruses

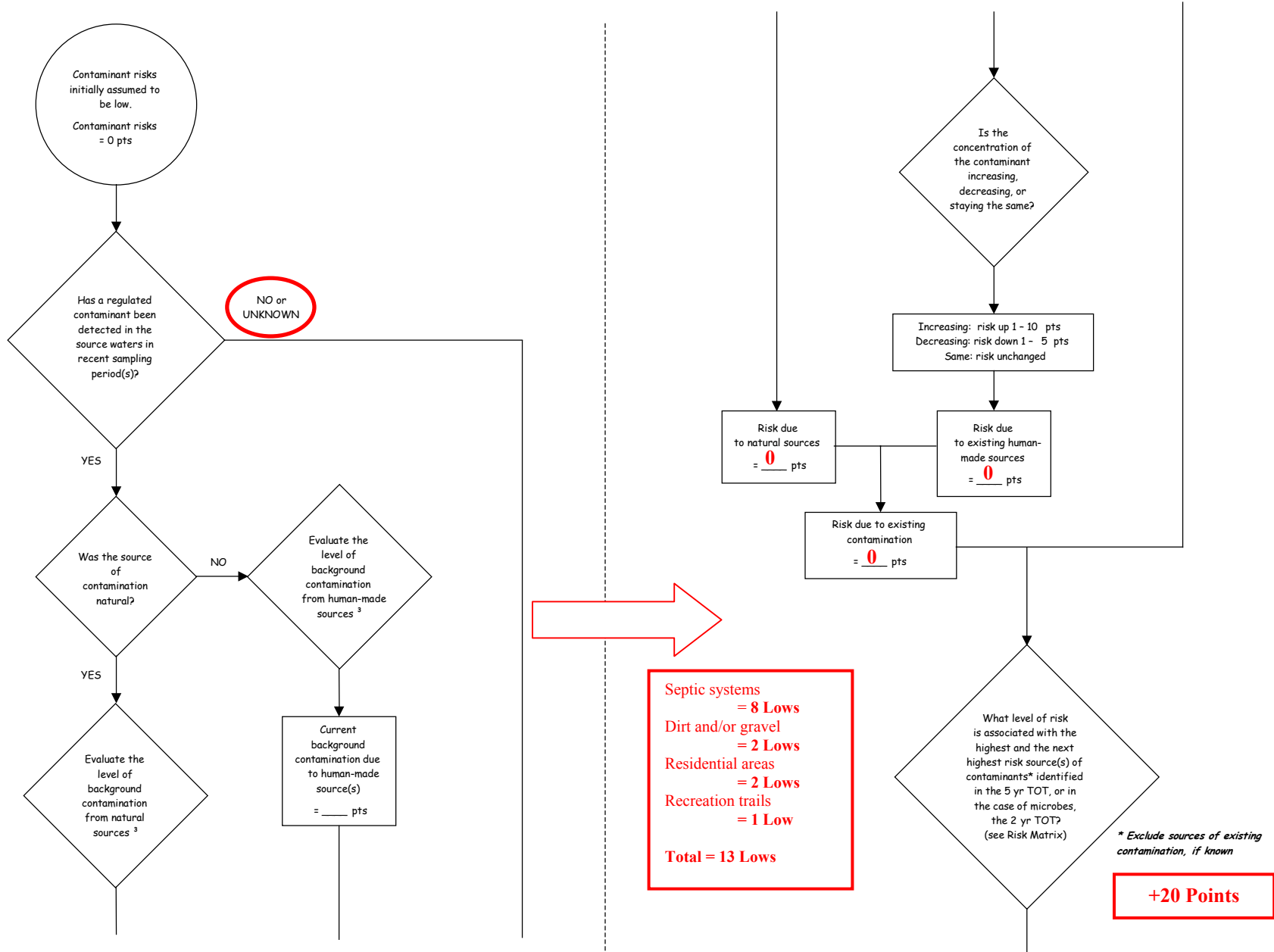
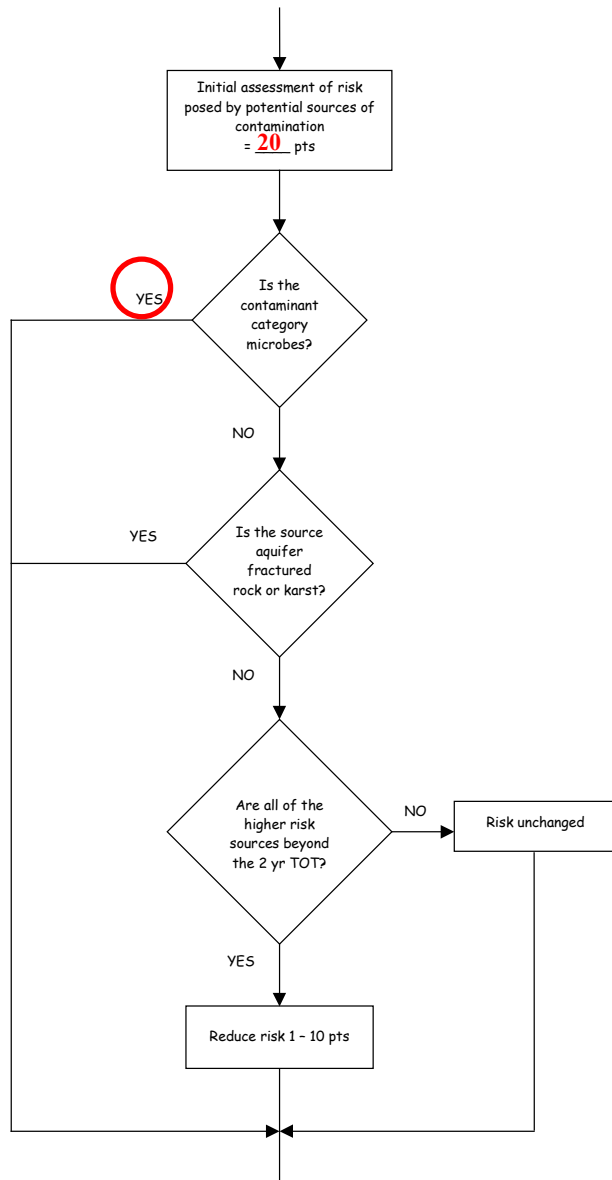
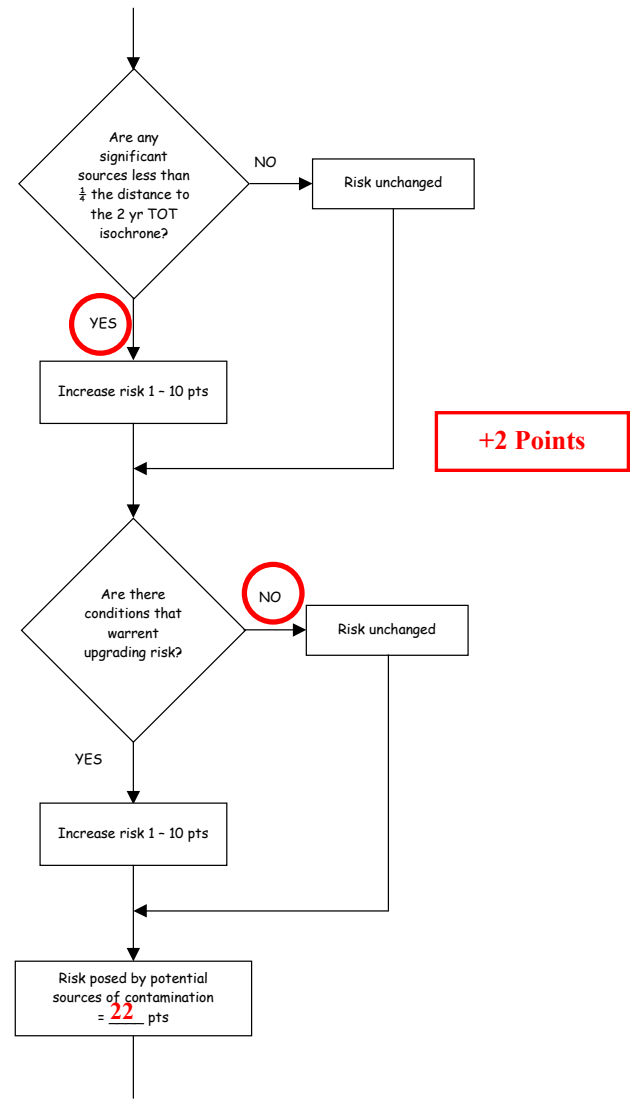
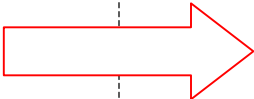


Chart 3. Contaminant risks for Lake O’The Hills Wells – Bacteria & Viruses (Continued)



Zone A
 Septic systems drive the increase of potential contaminant risk.
 + 2 Points



+2 Points

Chart 3. Contaminant risks for Lake O’The Hills Wells – Bacteria & Viruses (Continued)

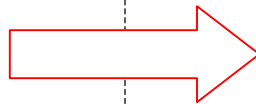
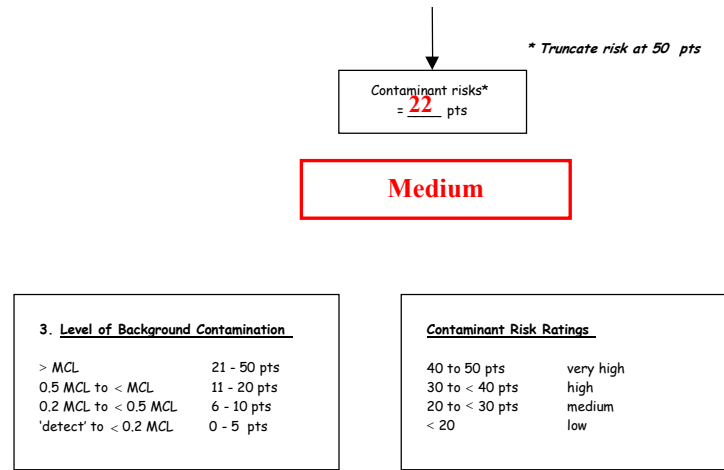
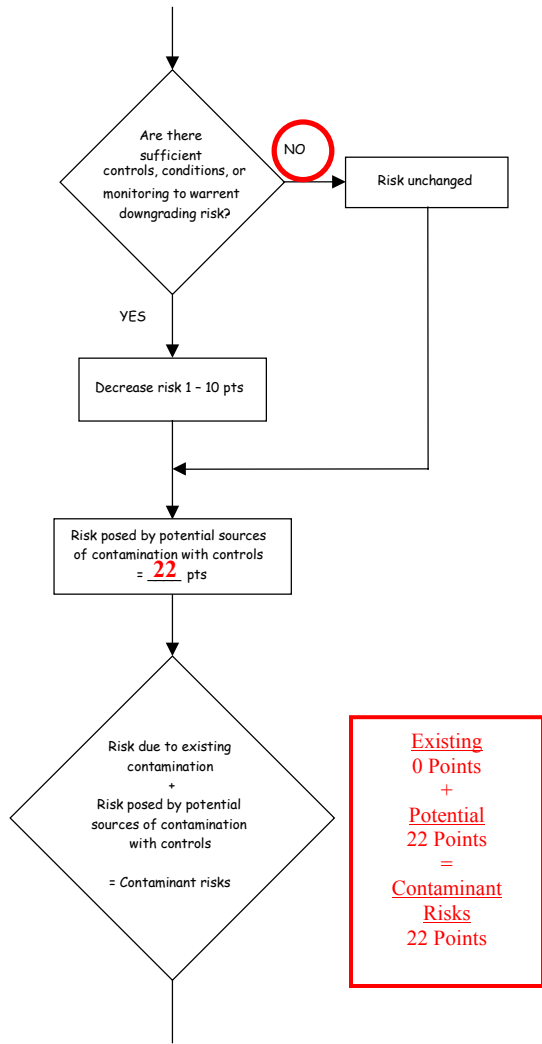


Table 1. Risk Matrix for Contaminant Sources for Lake O’The Hills Wells – Bacteria & Viruses

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	Septic systems, dirt and/or gravel roads, residential areas, recreation trails	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
	Low	> 10 sources + 10 pts	> 10 sources + 5 pts	> 20 sources + 5 pts	---
	Medium	---	> 2 sources + 5 pts	> 5 sources + 5 pts	> 10 sources + 5 pts
	High	---	---	1 source + 10 pts	> 2 sources + 10 pts
	Very High	---	---	---	1 source + 10 pts

Chart 4. Vulnerability analysis for Lake O’The Hills Wells – Bacteria & Viruses

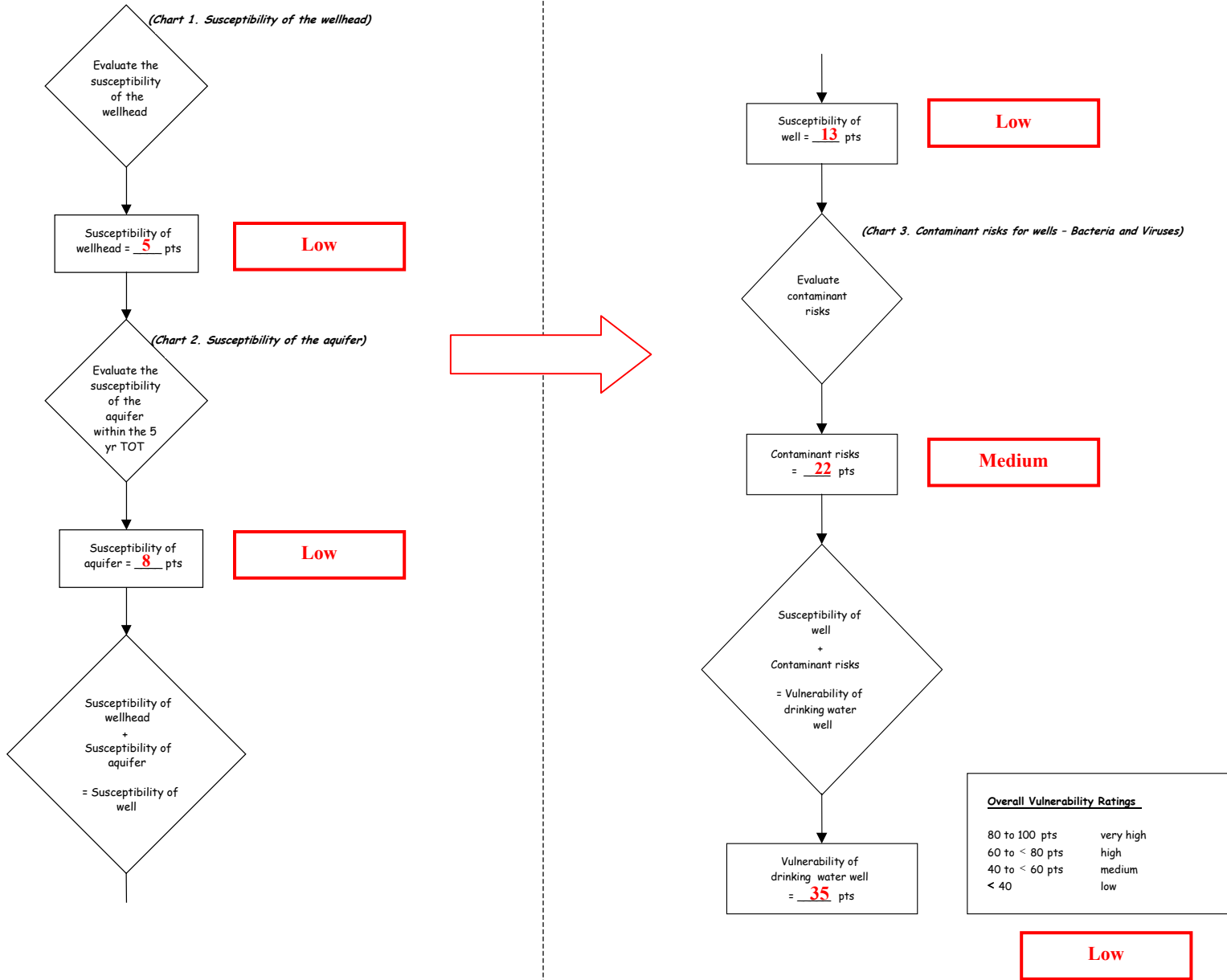
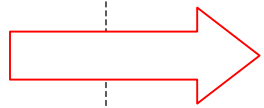
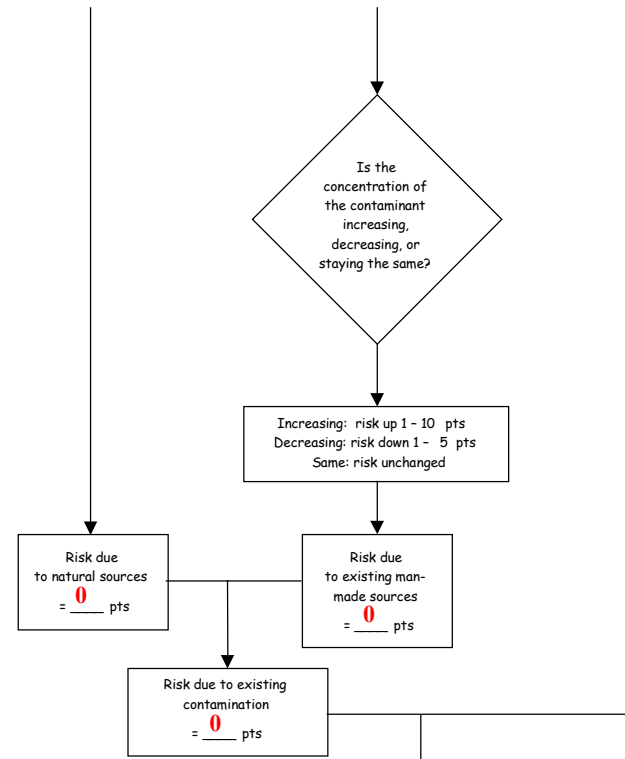
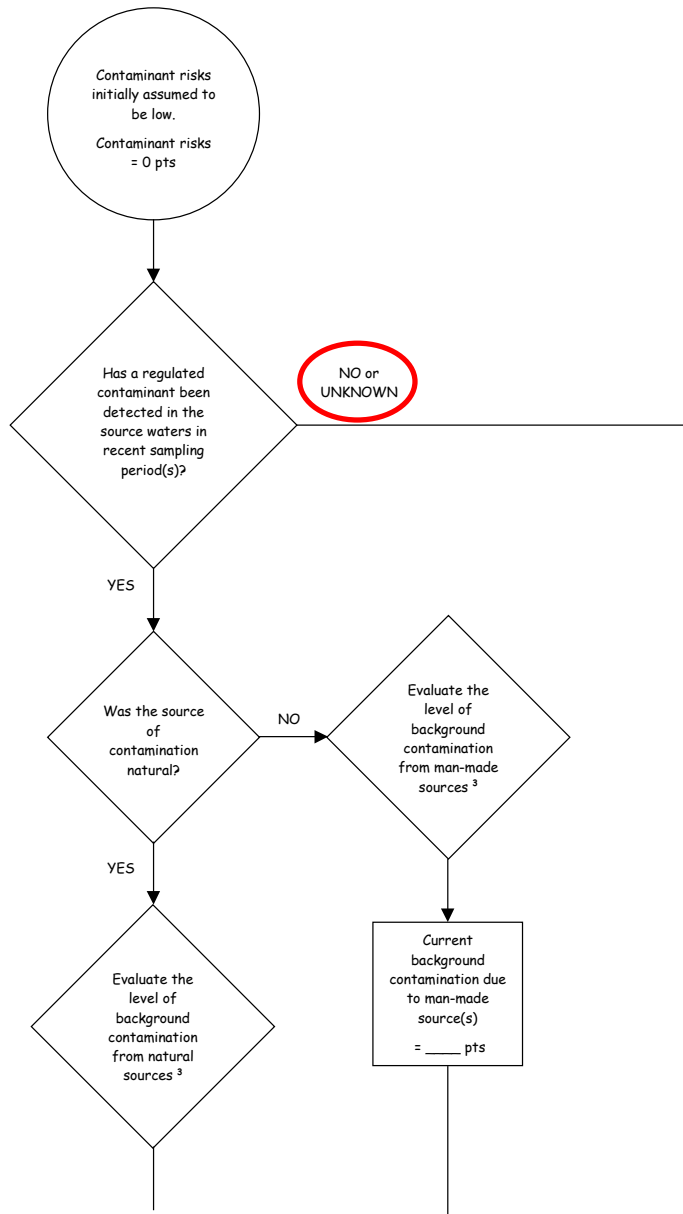
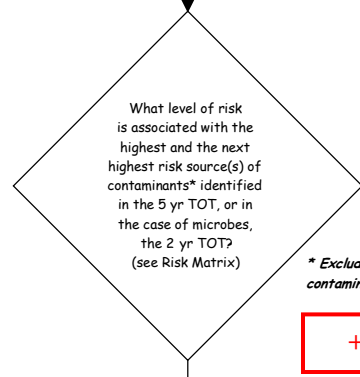


Chart 5. Contaminant risks for Lake O’The Hills Wells – Nitrates and Nitrites

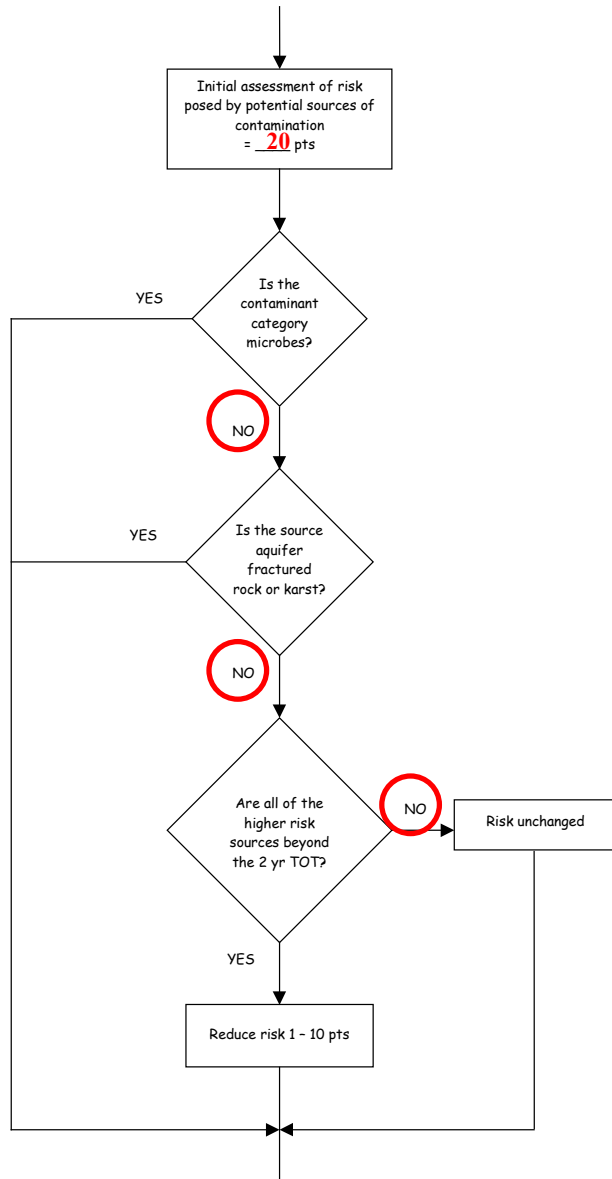


- Septic systems = 12 Lows
- Dirt and/or gravel roads = 2 Lows
- Residential areas = 3 Lows
- Recreation trails = 1 Low
- Total = 18 Lows**

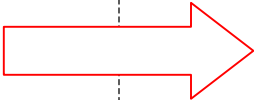


* Exclude sources of existing contamination, if known

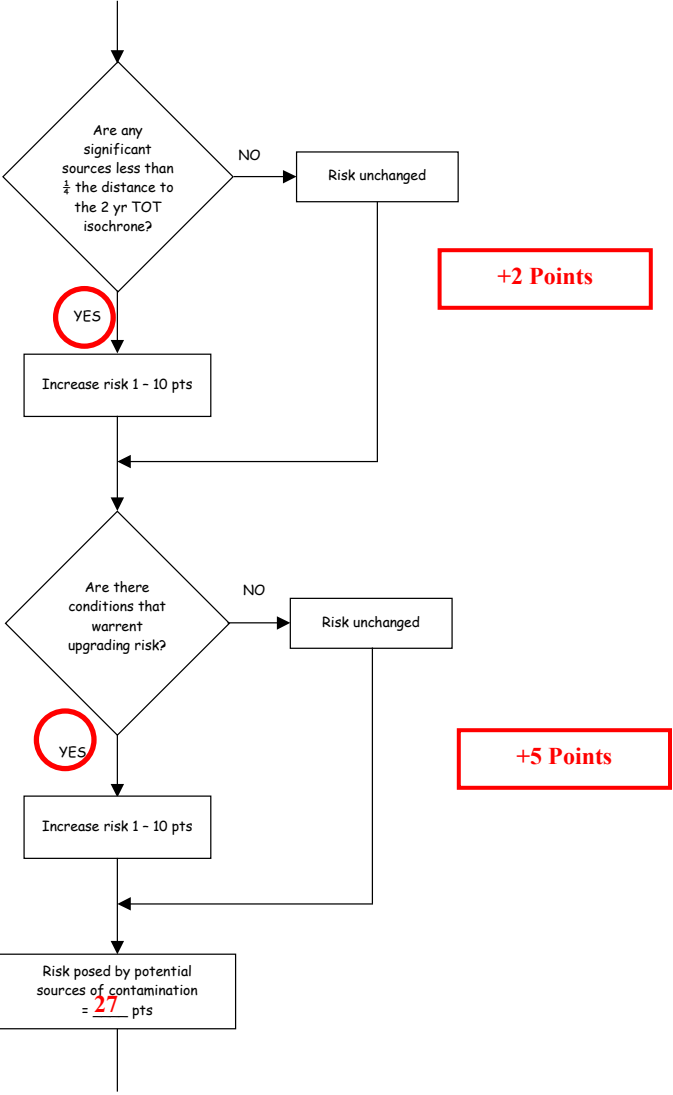
Chart 5. Contaminant risks for Lake O’The Hills Wells – Nitrates and Nitrites (Continued)



Zone A
 Septic systems drive the increase of potential contaminant risk.
 +2 Points



Zone C
 The density of septic systems in Zone C further drives the increase of potential contaminant risks.
 +5 Points



+2 Points

+5 Points

Chart 5. Contaminant risks for Lake O’The Hills Wells – Nitrates and Nitrites (Continued)

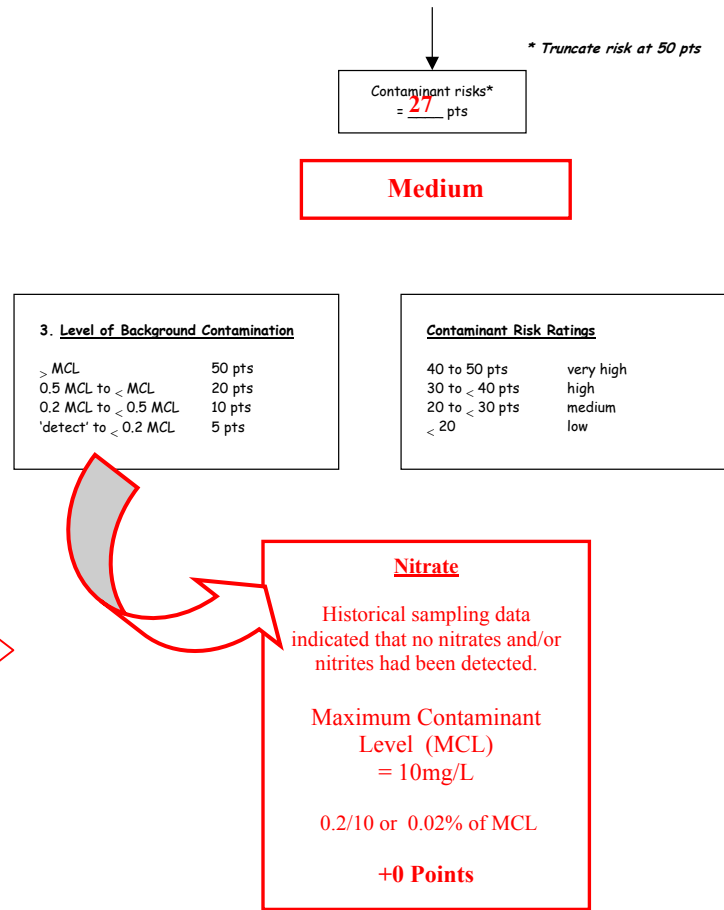
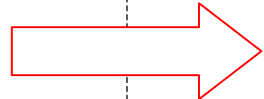
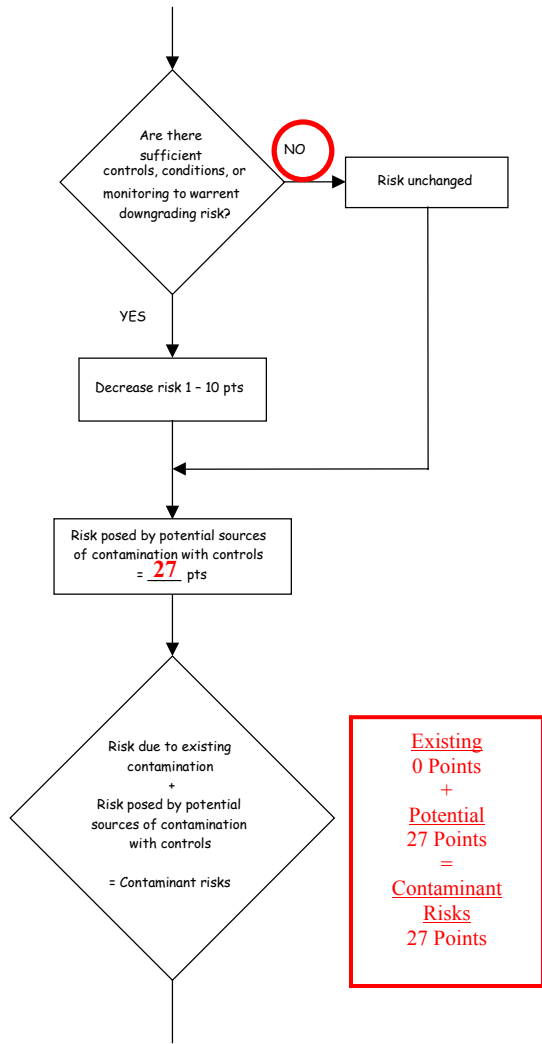


Table 2. Risk Matrix for Contaminant Sources for Lake O’The Hills Wells – Nitrates and Nitrites

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	Septic systems, dirt and/or gravel roads, residential areas, recreation trails	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
	Low	> 10 sources + 10 pts	> 10 sources + 5 pts	> 20 sources + 5 pts	---
	Medium	---	> 2 sources + 5 pts	> 5 sources + 5 pts	> 10 sources + 5 pts
	High	---	---	1 source + 10 pts	> 2 sources + 10 pts
	Very High	---	---	---	1 source + 10 pts

Chart 6. Vulnerability analysis for Lake O’The Hills Wells – Nitrates and Nitrites

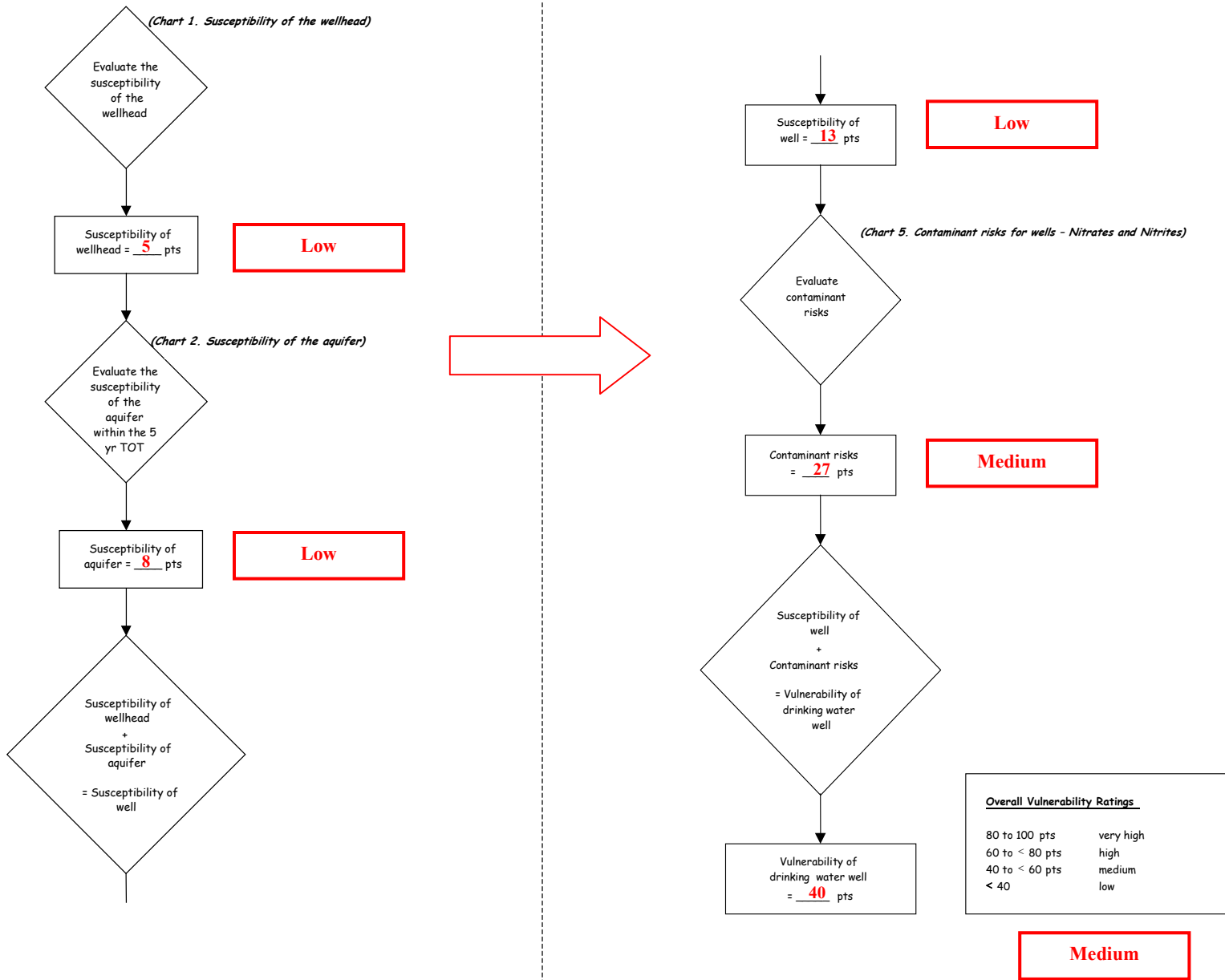


Chart 7. Contaminant risks for Lake O’The Hills Wells – Volatile Organic Chemicals

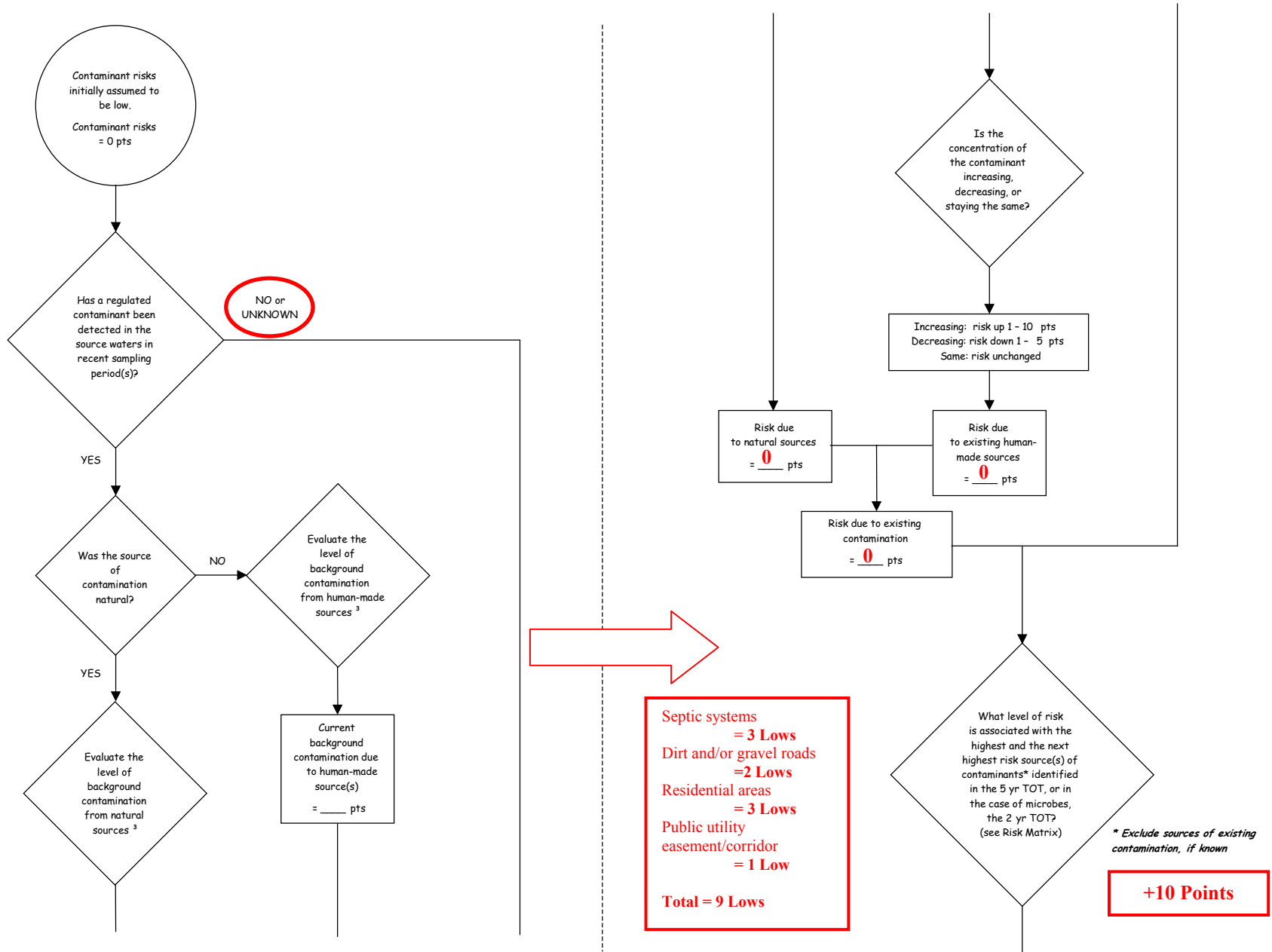
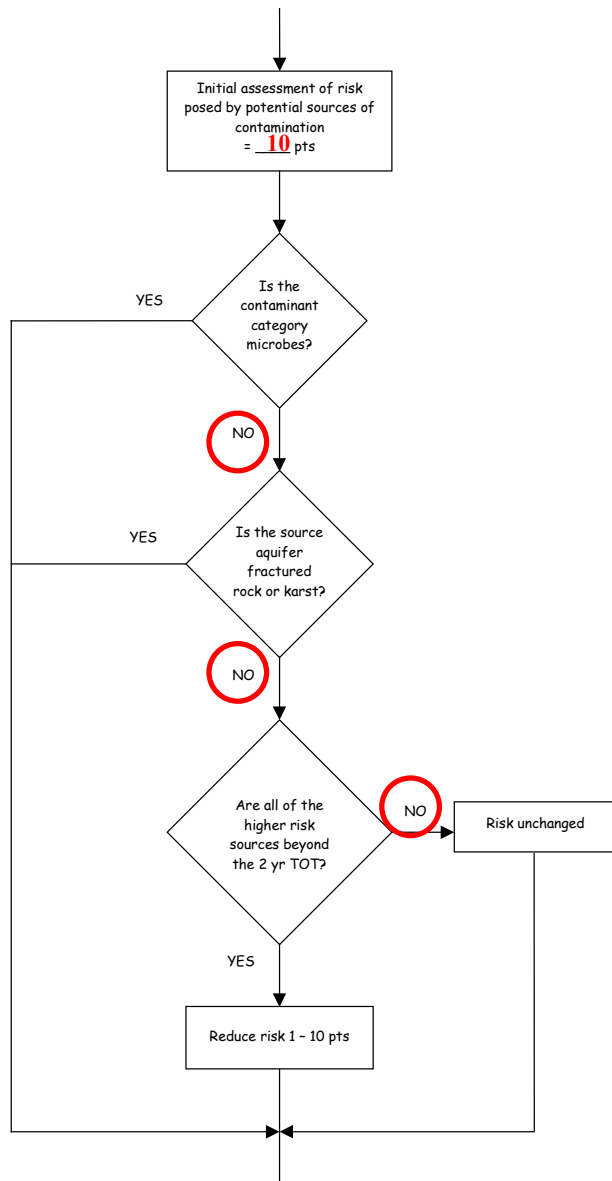


Chart 7. Contaminant risks for Lake O’The Hills Wells – Volatile Organic Chemicals (Continued)



Zone A
 Septic systems and dirt and/or gravel roads
 +2 Points

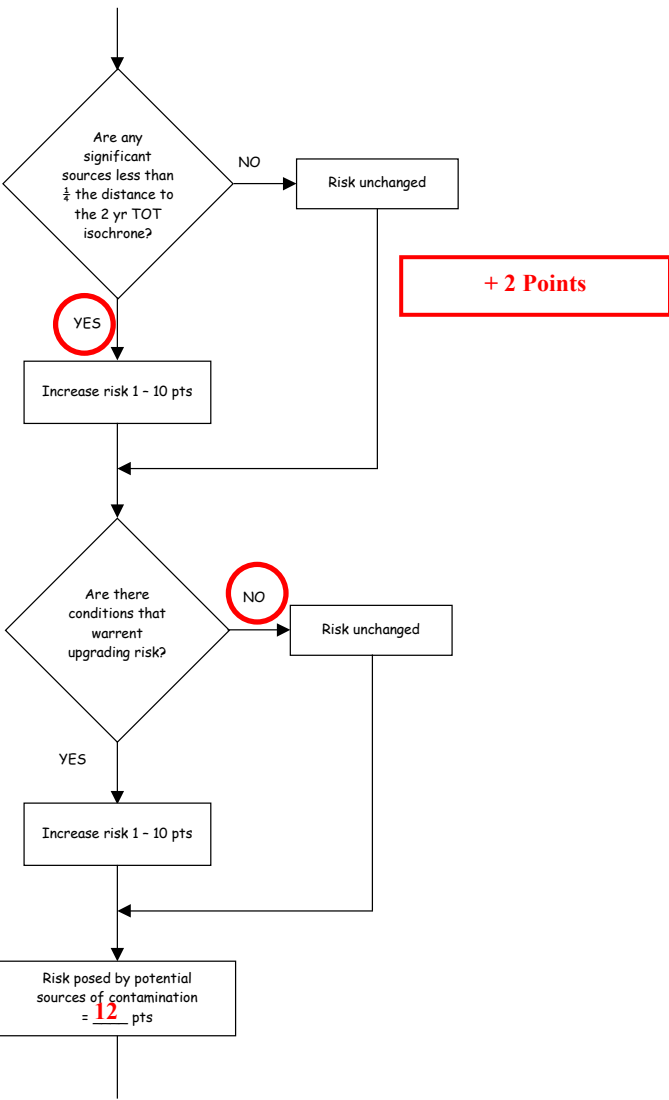
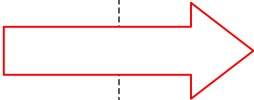
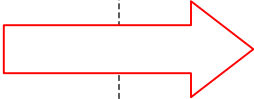
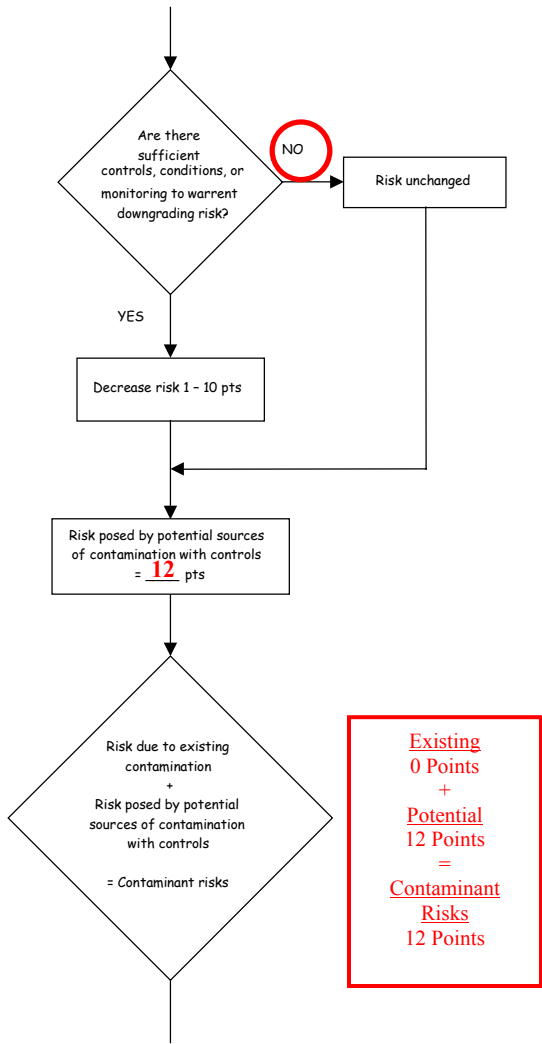


Chart 7. Contaminant risks for Lake O’The Hills Wells – Volatile Organic Chemicals (Continued)



* Truncate risk at 50 pts

Contaminant risks* = **12** pts

Low

3. Level of Background Contamination

> MCL	21 - 50 pts
0.5 MCL to < MCL	11 - 20 pts
0.2 MCL to < 0.5 MCL	6 - 10 pts
'detect' to < 0.2 MCL	0 - 5 pts

Contaminant Risk Ratings

40 to 50 pts	very high
30 to < 40 pts	high
20 to < 30 pts	medium
< 20	low

Table 3. Risk Matrix for Contaminant Sources for Lake O’The Hills Wells – Volatile Organic Chemicals

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	Septic systems, dirt and/or gravel roads, residential areas, public utility easement/corridor	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
	Low	> 10 sources + 10 pts	> 10 sources + 5 pts	> 20 sources + 5 pts	---
	Medium	---	> 2 sources + 5 pts	> 5 sources + 5 pts	> 10 sources + 5 pts
	High	---	---	1 source + 10 pts	> 2 sources + 10 pts
	Very High	---	---	---	1 source + 10 pts

Chart 8. Vulnerability analysis for Lake O’The Hills Wells – Volatile Organic Chemicals

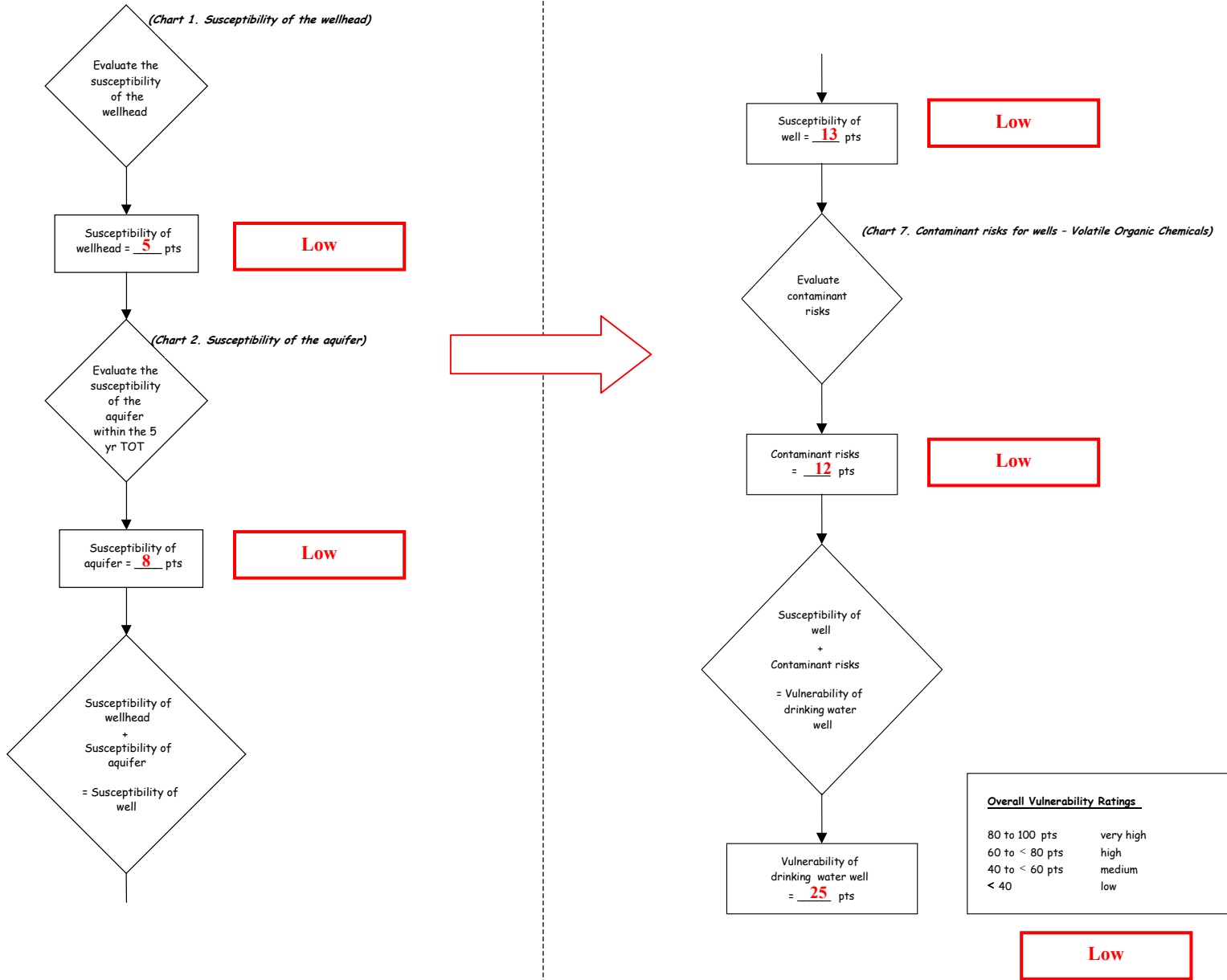


Chart 9. Contaminant risks for Lake O’The Hills Wells – Heavy Metals, Cyanide and Other Inorganic Chemicals

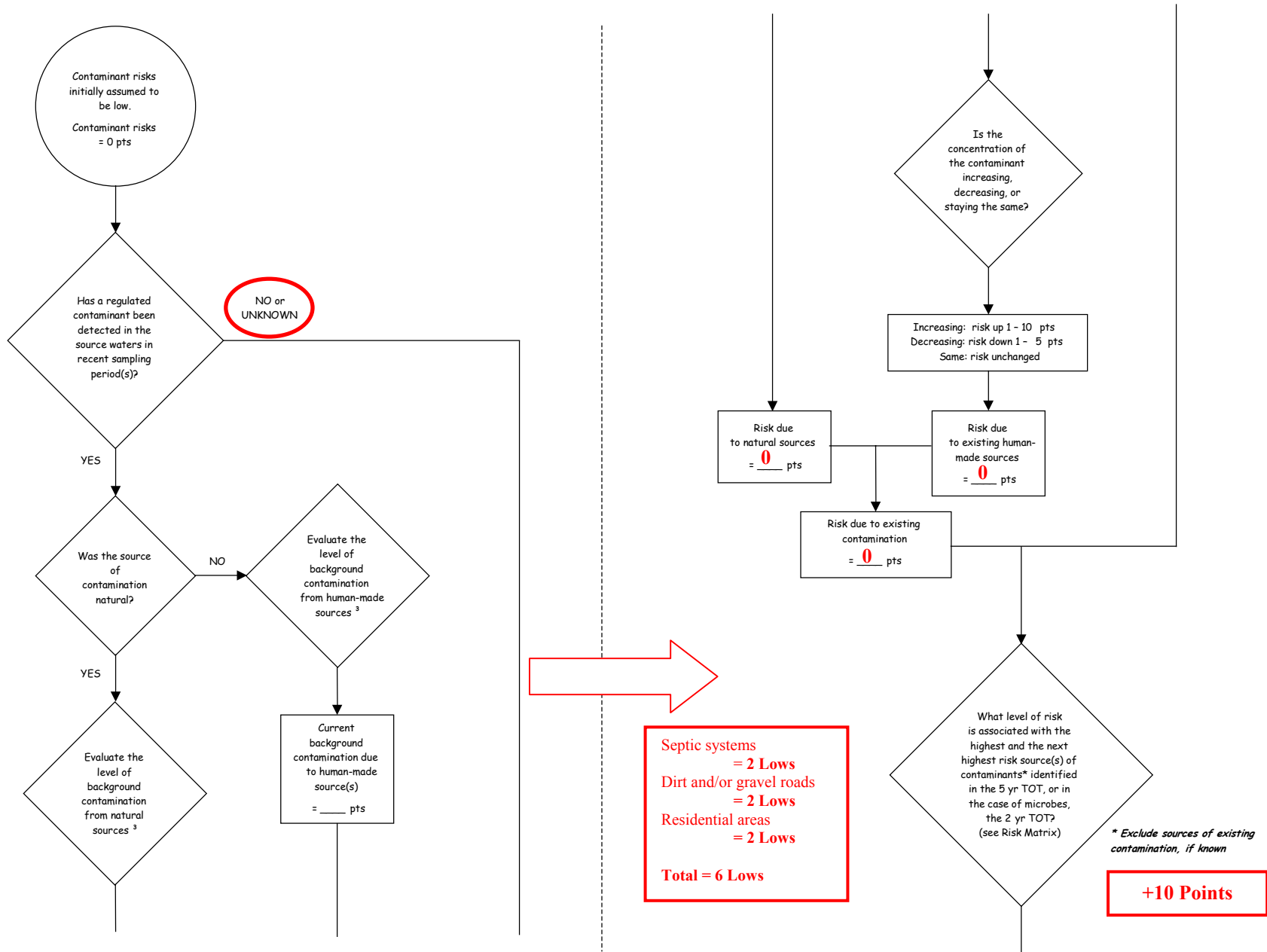
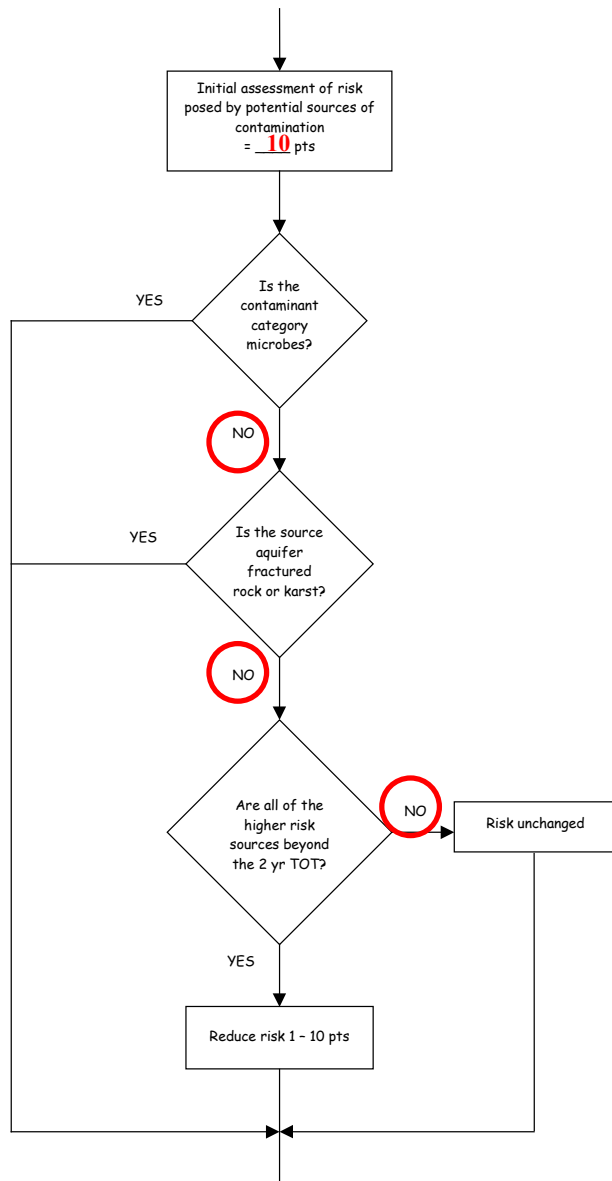
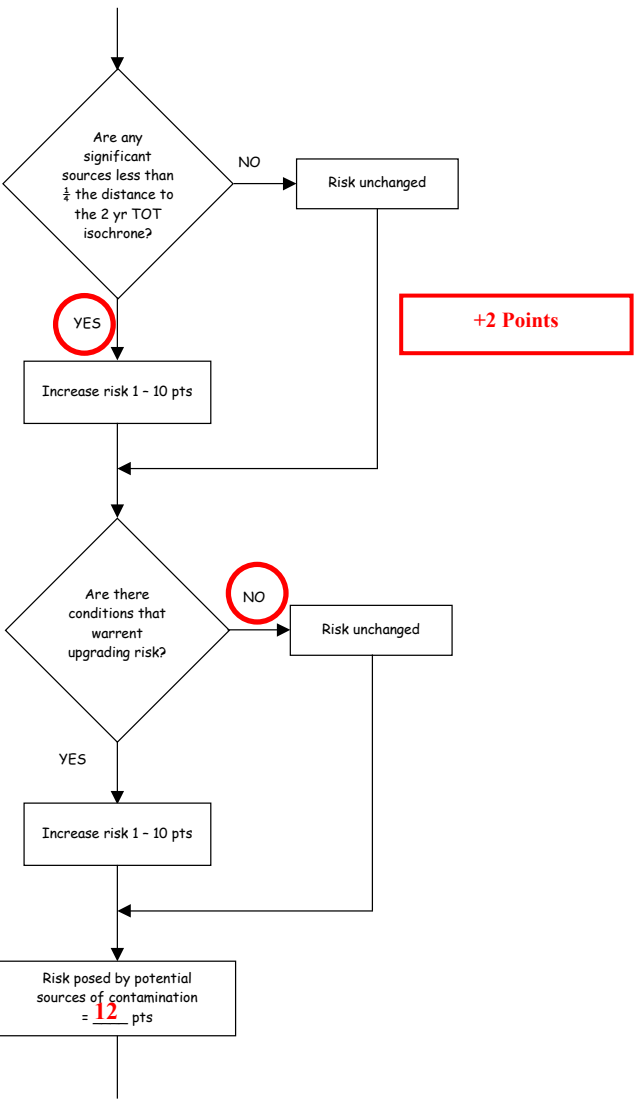
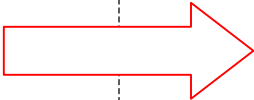


Chart 9. Contaminant risks for Lake O’The Hills Wells – Heavy Metals, Cyanide and Other Inorganic Chemicals (Continued)



Zone A
 Dirt and/or gravel roads and septic systems.
 +2 Points



+2 Points

Chart 9. Contaminant risks for Lake O’The Hills Wells – Heavy Metals, Cyanide and Other Inorganic Chemicals (Continued)

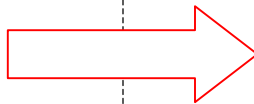
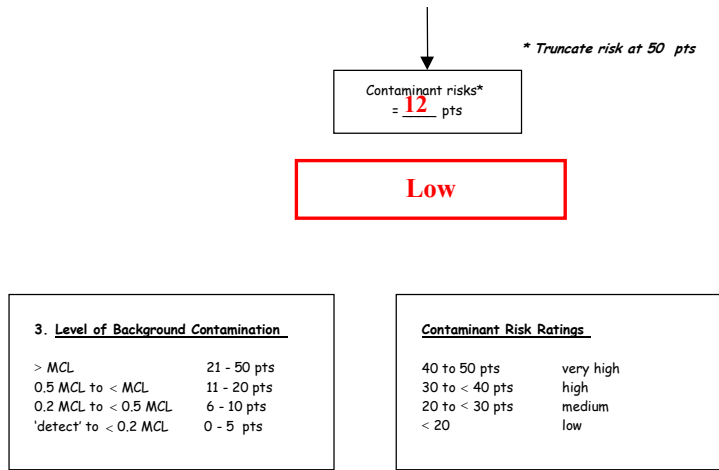
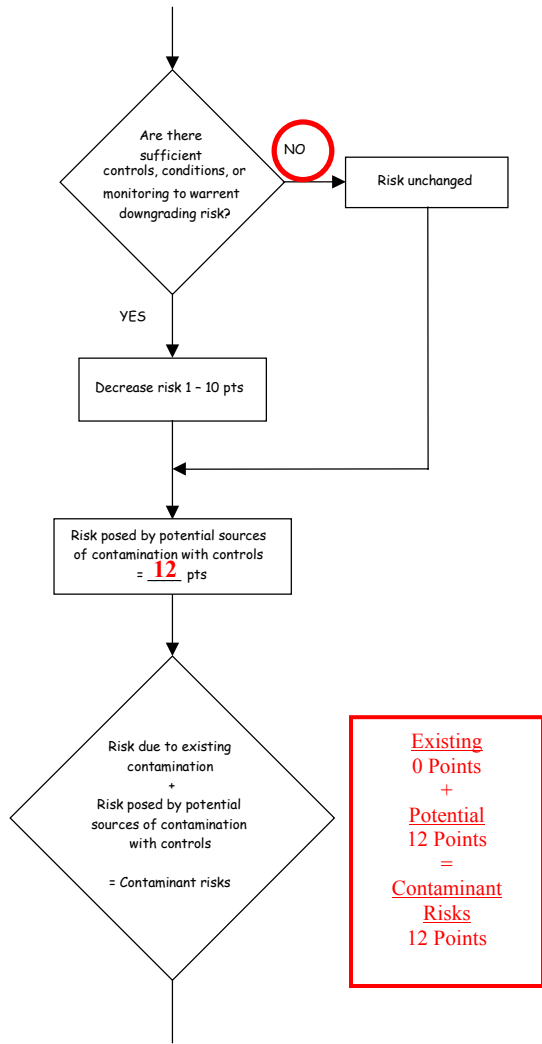


Table 4. Risk Matrix for Contaminant Sources for Lake O’The Hills Wells – Heavy Metals, Cyanide and Other Inorganic Chemicals

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	Septic systems, sewer lines, highways and roads, residential areas	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
	Low	>10 sources + 10 pts	> 10 sources + 5 pts	> 20 sources + 5 pts	---
	Medium	---	> 2 sources + 5 pts	> 5 sources + 5 pts	> 10 sources + 5 pts
	High	---	---	1 source + 10 pts	> 2 sources + 10 pts
	Very High	---	---	---	1 source + 10 pts

Chart 10. Vulnerability analysis for Lake O’The Hills Wells – Heavy Metals, Cyanide and Other Inorganic Chemicals

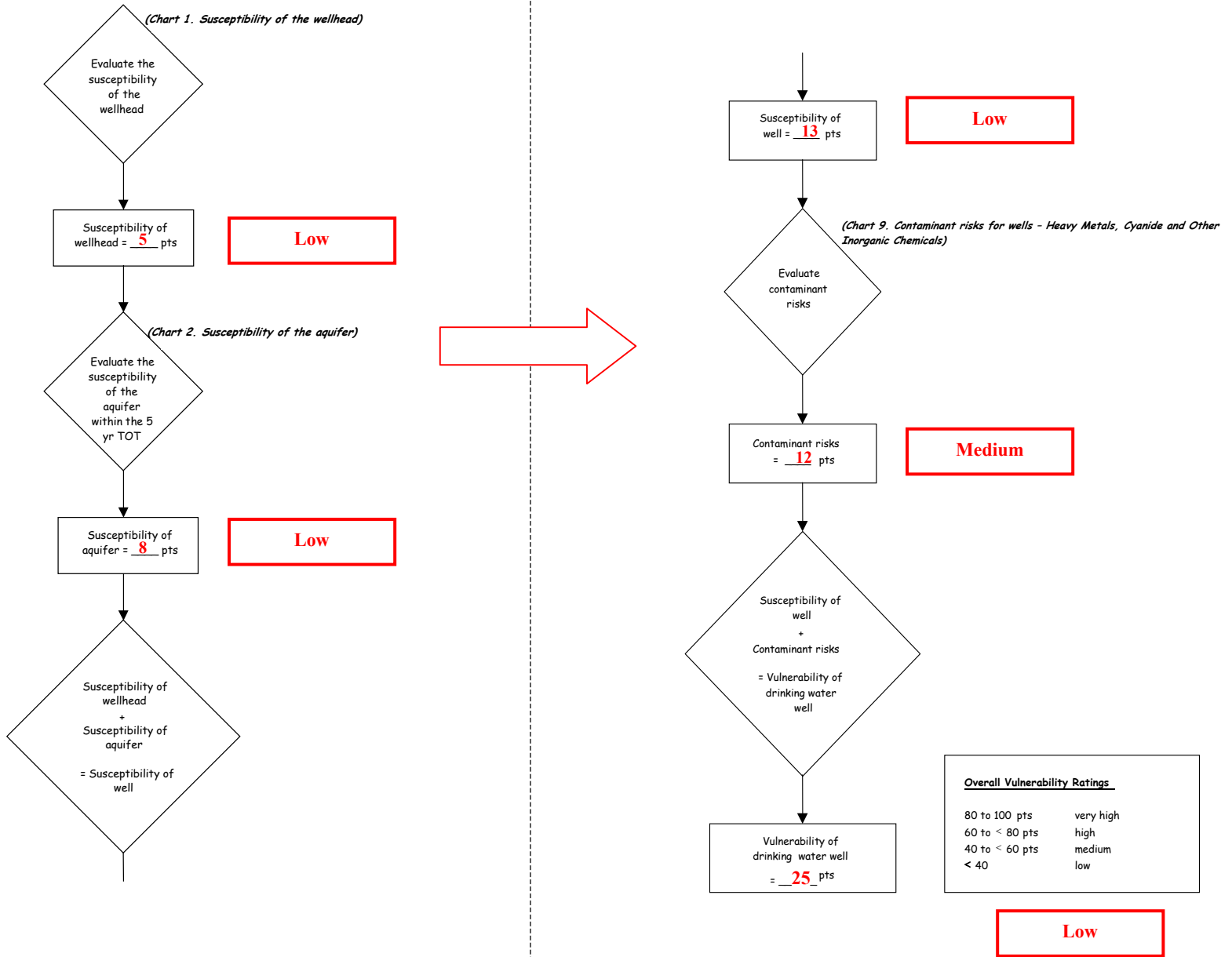


Chart 11. Contaminant risks for Lake O'The Hills Wells – Synthetic Organic Chemicals

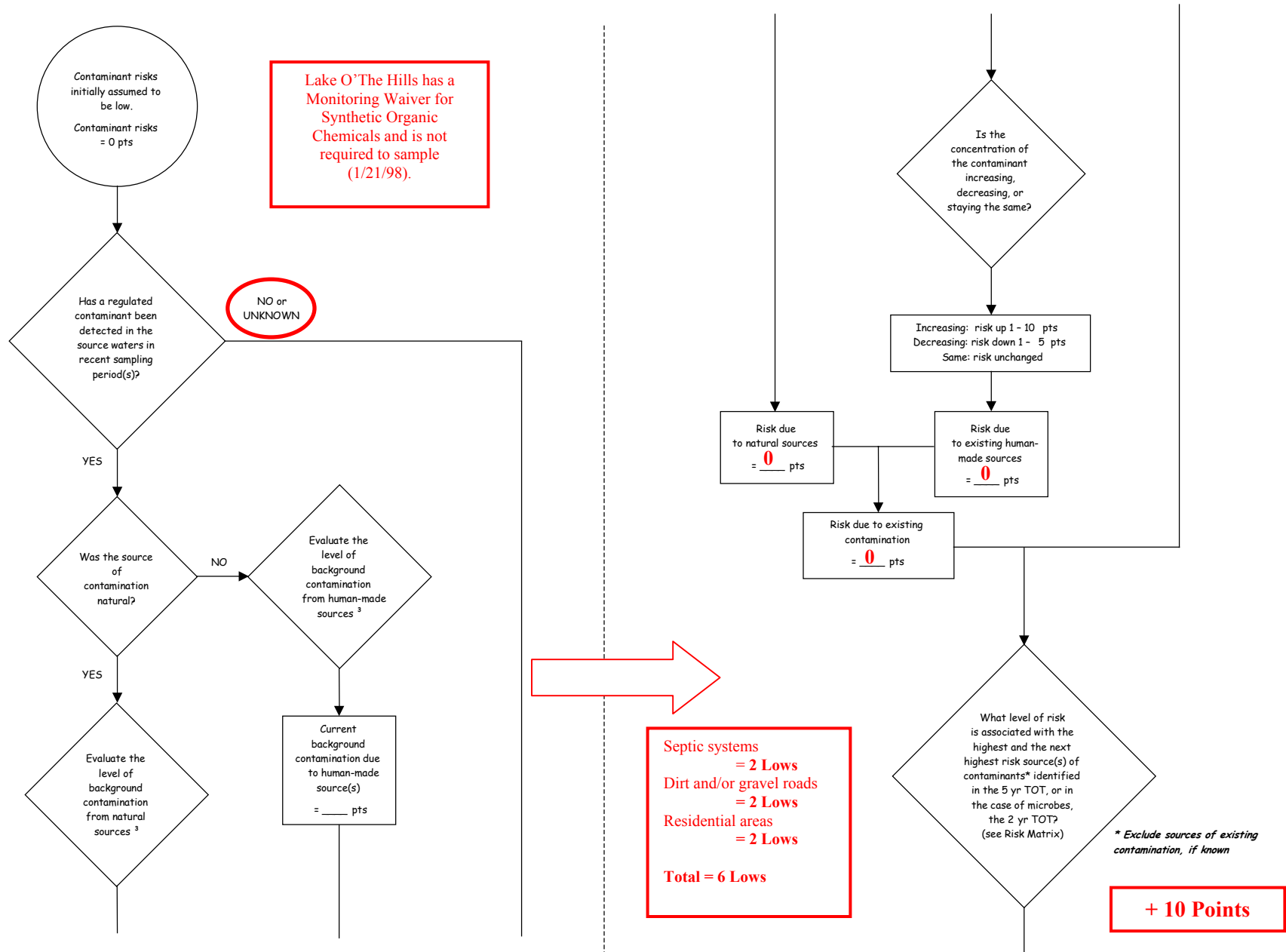
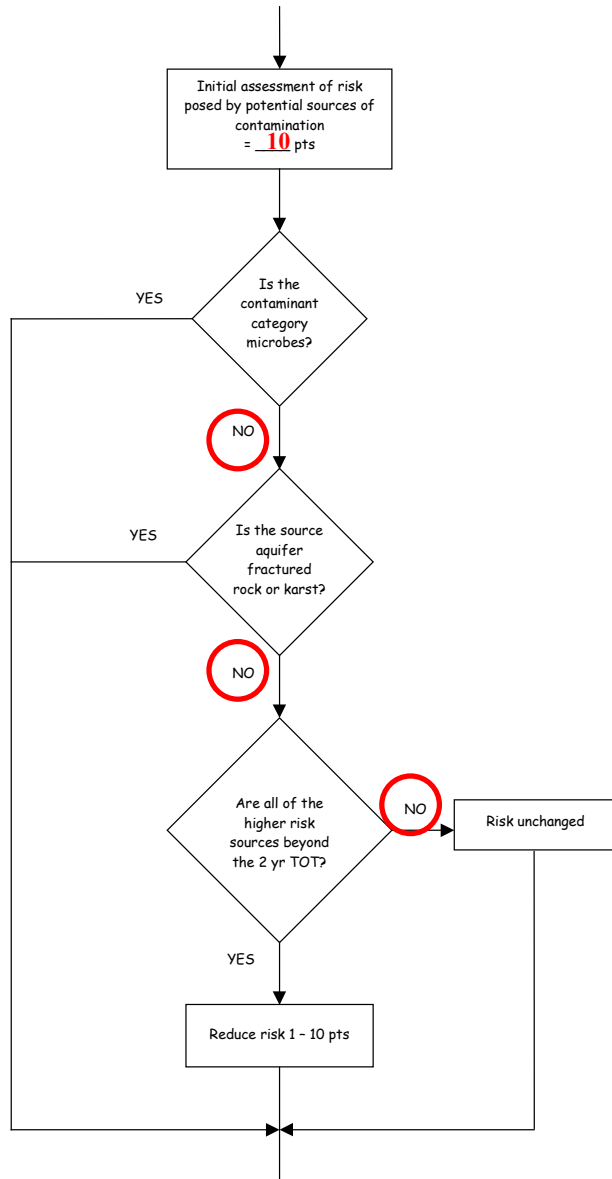


Chart 11. Contaminant risks for Lake O’The Hills Wells – Synthetic Organic Chemicals (Continued)



Zone A
 Dirt and/or gravel roads and septic systems.
 +2 Points

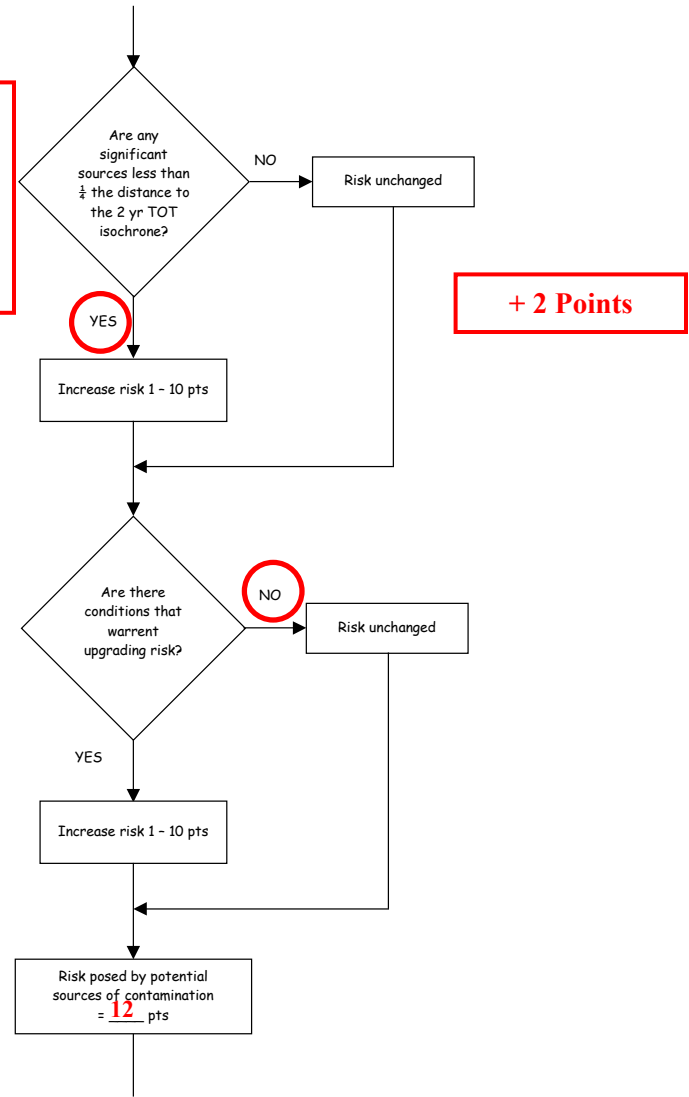
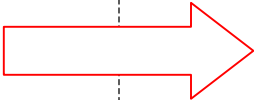


Chart 11. Contaminant risks for Lake O’The Hills Wells – Synthetic Organic Chemicals (Continued)

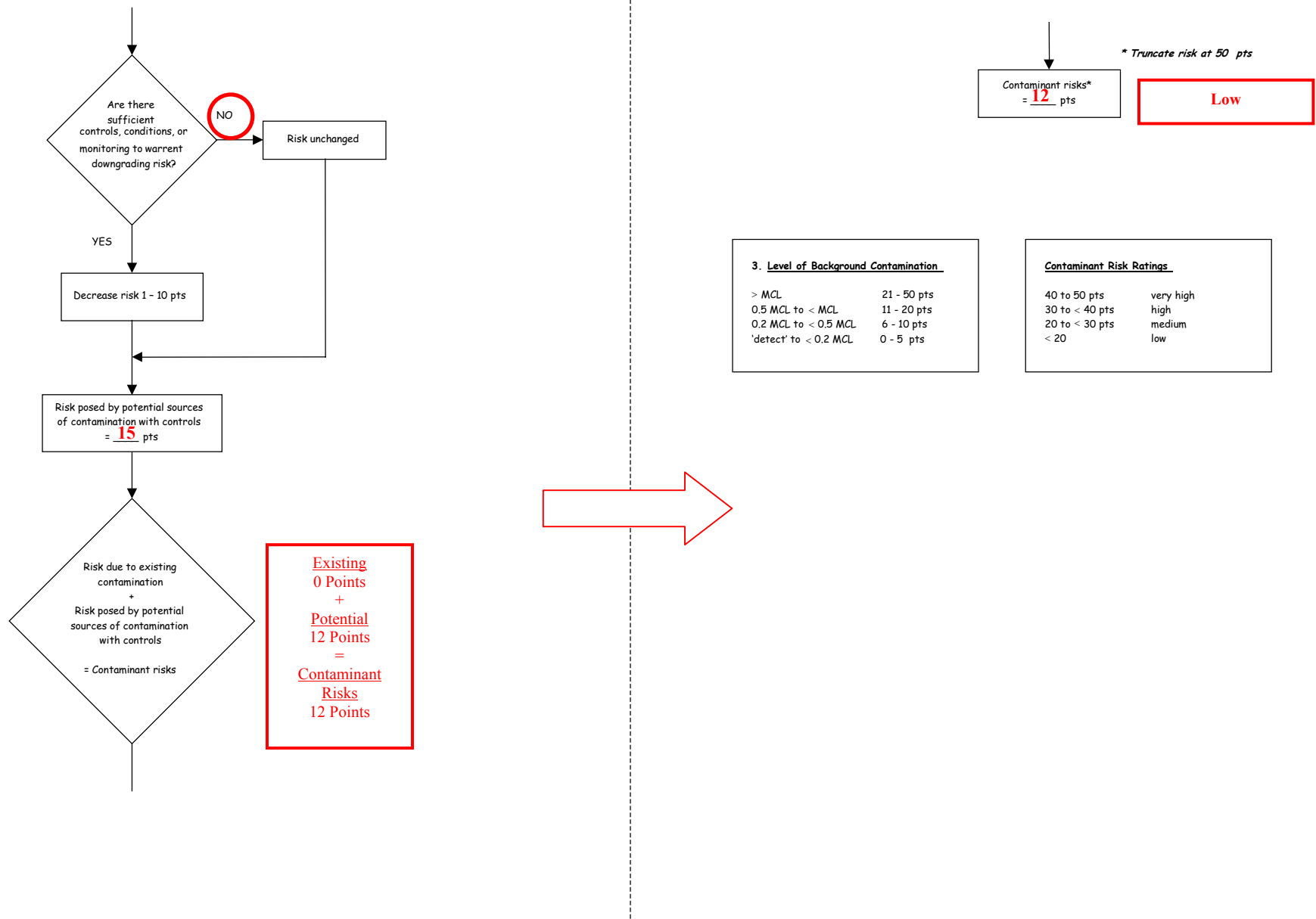


Table 5. Risk Matrix for Contaminant Sources for Lake O’The Hills Wells – Synthetic Organic Chemicals

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	Septic systems, dirt and/or gravel roads, and residential areas	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
	Low	>10 sources + 10 pts	> 10 sources + 5 pts	> 20 sources + 5 pts	---
	Medium	---	> 2 sources + 5 pts	> 5 sources + 5 pts	> 10 sources + 5 pts
	High	---	---	1 source + 10 pts	> 2 sources + 10 pts
	Very High	---	---	---	1 source + 10 pts

Chart 12. Vulnerability analysis for Lake O’The Hills Wells – Synthetic Organic Chemicals

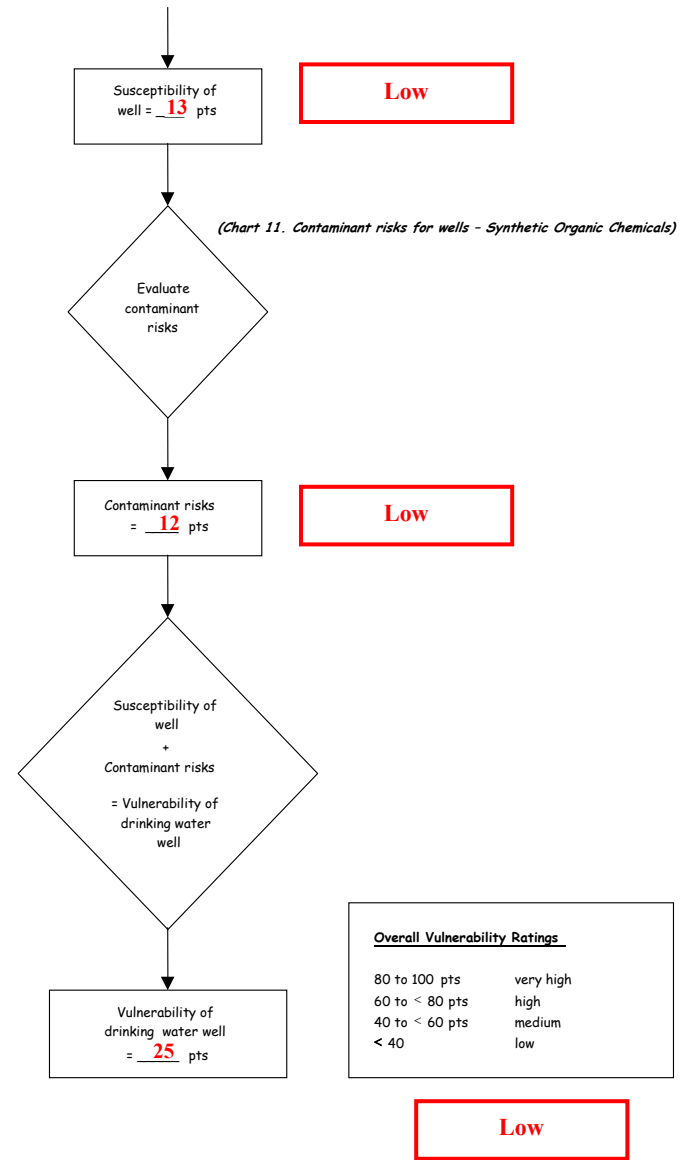
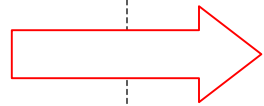
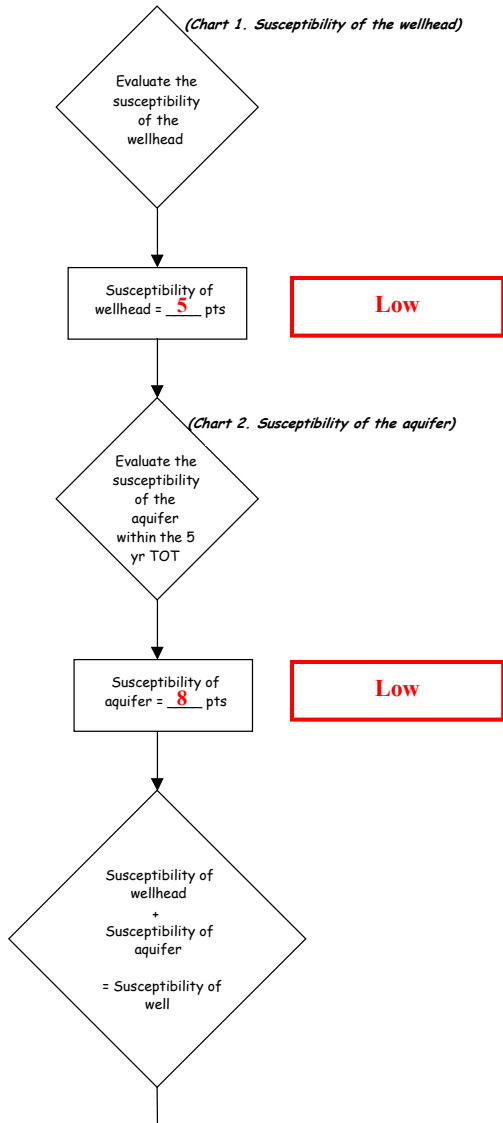
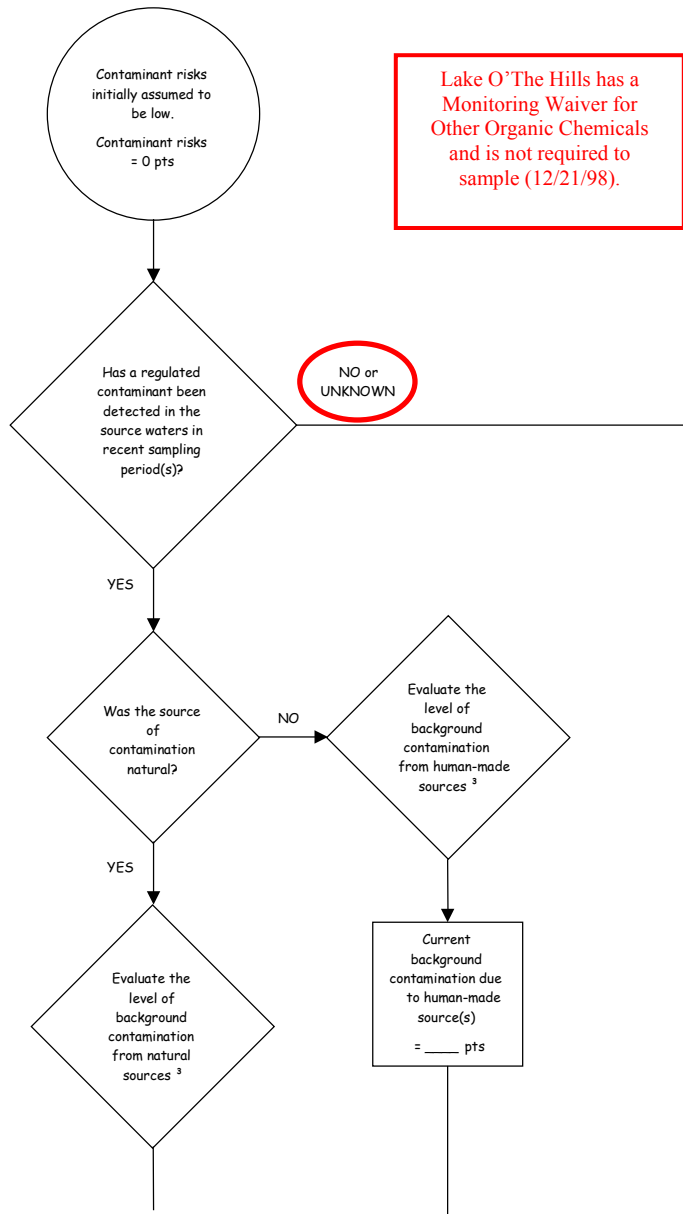
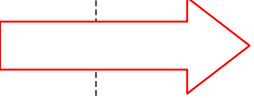
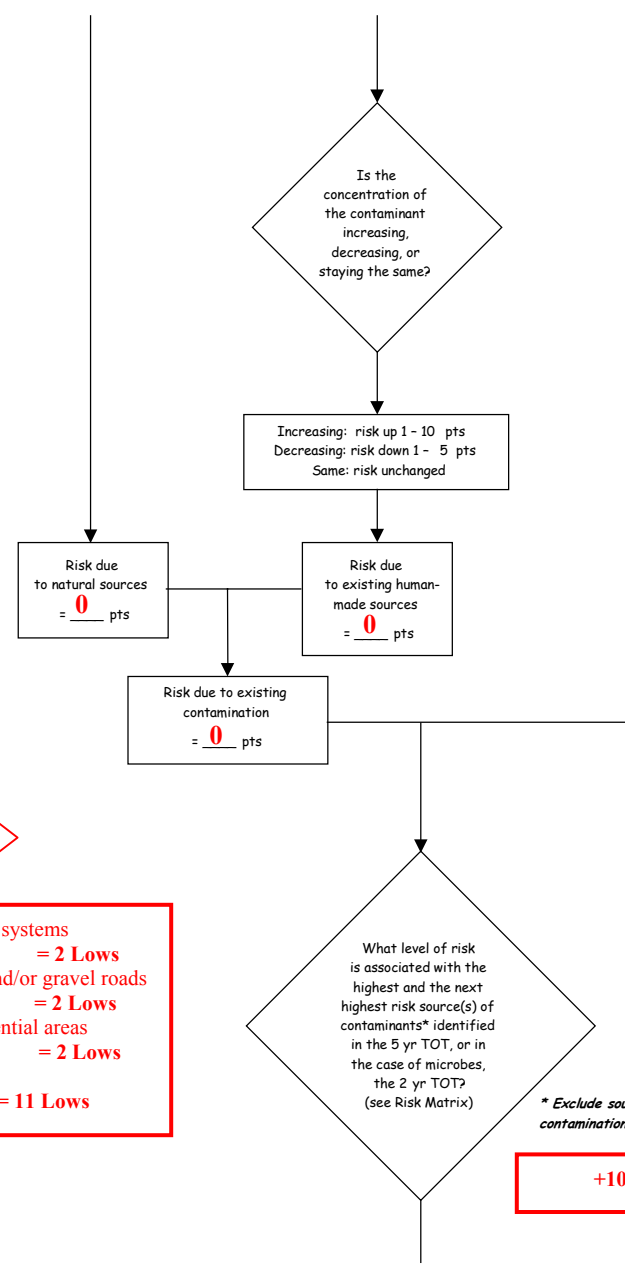


Chart 13. Contaminant risks for Lake O'The Hills Wells – Other Organic Chemicals



Lake O'The Hills has a Monitoring Waiver for Other Organic Chemicals and is not required to sample (12/21/98).

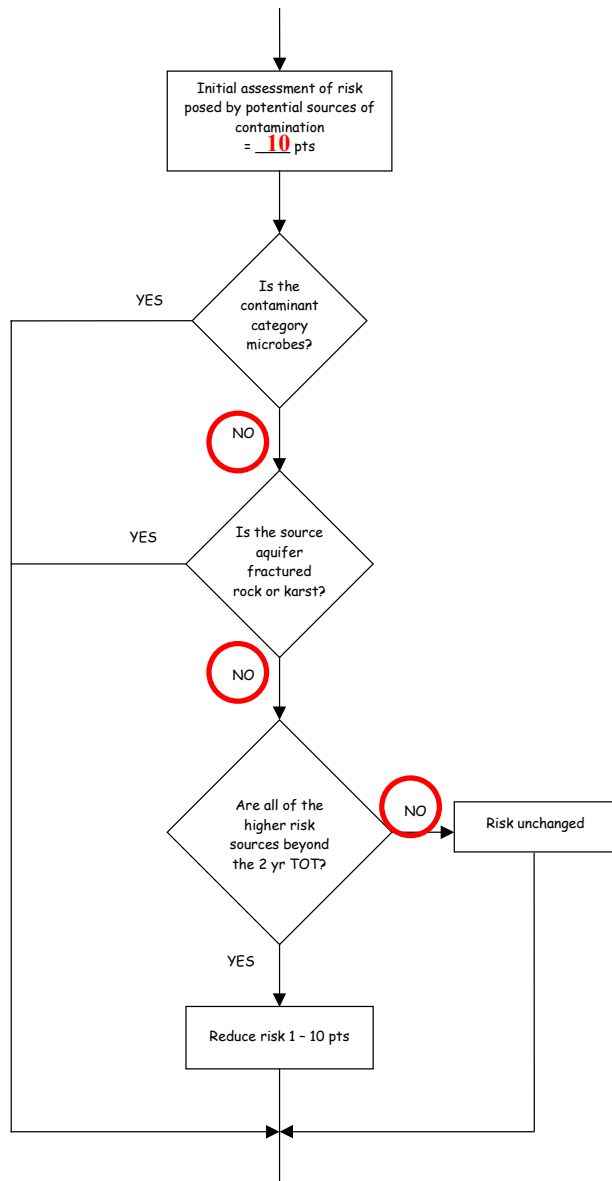
NO or UNKNOWN



Septic systems = 2 Lows
 Dirt and/or gravel roads = 2 Lows
 Residential areas = 2 Lows
 Total = 11 Lows

+10 Points

Chart 13. Contaminant risks for Lake O’The Hills Wells – Other Organic Chemicals (Continued)



Zone A
 Dirt and/or gravel roads and septic systems.
 +2 points

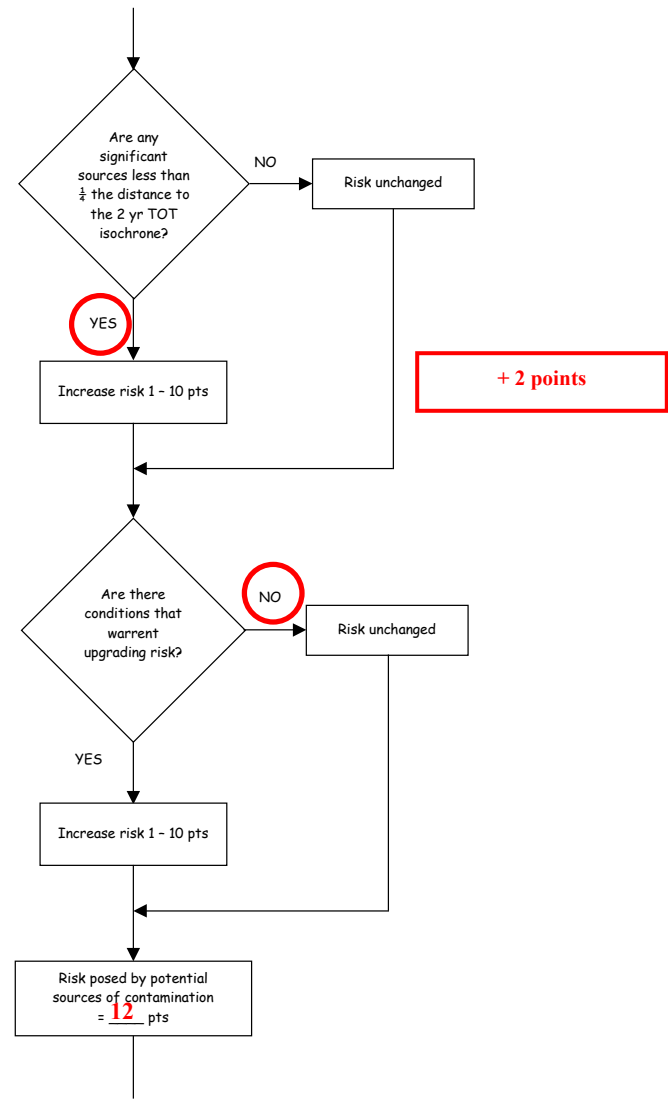
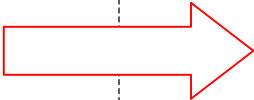


Chart 13. Contaminant risks for Lake O’The Hills Wells – Other Organic Chemicals (Continued)

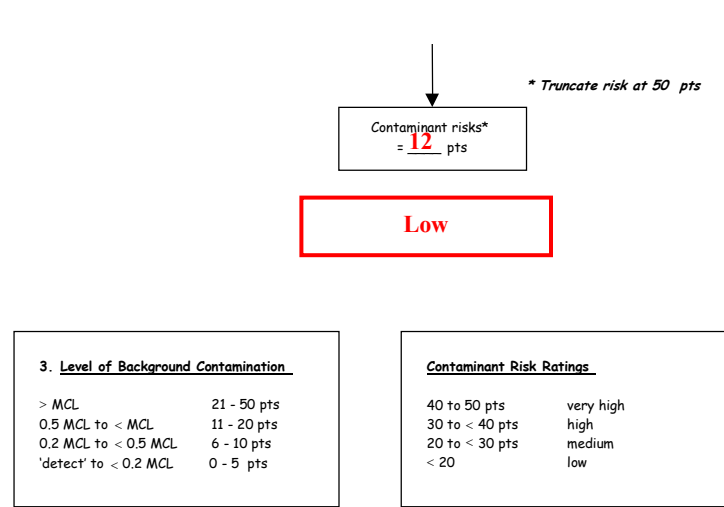
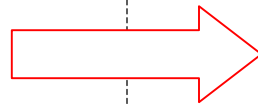
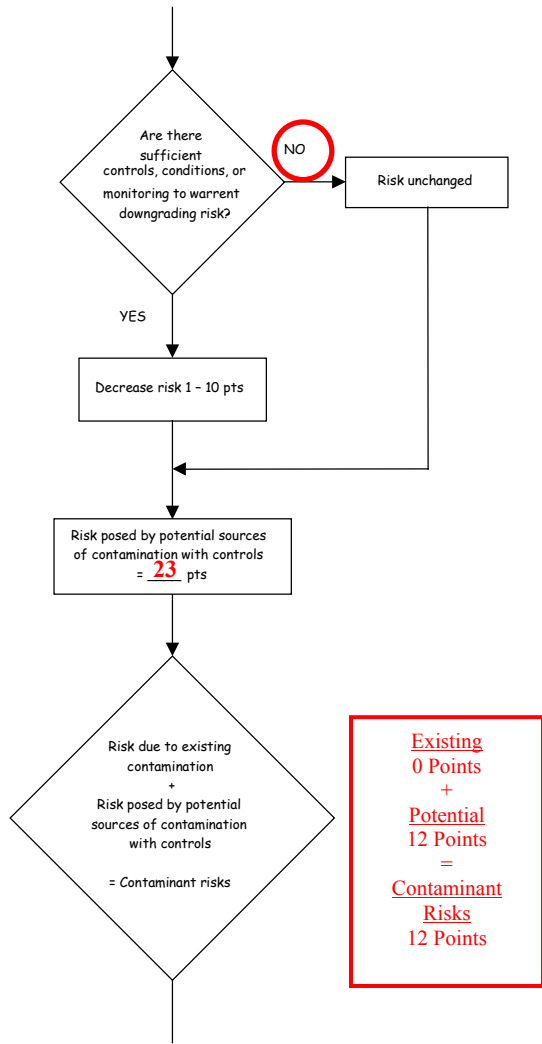


Table 6. Risk Matrix for Contaminant Sources for Lake O’The Hills Wells – Other Organic Chemicals

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	Septic systems, dirt and/or gravel roads, residential areas	LOW 10 pts	MEDIUM 20 pts	HIGH 30 pts	VERY HIGH 40 pts
	Low	>10 sources + 10 pts	> 10 sources + 5 pts	> 20 sources + 5 pts	---
	Medium	---	> 2 sources + 5 pts	> 5 sources + 5 pts	> 10 sources + 5 pts
	High	---	---	1 source + 10 pts	> 2 sources + 10 pts
	Very High	---	---	---	1 source + 10 pts

Chart 14. Vulnerability analysis for Lake O’The Hills Wells – Other Organic Chemicals

