

Source Water Assessment for
Spring Forest Homeowner's Association
Anchorage, Alaska

A Hydrogeologic Susceptibility and Vulnerability Analysis

DRINKING WATER PROTECTION PROGRAM REPORT 159

December 2001

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Spring Forest Homeowner's Association
Anchorage, Alaska

By HEATHER A. HAMMOND

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Source Water Assessment for Spring Forest Homeowner's Association Source of Public Drinking Water, Anchorage, Alaska

A Hydrogeologic Susceptibility and Vulnerability Analysis

By Heather A. Hammond

Drinking Water Protection Program Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The Public Water System for Spring Forest Homeowner's Association is a Class A (community) water system consisting of one well in the Anchorage area. Identified potential and current sources of contaminants for Spring Forest Homeowner's Association include: residential septic systems, highways and roads, activities associated with recreation trails, approximately 77 acres of residential area, a public utility corridor, and a heavy equipment rental and/or storage area. 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 source for Spring Forest Homeowner's Association received a vulnerability rating of **Low** for bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, synthetic organic chemicals, and other organic chemicals.



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

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 source of public drinking water serving Spring Forest Homeowner's Association. This water system consists of one well 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 source 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.

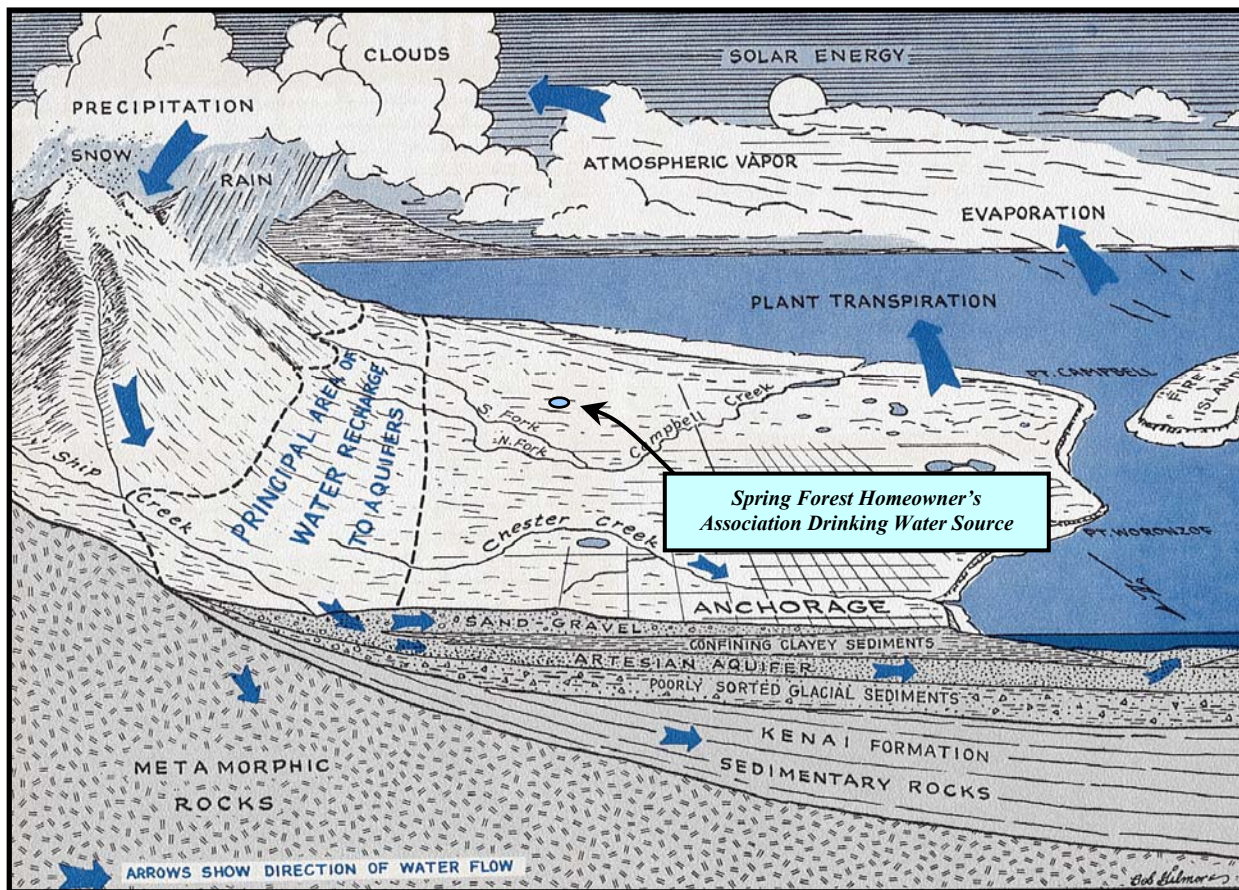


Figure 2. Generalized hydrologic cycle in the Anchorage area [Barnwell, George, Dearborn, Weeks, and Zenone, 1972].

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 enter 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.

SPRING FOREST HOMEOWNER'S ASSOCIATION PUBLIC DRINKING WATER SYSTEM

The public water system serving Spring Forest Homeowner's Association is a Class A (community)

water system, which is owned and operated by Spring Forest Homeowner's Association, of Anchorage. The system consists of one well, which is located off of Birch road (T12N, R3W, Section 14), at an elevation of approximately 500 feet above sea level (see Figure 3).

According to the most recent Monitoring Waiver Application (2/27/98) the well is in the middle of a fenced area which is graded to prevent storm water from entering the well along the well casing. The most recent Sanitary Survey (09/20/01) indicates that the well was properly installed with a cap which may provide protection against foreign objects and potential contaminants from entering the source waters at the well casing. Installation of the well was completed November 30, 1982 to a total depth of 310 feet below ground surface and was completed in a 6" well casing. The Sanitary Survey also indicates that the well was properly grouted. However, the vertical location of grouting along the well casing is unknown. Proper grouting provides added protection against contaminants travelling along the well casing and into source waters.

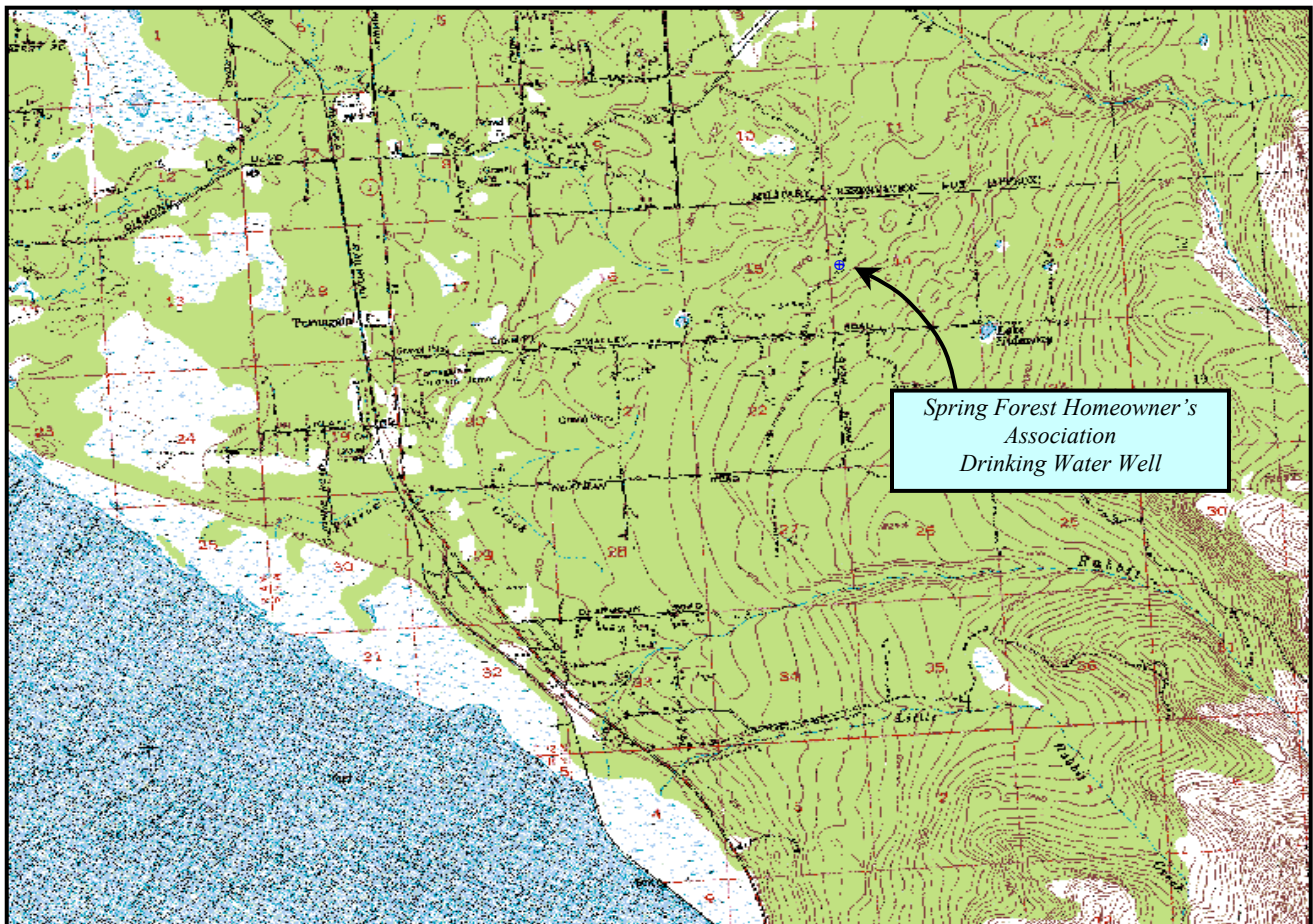


Figure 3. Map showing the location of the drinking water sources for Spring Forest Homeowner's Association [Base: USGS Anchorage A8].

This system operates year round and serves 94 residents through 26 service connections.

ASSESSMENT AND PROTECTION AREA FOR SPRING FOREST HOMEOWNER'S ASSOCIATION DRINKING WATER SOURCE

The Drinking Water Protection and Assessment Area that has been established for Spring Forest Homeowner's Association source 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 source to contamination. The zones around the drinking water source 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 determine 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 Spring Forest Homeowner's Association 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 $\frac{1}{4}$ 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 Spring Forest Homeowner's Association. 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
- Other organic chemicals

Maps 2 through 5 in Appendix C depict the Contaminant Source Inventory for Spring Forest Homeowner's Association. 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 Spring Forest Homeowner's Association:

- Residential septic systems;
- highways and roads;
- activities associated with recreation trails;
- approximately 77 acres of residential area;
- a public utility corridor;
- heavy equipment rental/storage area.

These potential and existing contaminant sources present risk for all six categories of drinking water contaminants for the source of public drinking water serving Spring Forest Homeowner's Association.

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 SPRING FOREST HOMEOWNER’S ASSOCIATION PUBLIC DRINKING WATER SOURCE

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.

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

The well serving Spring Forest Homeowner’s Association was completed in a confining aquifer. The depth to the top of the confining unit is approximately 6 feet below land surface. The thickness of the confining layer is suspected to be approximately 44 feet and composed of clay and silt with intermittent layers of tan gravel. 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 source of public drinking water serving Spring Forest Homeowner’s Association.

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

	Score	Rating
Susceptibility of the Wellhead	0	Low
Susceptibility of the Aquifer	12	Medium
Natural Susceptibility	12	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	22	Medium
Volatile Organic Chemicals	22	Medium
Heavy Metals, Cyanide, And Other Inorganic Chemicals	12	Low
Synthetic Organic Chemicals	12	Low
Other Organic Chemicals	22	Medium

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 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 Spring Forest Homeowner’s Association Public Drinking Water Source to Contamination by Category

Category	Score	Rating
Bacteria and Viruses	35	Low
Nitrates and Nitrites	35	Low
Volatile Organic Chemicals	35	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 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 residential areas, recreation trails and highways and roads.

Historical sampling data indicates that no nitrates and/or nitrites have not been detected in Spring Forest Homeowner’s Association 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 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 low.

Other low potential and existing sources of nitrates and/or nitrites include activities associated with residential areas, recreation trails, and highways and roads.

Overall, contaminant risk for volatile organic chemicals is low with highways and 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, heavy equipment rental/storage area, and a public utility easement corridor.

A natural gas pipeline transverses the Zone C 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 the source of public drinking water serving Spring Forest Homeowner’s Association.

Overall, contaminant risks for heavy metals, cyanide and other inorganic chemicals is low with highways and 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 highways and roads, residential septic systems and residential areas 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 other organic chemicals include activities associated with heavy equipment rental/storage areas.

SUMMARY

A *Source Water Assessment* has been completed for the sources of public drinking water serving Spring Forest Homeowner's Association. The overall vulnerability of this source to contamination is **Low** for bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals heavy metals, synthetic organic chemicals, and other organic chemicals. 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 Spring Forest Homeowner's Association 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 Spring Forest Homeowner's Association public drinking water source.

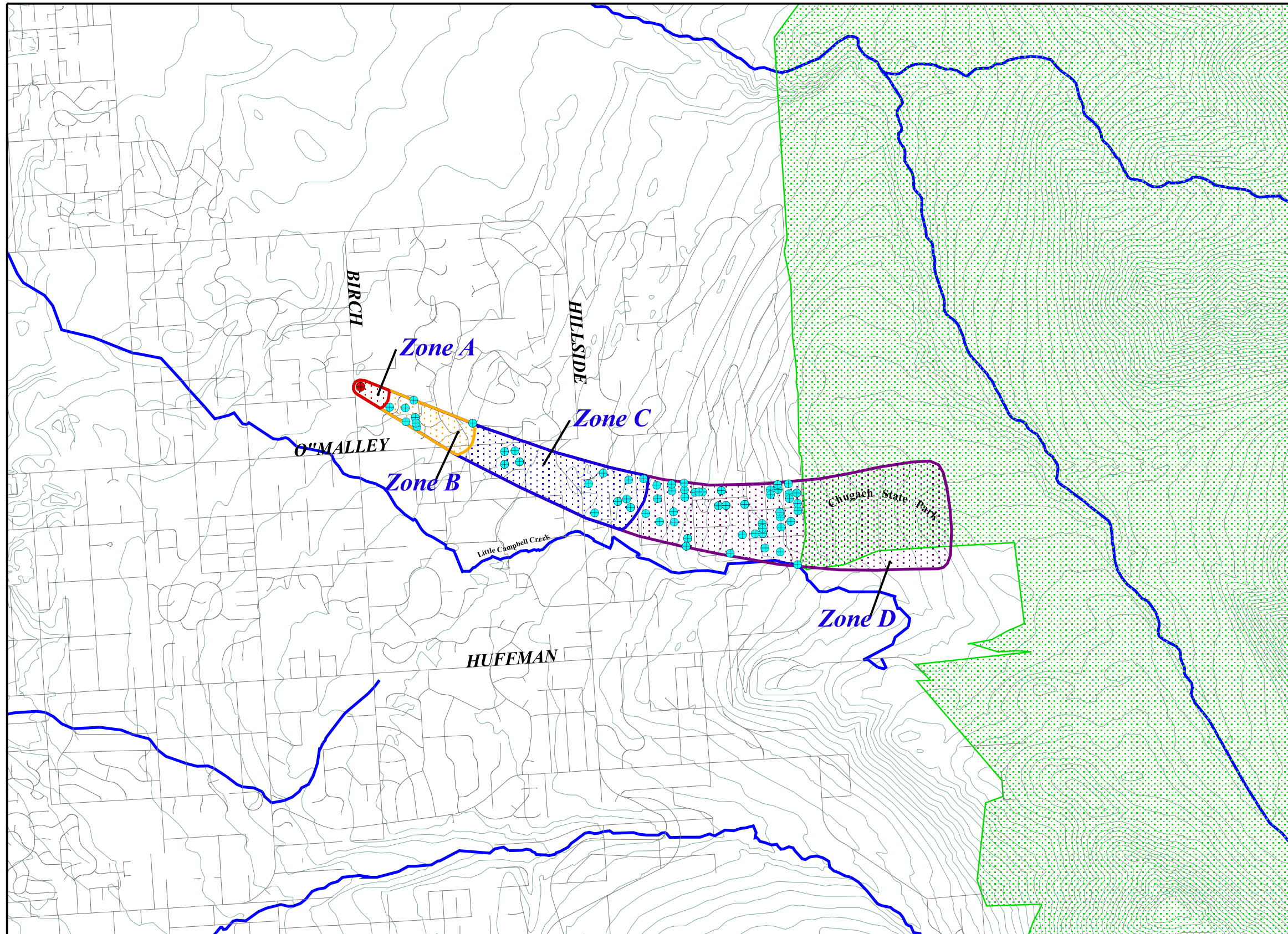
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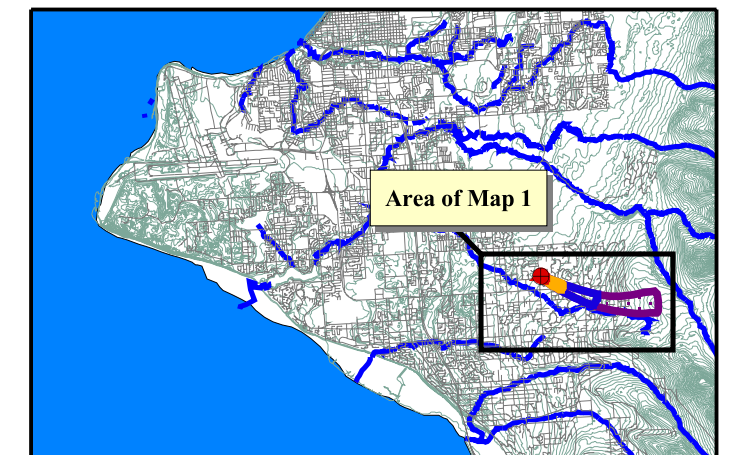
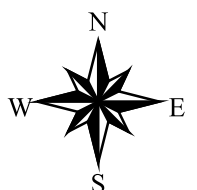
APPENDIX A

Spring Forest Homeowner's Association Drinking Water Protection Area

Drinking Water Protection Area for Spring Forest Homeowner's Association



- Spring Forest DW Well
- MOA Public & Private 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
- ⚡ Anchorage Roads
- Anchorage Parks
- ⚡ Anchorage Streams
- ⚡ Elevation Contours



PWSID 213564.001

Map 1

APPENDIX B

Contaminant Source Inventory and Risk Ranking for Spring Forest Homeowner's Association

Table 1

**Contaminant Source Inventory for
Spring Forest Homeowner's Association**

PWSID 213564.001

Contaminant Source Category	Contaminant Source ID	CS ID Tag	Zone	Location	Map	Comments
Highways and roads, paved (cement or asphalt)	X20	X20-10-21	4	Roads located within Zone C	3	
Residential Areas	R01	R1-1	A	Residential areas located within Zone A	3	
Septic systems (serves one or more single-family homes)	R2	R2-1	A	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-2	A	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-3	A	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-4	A	Near Birch Road	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Birch Road	2	
Dog walking areas/foot trails	X46	X46-1	A	Trail along east side of Birch Road	2	
Heavy equipment rental/storage	C18	C18-1	B	Off of Main Tree Drive	2	
Residential Areas	R01	R1-2	B	Residential areas located within Zone B	3	
Septic systems (serves one or more single-family homes)	R2	R2-10	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Along West Tree Drive	3	

Table 1

**Contaminant Source Inventory for
Spring Forest Homeowner's Association**

PWSID 213564.001

Septic systems (serves one or more single-family homes)	R2	R2-20	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-21	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Along Corner Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Along Main Tree Drive	3	

Table 1

**Contaminant Source Inventory for
Spring Forest Homeowner's Association**

PWSID 213564.001

Septic systems (serves one or more single-family homes)	R2	R2-42	B	Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-44	B	Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-5	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-7	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-9	B	Along West Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-2	B	West Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-3	B	West Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-4	B	West Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-5	B	Corner Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-6	B	Lone Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-7	B	Main Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-8	B	O'Malley Road	2	
Highways and roads, paved (cement or asphalt)	X20	X20-9	B	Ridgecrest Drive	2	
Dog walking areas/foot trails	X46	X46-2	B	Trail along west side of Main Tree Drive	2	
Dog walking areas/foot trails	X46	X46-3	B	Trail along north side of O'Malley Road	2	

Table 1**Contaminant Source Inventory for
Spring Forest Homeowner's Association****PWSID 213564.001**

Dog walking areas/foot trails	X46	X46-4	B	Trail along south side of O'Malley Road	2	
Residential Areas	R01	R1-3	C	Residential areas located within Zone C	4	
Septic systems (serves one or more single-family homes)	R2	R2-49-99	C	Septics located within Zone C	4	
Public utility easements/corridors	X42	X42-1	C	Utility easement along pipeline intersecting Zone C	4	
Dog walking areas/foot trails	X46	X46-5	C	Trail along west side of O'Malley Road	4	
Dog walking areas/foot trails	X46	X46-6	C	Trail along east side of O'Malley Road	4	

Table 2

**Contaminant Source Inventory and Risk Ranking for
Spring Forest Homeowner's Association
Sources of Bacteria and Viruses**

PWSID 213564.001

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	R2-1	A	Low	1	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-2	A	Low	2	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-3	A	Low	3	Near Birch Road	3	
Dog walking areas/foot trails	X46	X46-1	A	Low	4	Trail along east side of Birch Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-4	A	Low	5	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-5	B	Low	6	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	B	Low	7	Along West Tree Drive	3	
Residential Areas	R01	R1-1	A	Low	8	Residential areas located within Zone A	3	
Residential Areas	R01	R1-2	B	Low	9	Residential areas located within Zone B	3	
Septic systems (serves one or more single-family homes)	R2	R2-7	B	Low	10	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-10	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	Low		Along West Tree Drive	3	

Table 2

**Contaminant Source Inventory and Risk Ranking for
Spring Forest Homeowner's Association
Sources of Bacteria and Viruses**

PWSID 213564.001

Septic systems (serves one or more single-family homes)	R2	R2-40	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-9	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Low		Along Corner Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-21	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Low		Along Long Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-4	B	Very Low		West Tree Drive	2	
Dog walking areas/foot trails	X46	X46-4	B	Low		Trail along south side of O'Malley Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-44	B	Low		Along Main Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-9	B	Very Low		Ridgecrest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-3	B	Very Low		West Tree Drive	2	

Table 2

**Contaminant Source Inventory and Risk Ranking for
Spring Forest Homeowner's Association
Sources of Bacteria and Viruses**

PWSID 213564.001

Highways and roads, paved (cement or asphalt)	X20	X20-6	B	Very Low		Lone Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-10-21	4	Very Low		Roads located within Zone C	3	
Highways and roads, paved (cement or asphalt)	X20	X20-2	B	Very Low		West Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Low		Along O'Malley Road	3	
Dog walking areas/foot trails	X46	X46-3	B	Low		Trail along north side of O'Malley Road	2	
Residential Areas	R01	R1-3	C	Low		Residential areas located within Zone C	4	
Highways and roads, paved (cement or asphalt)	X20	X20-8	B	Very Low		O'Malley Road	2	
Highways and roads, paved (cement or asphalt)	X20	X20-5	B	Very Low		Corner Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Low		Along O'Malley Road	3	
Highways and roads, paved (cement or asphalt)	X20	X20-7	B	Very Low		Main Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-49-99	C	Low		Septics located within Zone C	4	
Dog walking areas/foot trails	X46	X46-6	C	Low		Trail along east side of O'Malley Road	4	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Very Low		Birch Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Low		Along Main Tree Drive	3	
Dog walking areas/foot trails	X46	X46-2	B	Low		Trail along west side of Main Tree Drive	2	
Dog walking areas/foot trails	X46	X46-5	C	Low		Trail along west side of O'Malley Road	4	

Table 3

**Contaminant Source Inventory and Risk Ranking for
Spring Forest Homeowner's Association
Sources of Nitrates/Nitrites**

PWSID 213564.001

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	R2-1	A	Low	1	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-2	A	Low	2	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-3	A	Low	3	Near Birch Road	3	
Dog walking areas/foot trails	X46	X46-1	A	Low	4	Trail along east side of Birch Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-4	A	Low	5	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-5	B	Low	6	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	B	Low	7	Along West Tree Drive	3	
Residential Areas	R01	R1-1	A	Low	8	Residential areas located within Zone A	3	
Residential Areas	R01	R1-2	B	Low	9	Residential areas located within Zone B	3	
Septic systems (serves one or more single-family homes)	R2	R2-7	B	Low	10	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Low		Along West Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-7	B	Very Low		Main Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-49-99	C	Low		Septics located within Zone C	4	
Highways and roads, paved (cement or asphalt)	X20	X20-5	B	Very Low		Corner Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Low		Along West Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-6	B	Very Low		Lone Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-44	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Low		Along West Tree Drive	3	

Table 3

**Contaminant Source Inventory and Risk Ranking for
Spring Forest Homeowner's Association
Sources of Nitrates/Nitrites**

PWSID 213564.001

Septic systems (serves one or more single-family homes)	R2	R2-30	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Low		Along O'Malley Road	3	
Highways and roads, paved (cement or asphalt)	X20	X20-10-21	4	Very Low		Roads located within Zone C	3	
Septic systems (serves one or more single-family homes)	R2	R2-9	B	Low		Along West Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-9	B	Very Low		Ridgecrest Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Low		Along Main Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-8	B	Very Low		O'Malley Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Low		Along West Tree Drive	3	
Dog walking areas/foot trails	X46	X46-2	B	Low		Trail along west side of Main Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-10	B	Low		Along West Tree Drive	3	
Dog walking areas/foot trails	X46	X46-5	C	Low		Trail along west side of O'Malley Road	4	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Low		Along Corner Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Low		Along Long Tree Drive	3	

Table 3

**Contaminant Source Inventory and Risk Ranking for
Spring Forest Homeowner's Association
Sources of Nitrates/Nitrites**

PWSID 213564.001

Dog walking areas/foot trails	X46	X46-3	B	Low		Trail along north side of O'Malley Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-21	B	Low		Along West Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-3	B	Very Low		West Tree Drive	2	
Residential Areas	R01	R1-3	C	Low		Residential areas located within Zone C	4	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Low		Along West Tree Drive	3	
Dog walking areas/foot trails	X46	X46-6	C	Low		Trail along east side of O'Malley Road	4	
Highways and roads, paved (cement or asphalt)	X20	X20-2	B	Very Low		West Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Low		Along Main Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Very Low		Birch Road	2	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Low		Along Long Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-4	B	Very Low		West Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Low		Along Main Tree Drive	3	
Dog walking areas/foot trails	X46	X46-4	B	Low		Trail along south side of O'Malley Road	2	

Table 4

**Contaminant Source Inventory and Risk Ranking for
Spring Forest Homeowner's Association
Sources of Volatile Organic Chemicals**

PWSID 213564.001

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, paved (cement or asphalt)	X20	X20-1	A	Low	1	Birch Road	2	
Highways and roads, paved (cement or asphalt)	X20	X20-2	B	Low	2	West Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-1	A	Low	3	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-2	A	Low	4	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-3	A	Low	5	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-4	A	Low	6	Near Birch Road	3	
Residential Areas	R01	R1-1	A	Low	7	Residential areas located within Zone A	3	
Residential Areas	R01	R1-2	B	Low	8	Residential areas located within Zone B	3	
Highways and roads, paved (cement or asphalt)	X20	X20-3	B	Low	9	West Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-4	B	Low	10	West Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Low		Along Main Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-7	B	Low		Main Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Low		Along Long Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-6	B	Low		Lone Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Low		Along Main Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-5	B	Low		Corner Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-21	B	Low		Along West Tree Drive	3	

Table 4

**Contaminant Source Inventory and Risk Ranking for
Spring Forest Homeowner's Association
Sources of Volatile Organic Chemicals**

PWSID 213564.001

Public utility easements/corridors	X42	X42-1	C	Low		pipeline intersecting Zone C	4	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Low		Along Corner Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-49-99	C	Low		Septics located within Zone C	4	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-7	B	Low		Along West Tree Drive	3	
Heavy equipment rental/storage	C18	C18-1	B	Medium		Off of Main Tree Drive	2	
Residential Areas	R01	R1-3	C	Low		Residential areas located within Zone C	4	
Septic systems (serves one or more single-family homes)	R2	R2-44	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-5	B	Low		Along West Tree Drive	3	

Table 4

**Contaminant Source Inventory and Risk Ranking for
Spring Forest Homeowner's Association
Sources of Volatile Organic Chemicals**

PWSID 213564.001

Septic systems (serves one or more single-family homes)	R2	R2-16	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-9	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Low		Along O'Malley Road	3	
Highways and roads, paved (cement or asphalt)	X20	X20-10-21	4	Low		Roads located within Zone C	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Low		Along West Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-8	B	Low		O'Malley Road	2	
Highways and roads, paved (cement or asphalt)	X20	X20-9	B	Low		Ridgecrest Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-10	B	Low		Along West Tree Drive	3	

Table 5

**Contaminant Source Inventory and Risk Ranking for
Spring Forest HOA
Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals**

PWSID 213564.001

Contaminant Source Type	Contaminant Source ID	CS ID Tag	Zone	Risk Ranking for Analysis	Overall Rank After Analysis	Location	Map Number	Comments
Residential Areas	R01	R1-1	A	Low	1	Residential areas located within Zone A	3	
Residential Areas	R01	R1-2	B	Low	2	Residential areas located within Zone B	3	
Septic systems (serves one or more single-family homes)	R2	R2-1	A	Low	3	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-2	A	Low	4	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-3	A	Low	5	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-4	A	Low	6	Near Birch Road	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	7	Birch Road	2	
Highways and roads, paved (cement or asphalt)	X20	X20-2	B	Low	8	West Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-3	B	Low	9	West Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-5	B	Low	10	Along West Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-10-21	4	Low		Roads located within Zone C	3	
Heavy equipment rental/storage	C18	C18-1	B	Low		Off of Main Tree Drive	2	
Septic systems (serves one or more single-family homes)	R2	R2-10	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-18	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Low		Along West Tree Drive	3	

Table 5

**Contaminant Source Inventory and Risk Ranking for
Spring Forest HOA
Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals**

PWSID 213564.001

Septic systems (serves one or more single-family homes)	R2	R2-21	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Low		Along Corner Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-33	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Low		Along Main Tree Drive	3	

Table 5

**Contaminant Source Inventory and Risk Ranking for
Spring Forest HOA
Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals**

PWSID 213564.001

Septic systems (serves one or more single-family homes)	R2	R2-44	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-7	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-9	B	Low		Along West Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-4	B	Low		West Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-5	B	Low		Corner Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-6	B	Low		Lone Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-7	B	Low		Main Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-8	B	Low		O'Malley Road	2	
Highways and roads, paved (cement or asphalt)	X20	X20-9	B	Low		Ridgecrest Drive	2	
Residential Areas	R01	R1-3	C	Low		Residential areas located within Zone C	4	
Septic systems (serves one or more single-family homes)	R2	R2-49-99	C	Low		Septics located within Zone C	4	

Table 6

**Contaminant Source Inventory and Risk Ranking for
Spring Forest Homeowner's Association
Sources of Synthetic Organic Chemicals**

PWSID 213564.001

Contaminant Source Type	Contaminant Source ID	CS ID Tag	Zone	Risk Ranking for Analysis	Overall Rank After Analysis	Location	Map Number	Comments
Residential Areas	R01	R1-1	A	Low	1	Residential areas located within Zone A	3	
Residential Areas	R01	R1-2	B	Low	2	Residential areas located within Zone B	3	
Septic systems (serves one or more single-family homes)	R2	R2-1	A	Low	3	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-2	A	Low	4	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-3	A	Low	5	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-4	A	Low	6	Near Birch Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-5	B	Low	7	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-6	B	Low	8	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-7	B	Low	9	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	Low	10	Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-25	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-48	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-14	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-20	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-21	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-35	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-22	B	Low		Along Corner Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-44	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-23	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-34	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-8	B	Low		Along West Tree Drive	3	
Residential Areas	R01	R1-3	C	Low		Residential areas located within Zone C	4	
Septic systems (serves one or more single-family homes)	R2	R2-42	B	Low		Along Main Tree Drive	3	

Table 6

**Contaminant Source Inventory and Risk Ranking for
Spring Forest Homeowner's Association
Sources of Synthetic Organic Chemicals**

PWSID 213564.001

Septic systems (serves one or more single-family homes)	R2	R2-33	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-49-99	C	Low		Septics located within Zone C	4	
Septic systems (serves one or more single-family homes)	R2	R2-43	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-26	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-27	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-32	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-28	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-29	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-31	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-30	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-24	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-12	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-9	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-17	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-45	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-40	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-41	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-10	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-46	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-11	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-39	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-36	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-47	B	Low		Along O'Malley Road	3	
Septic systems (serves one or more single-family homes)	R2	R2-19	B	Low		Along West Tree Drive	3	

Table 6**Contaminant Source Inventory and Risk Ranking for
Spring Forest Homeowner's Association
Sources of Synthetic Organic Chemicals**

PWSID 213564.001

Septic systems (serves one or more single-family homes)	R2	R2-18	B	Low		Along Long Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-37	B	Low		Along Main Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-16	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-13	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-15	B	Low		Along West Tree Drive	3	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Low		Along Long Tree Drive	3	

Table 7

**Contaminant Source Inventory and Risk Ranking for
Spring Forest Homeowner's Association
Sources of Other Organic Chemicals**

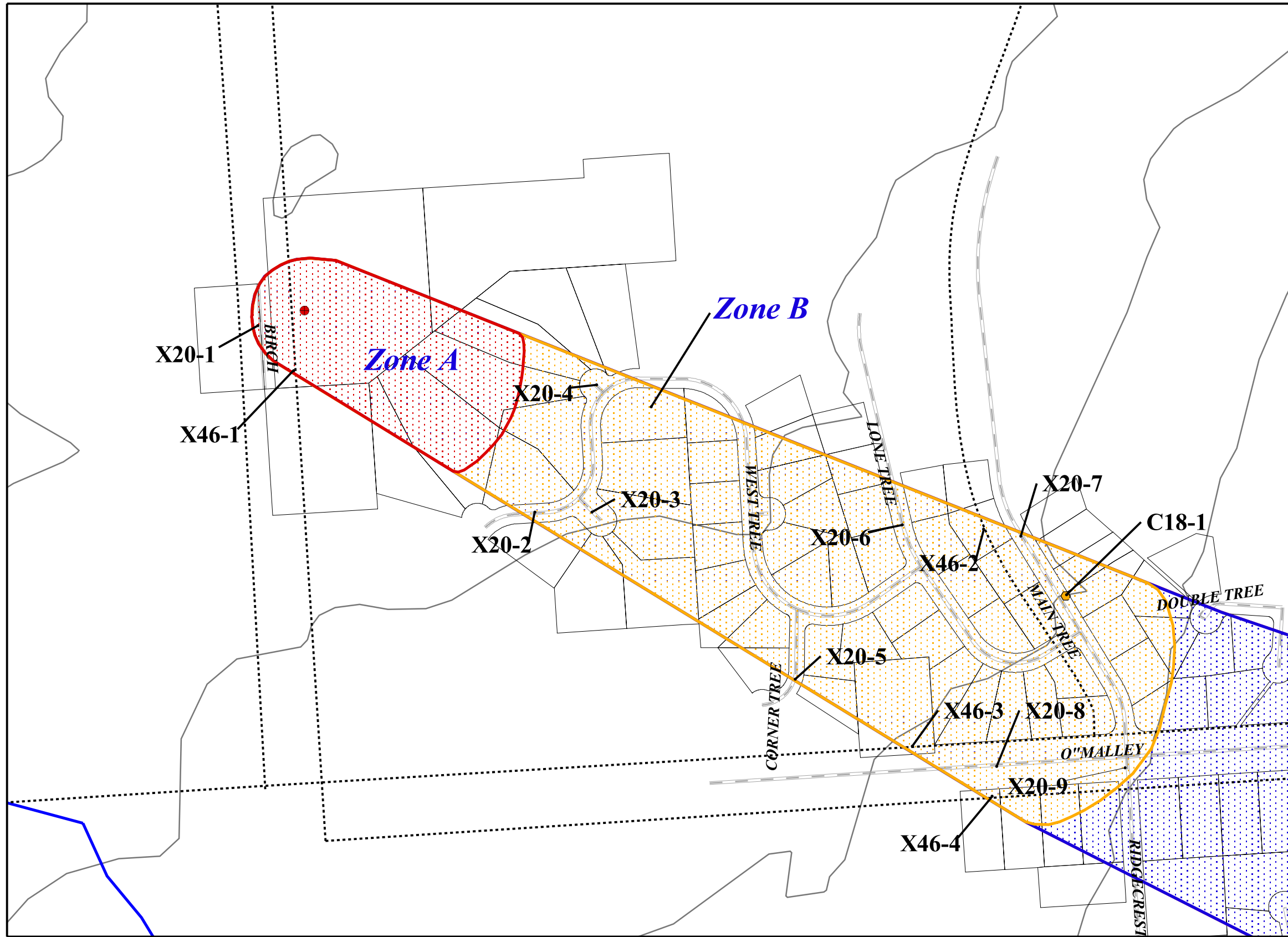
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Contaminant Source Type	Contaminant Source ID	CS ID Tag	Zone	Risk Ranking for Analysis	Overall Rank After Analysis	Location	Map Number	Comments
Residential Areas	R01	R1-1	A	Low	1	Residential areas located within Zone A	3	
Residential Areas	R01	R1-2	B	Low	2	Residential areas located within Zone B	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	3	Birch Road	2	
Highways and roads, paved (cement or asphalt)	X20	X20-2	B	Low	4	West Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-3	B	Low	5	West Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-4	B	Low	6	West Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-5	B	Low	7	Corner Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-6	B	Low	8	Lone Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-7	B	Low	9	Main Tree Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-8	B	Low	10	O'Malley Road	2	
Residential Areas	R01	R1-3	C	Low		Residential areas located within Zone C	4	
Septic systems (serves one or more single-family homes)	R2	R2-38	B	Low		Along Long Tree Drive	3	
Highways and roads, paved (cement or asphalt)	X20	X20-9	B	Low		Ridgecrest Drive	2	
Highways and roads, paved (cement or asphalt)	X20	X20-10-21	4	Low		Roads located within Zone C	3	
Heavy equipment rental/storage	C18	C18-1	B	Medium		Off of Main Tree Drive	2	

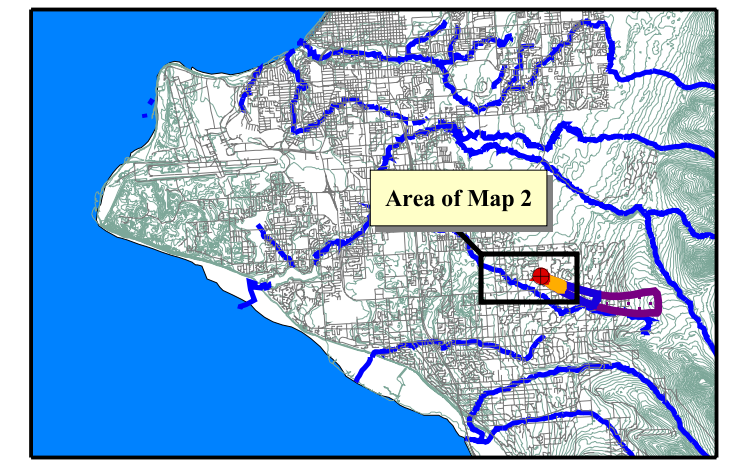
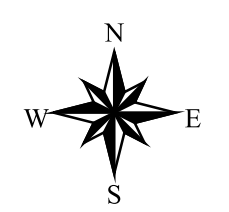
APPENDIX C

Spring Forest Homeowner's Association Drinking Water Protection Area and Potential & Existing Contaminant Sources

Drinking Water Protection Area for Spring Forest Homeowner's Association and Potential & Existing Contaminant Sources



- Spring Forest DW Well
- 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
- Potential & Existing Contaminant Sources
- Heavy equipment rental/storage (C18)
- ▬ Roads (X20)
- ▬ Trails (X46)
- MOA Lakes
- ▬ Anchorage Streams
- ▬ Elevation Contours

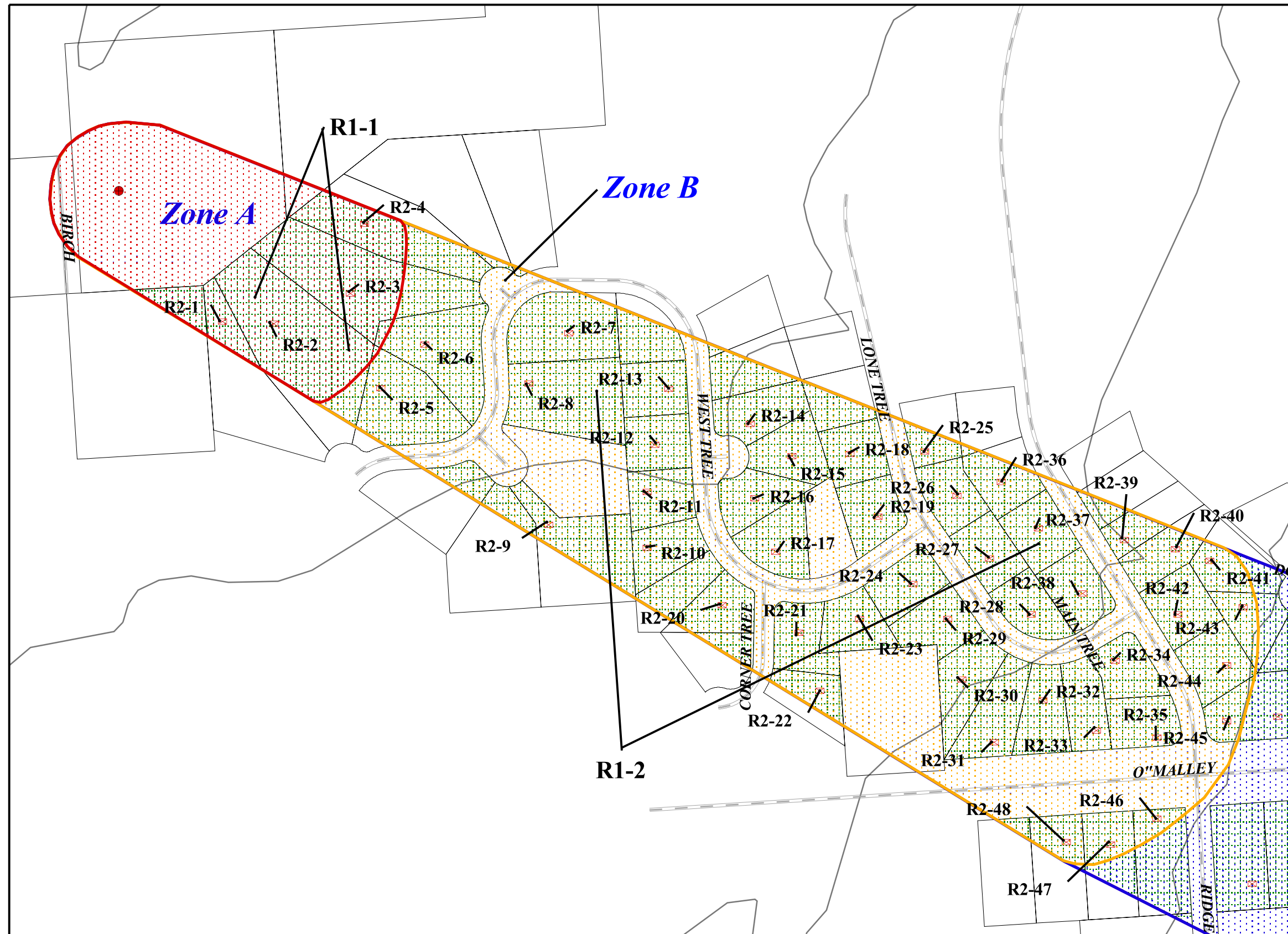


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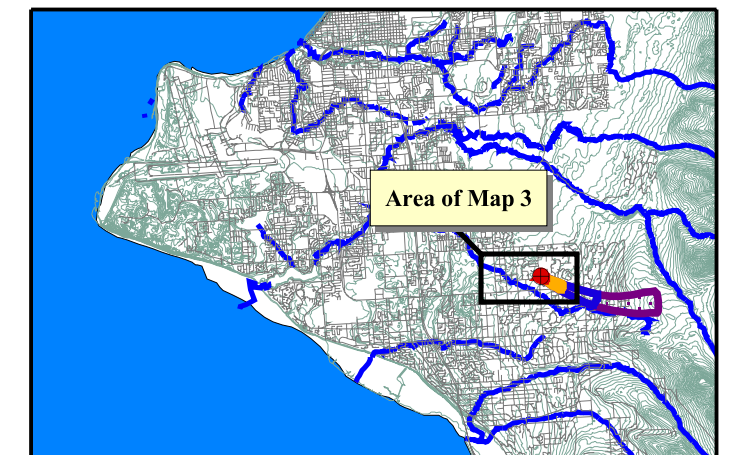
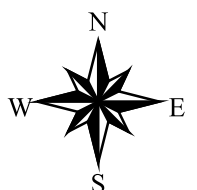
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Map 2

Drinking Water Protection Area for Spring Forest Homeowner's Association and Potential & Existing Contaminant Sources



- Spring Forest DW Well
- 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
- ▨ Roads (X20)
- ▨ Septic Systems (R2)
- ▨ MOA Land Parcels
- Anchorage Land Use
- ▨ Residentail Areas (R1)
- ▨ MOA Lakes
- ▨ Anchorage Streams
- ▨ Elevation Contours

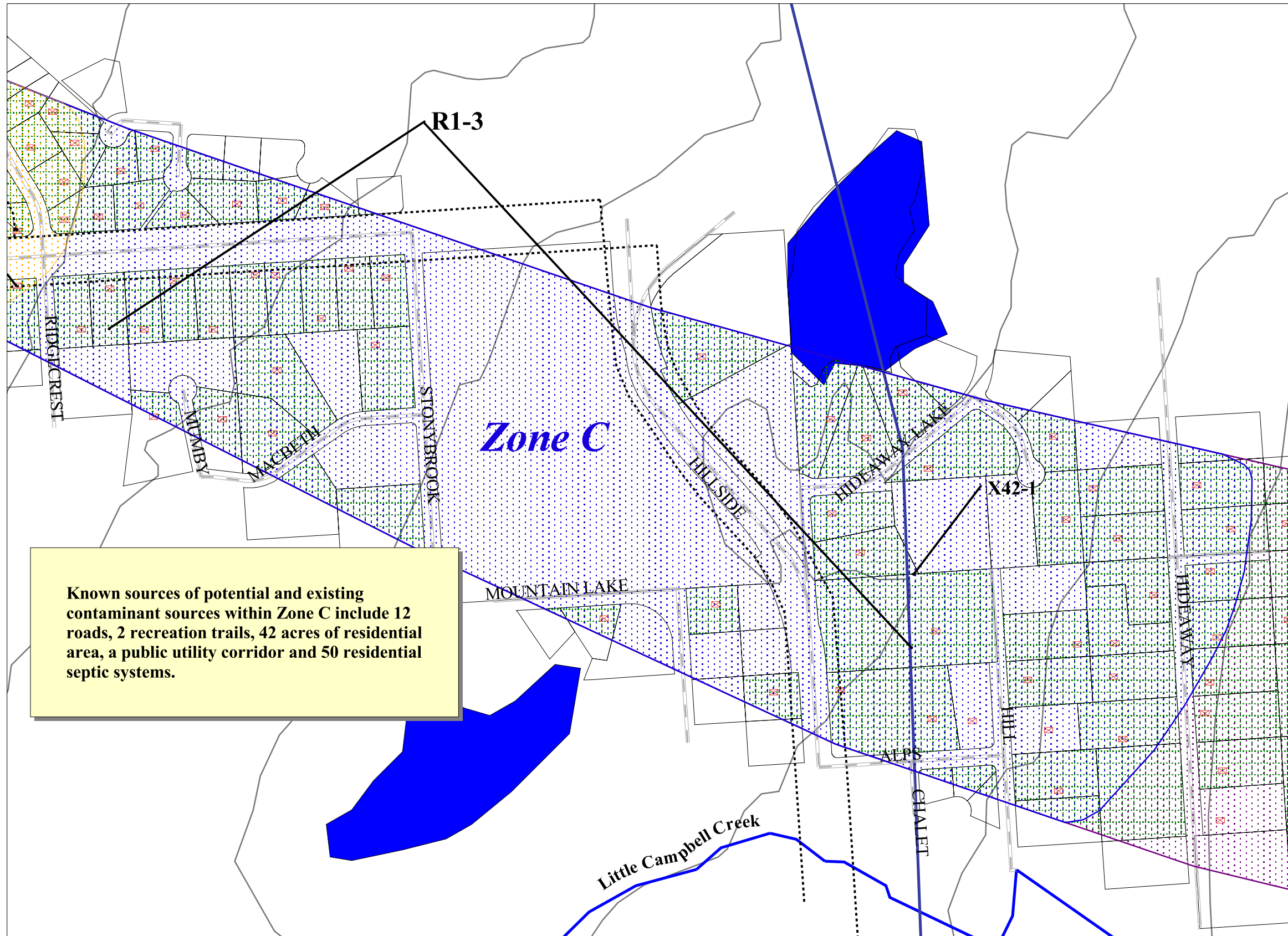


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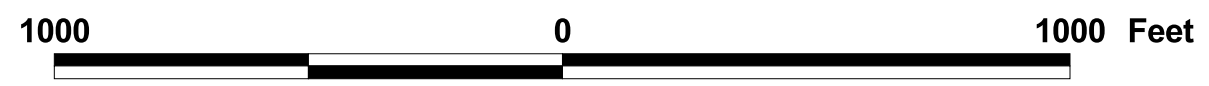
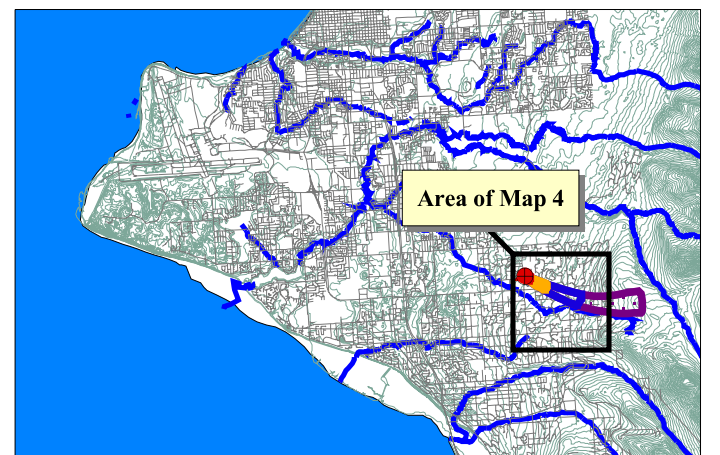
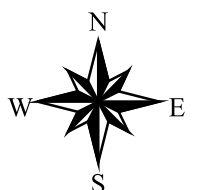
Map 3

Drinking Water Protection Area for Spring Forest Homeowner's Association and Potential & Existing Contaminant Sources



Known sources of potential and existing contaminant sources within Zone C include 12 roads, 2 recreation trails, 42 acres of residential area, a public utility corridor and 50 residential septic systems.

- Spring Forest DW Well
- 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
- Roads (X20)
- ⊗ Septic Systems (R2)
- Public utility easements/corridors (X42)
- ⋯ Trails (X46)
- MOA Land Parcels
- Anchorage Land Use
 - Residentail Areas (R1)
 - MOA Lakes
 - Anchorage Streams
 - Elevation Contours



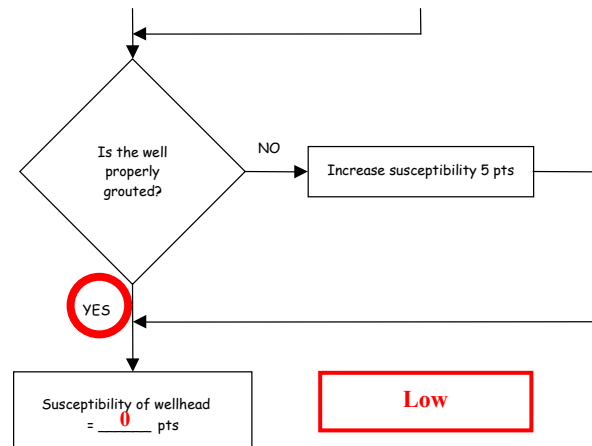
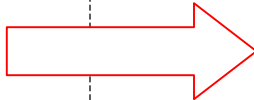
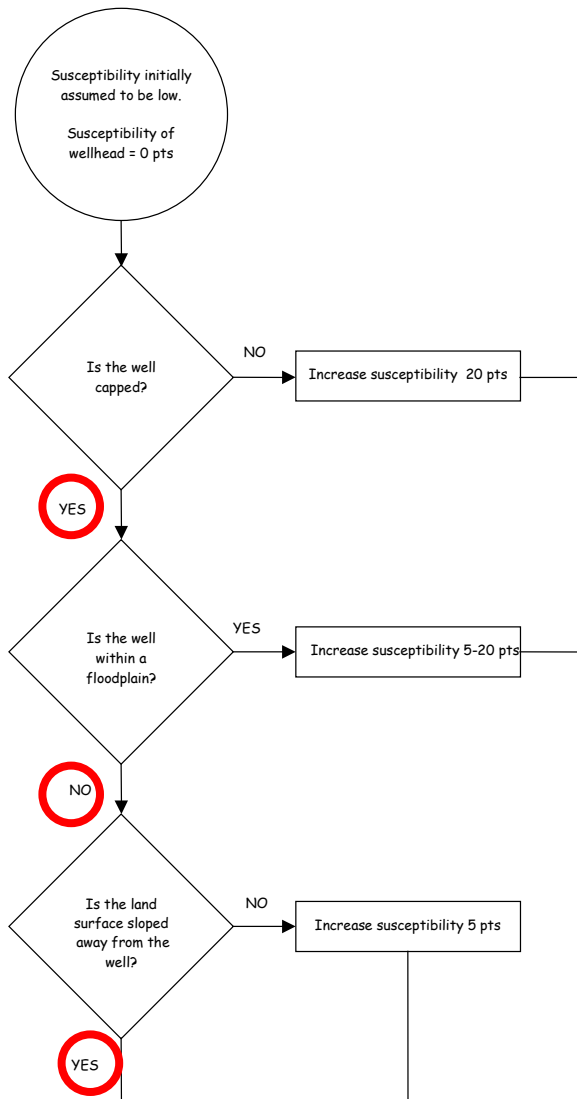
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Map 4

APPENDIX D

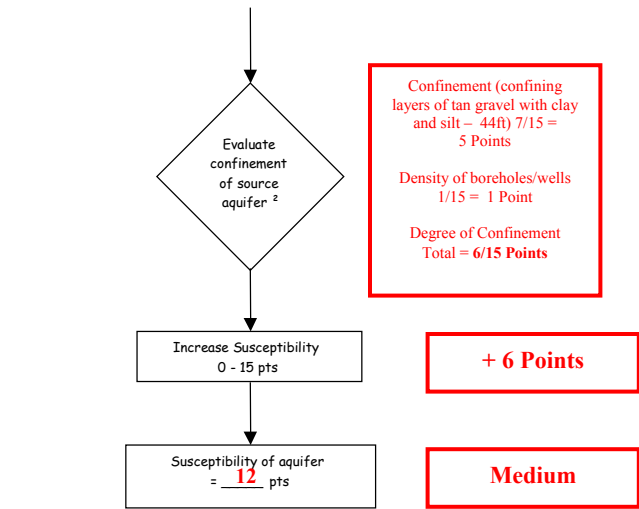
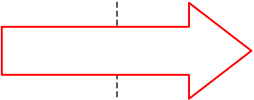
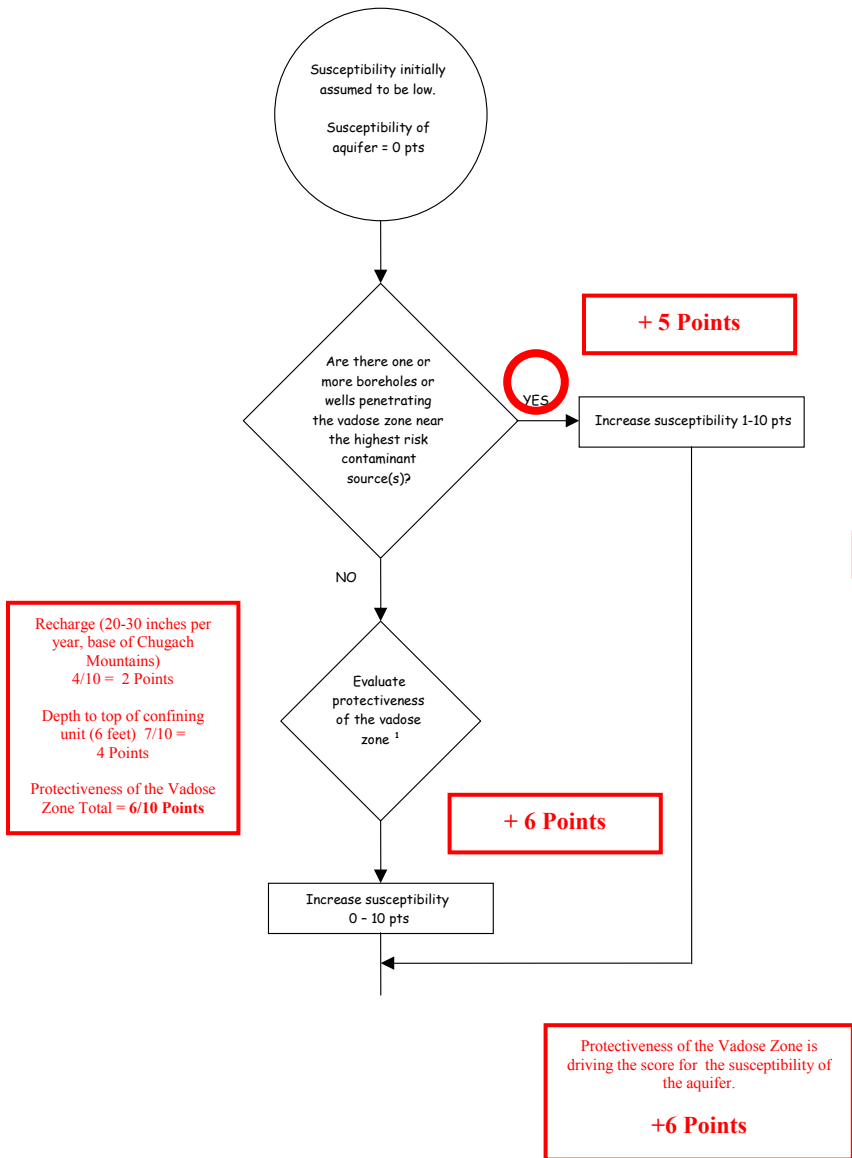
Vulnerability Analysis for Spring Forest Homeowner's Association Public Drinking Water Source

Chart 1. Susceptibility of the wellhead – Spring Forest Homeowner’s Association



<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 – Spring Forest Homeowner’s Association



1. Protectiveness of the Vadose Zone

- net recharge (function of precipitation, slope of land surface, & permeability of soils) [0 - 10 pts; 50% weight]
- depth to water table (unconfined aquifer) or top of confining layer (confined aquifer) [interpolate linearly: 100' - 20', 0 - 5 pts; 20' - 0', 5 - 10 pts; 50% weight]

2. Degree of Confinement

- confined versus unconfined aquifer [confined: $K \leq 10^{-6}$ cm/s, minimum thickness of at least one layer = 20 ft, interpolate linearly 100' - 20', 0 - 10 pts; unconfined = 15 pts; 65% weight]
- density of boreholes and wells penetrating the confining layer (confined aquifer) or the water table (unconfined aquifer) [confined: 0 - 15 pts; unconfined = 15 pts; 35% weight]

Aquifer Susceptibility Ratings

20 to 25 pts	very high
15 to < 20 pts	high
10 to < 15 pts	medium
< 10	low

Chart 3. Contaminant risks for Spring Forest Homeowner's Association – Bacteria & Viruses

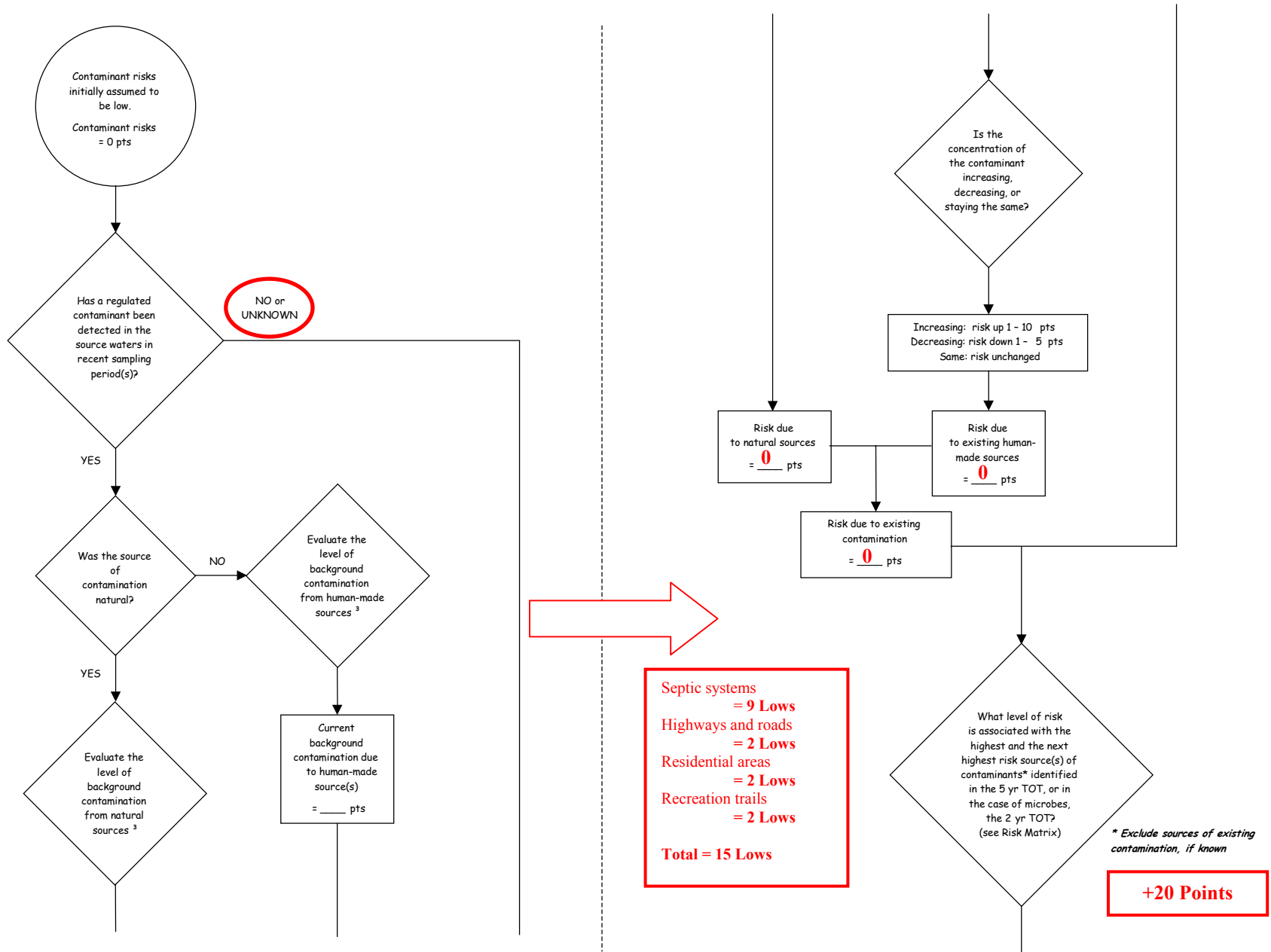
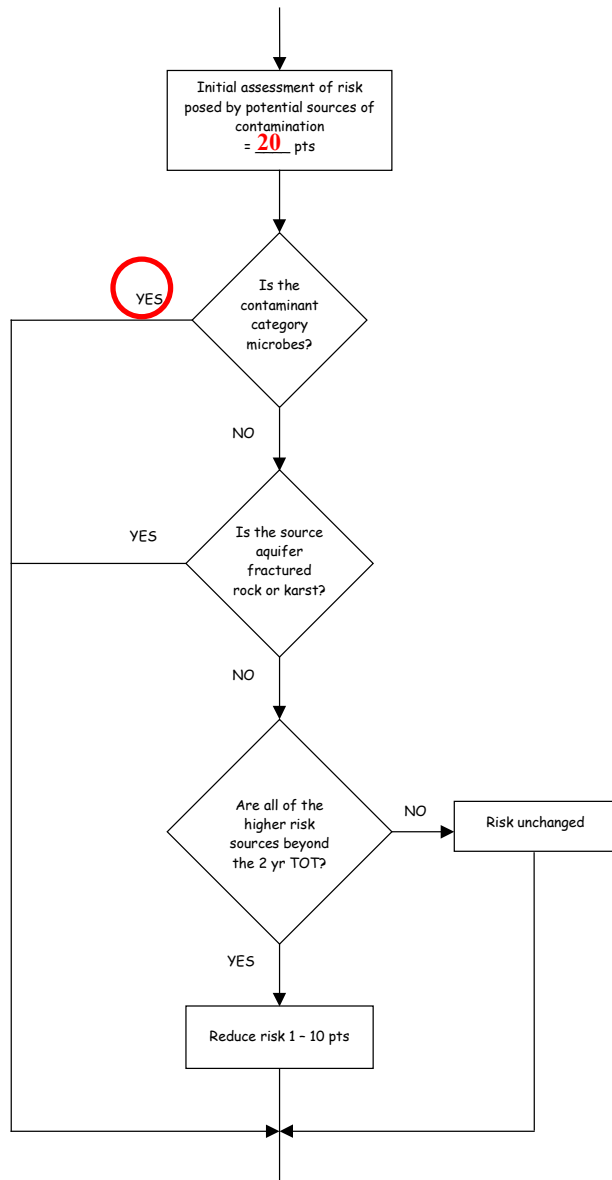
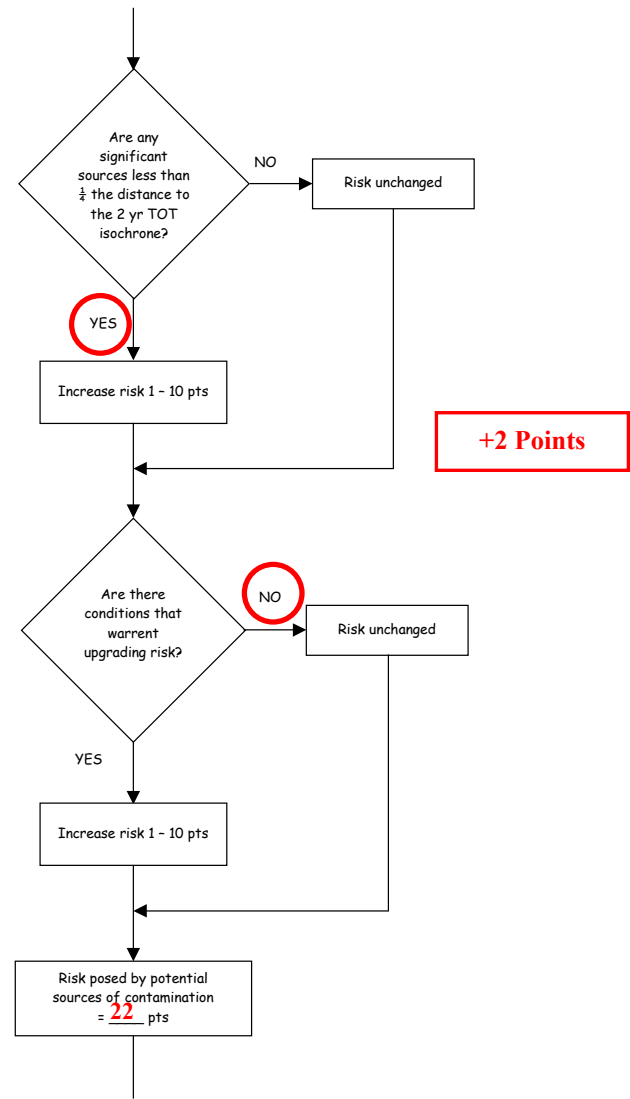
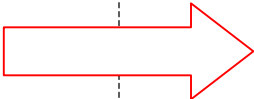


Chart 3. Contaminant risks for Spring Forest Homeowner's Association – Bacteria & Viruses (Continued)



Zone A
 Septic systems present a significant source of bacteria and viruses.
 + 2 Points



+2 Points

Chart 3. Contaminant risks for Spring Forest Homeowner's Association – Bacteria & Viruses (Continued)

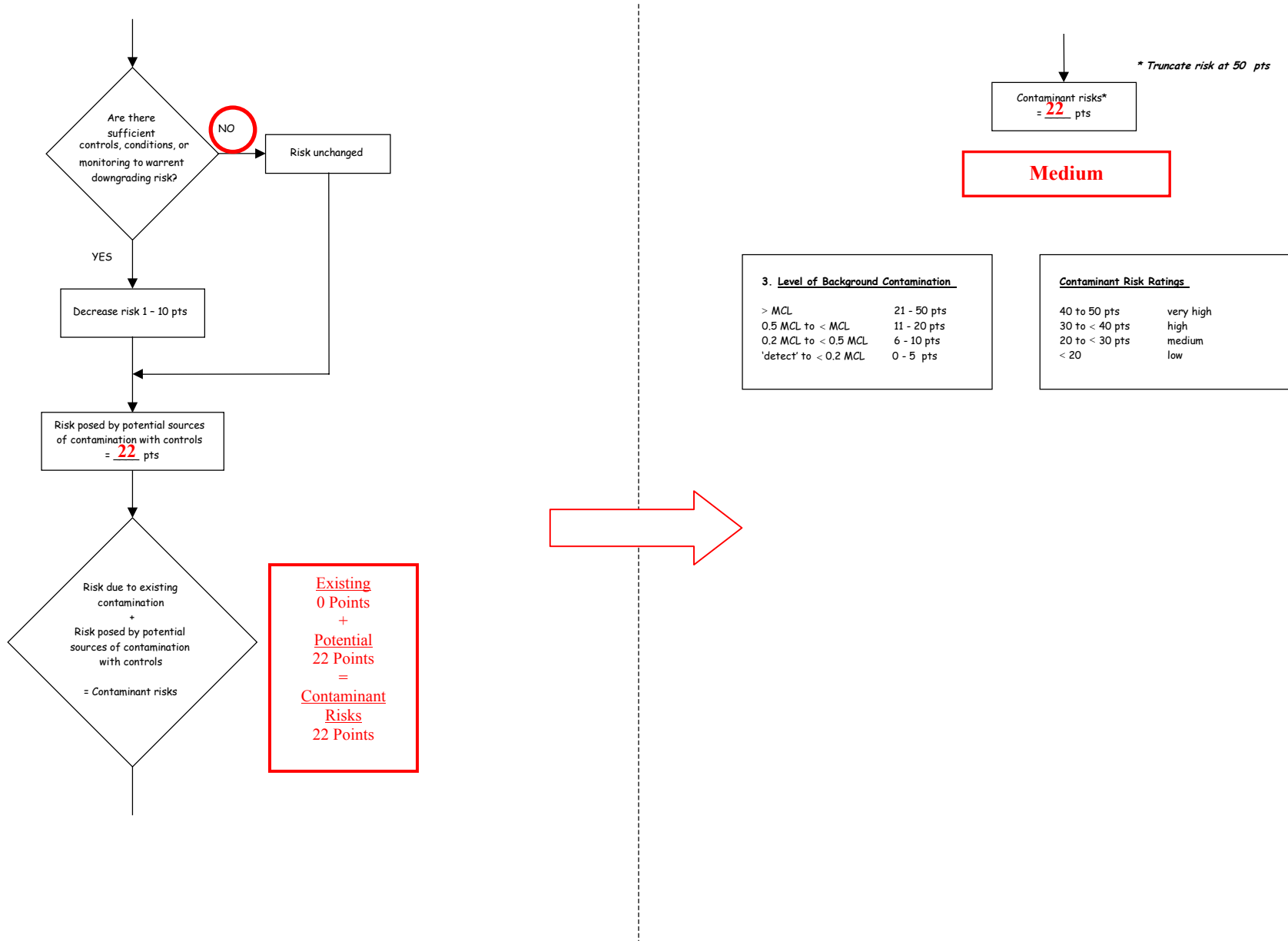


Table 1. Risk Matrix for Contaminant Sources for Spring Forest Homeowner’s Association – Bacteria & Viruses

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	Septic systems, highways and 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 Spring Forest Homeowner's Association – Bacteria & Viruses

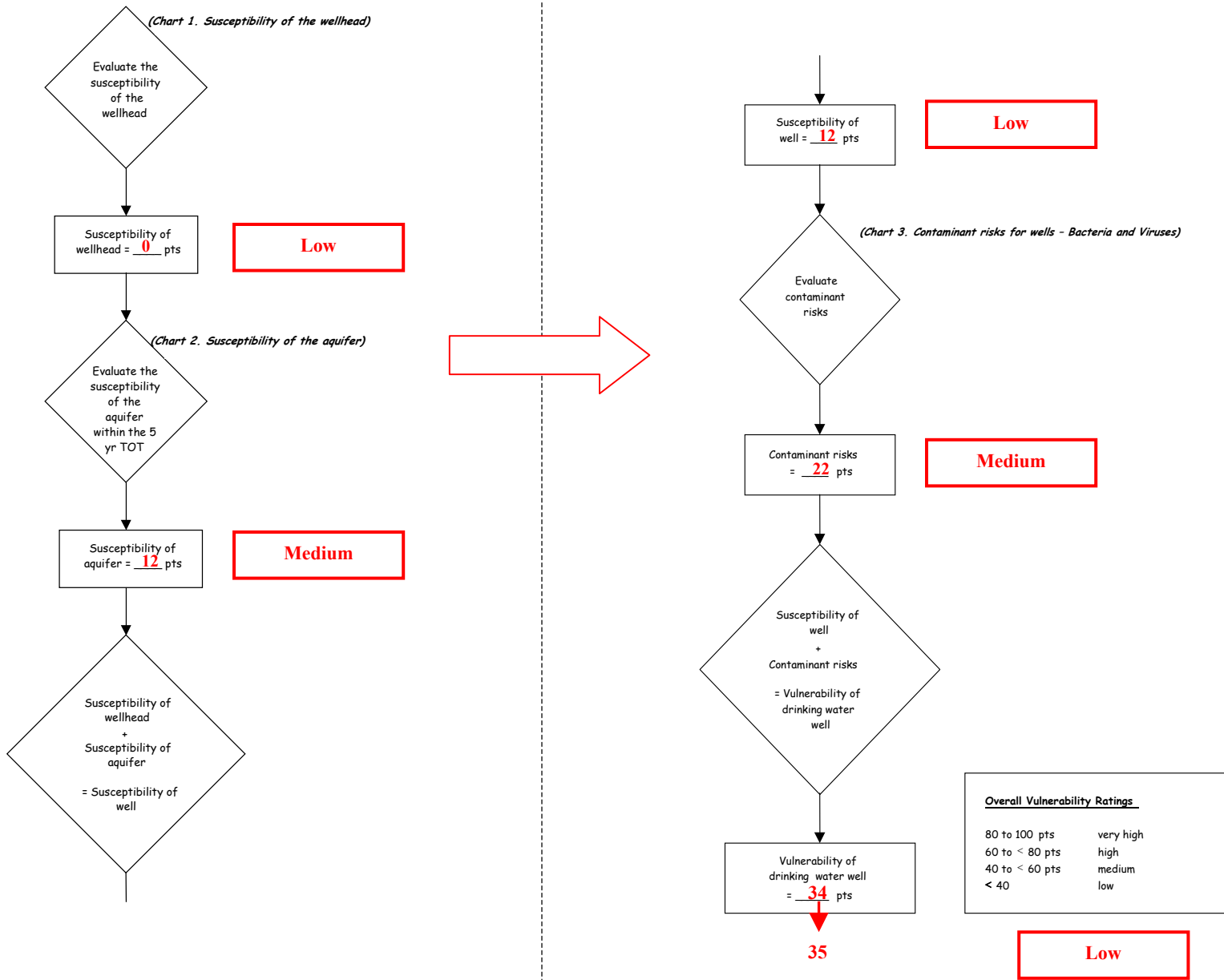


Chart 5. Contaminant risks for Spring Forest Homeowner's Association – Nitrates and Nitrites

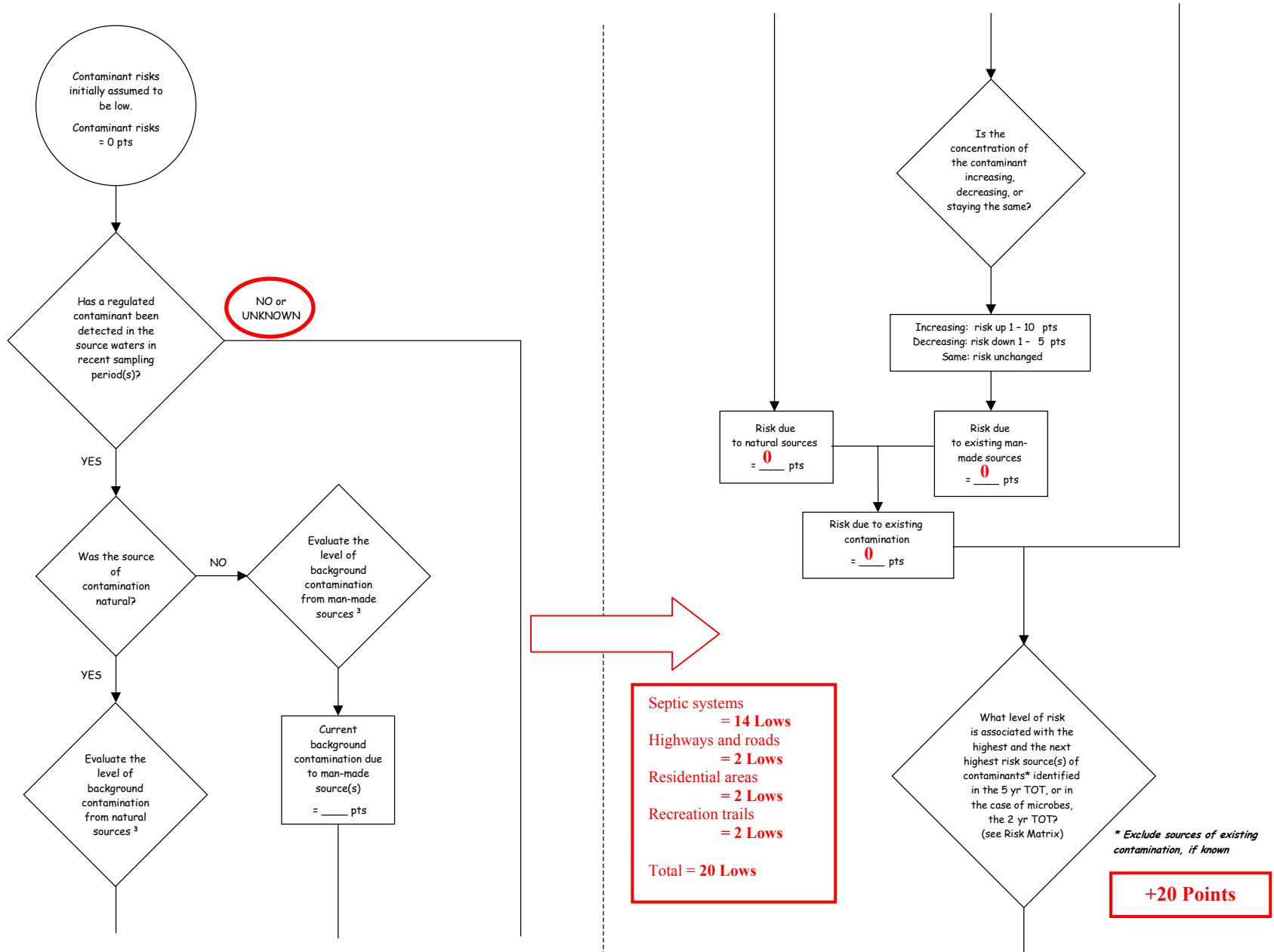
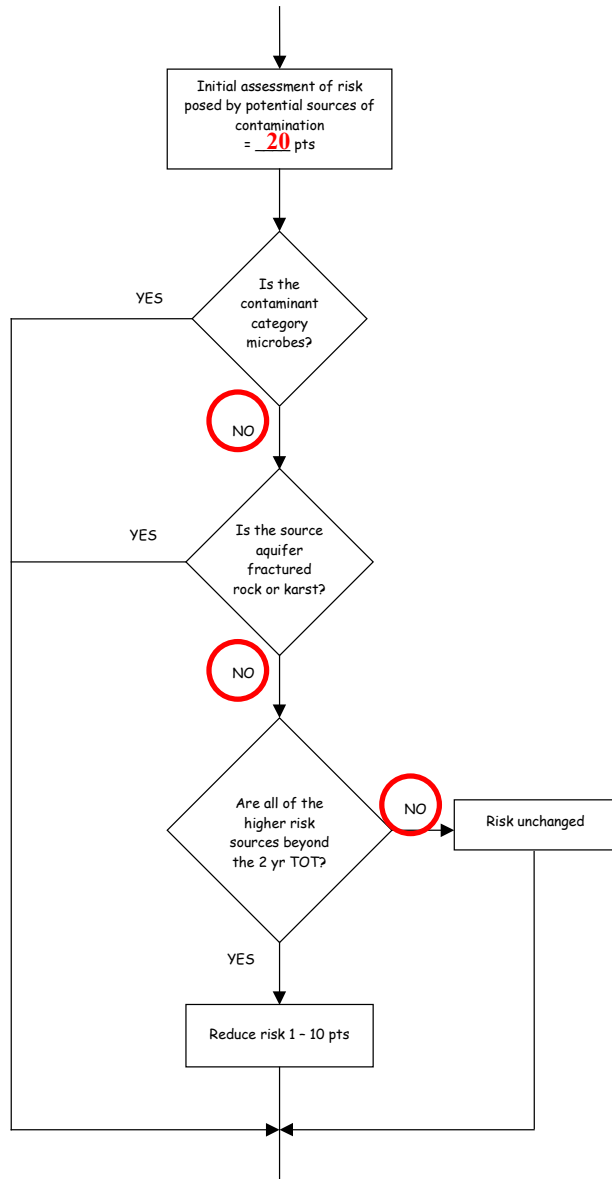


Chart 5. Contaminant risks for Spring Forest Homeowner's Association – Nitrates and Nitrites (Continued)



Zone A
 Septic systems present a significant source of nitrates and nitrites.
 +2 Points

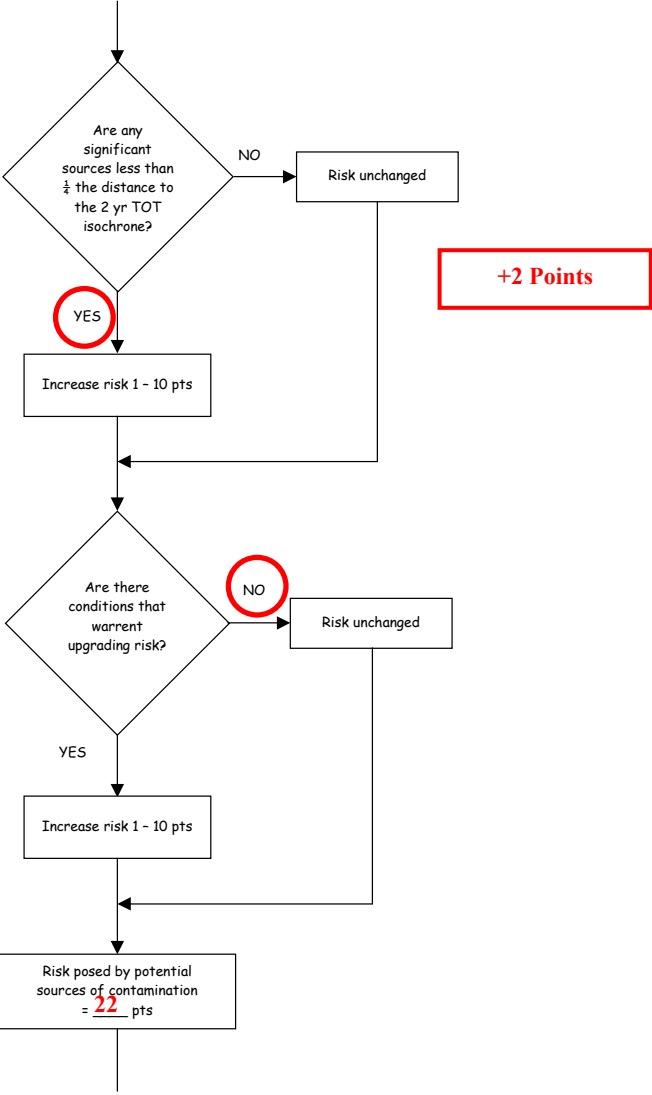
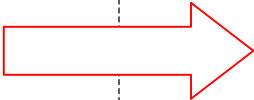


Chart 5. Contaminant risks for Spring Forest Homeowner's Association – Nitrates and Nitrites (Continued)

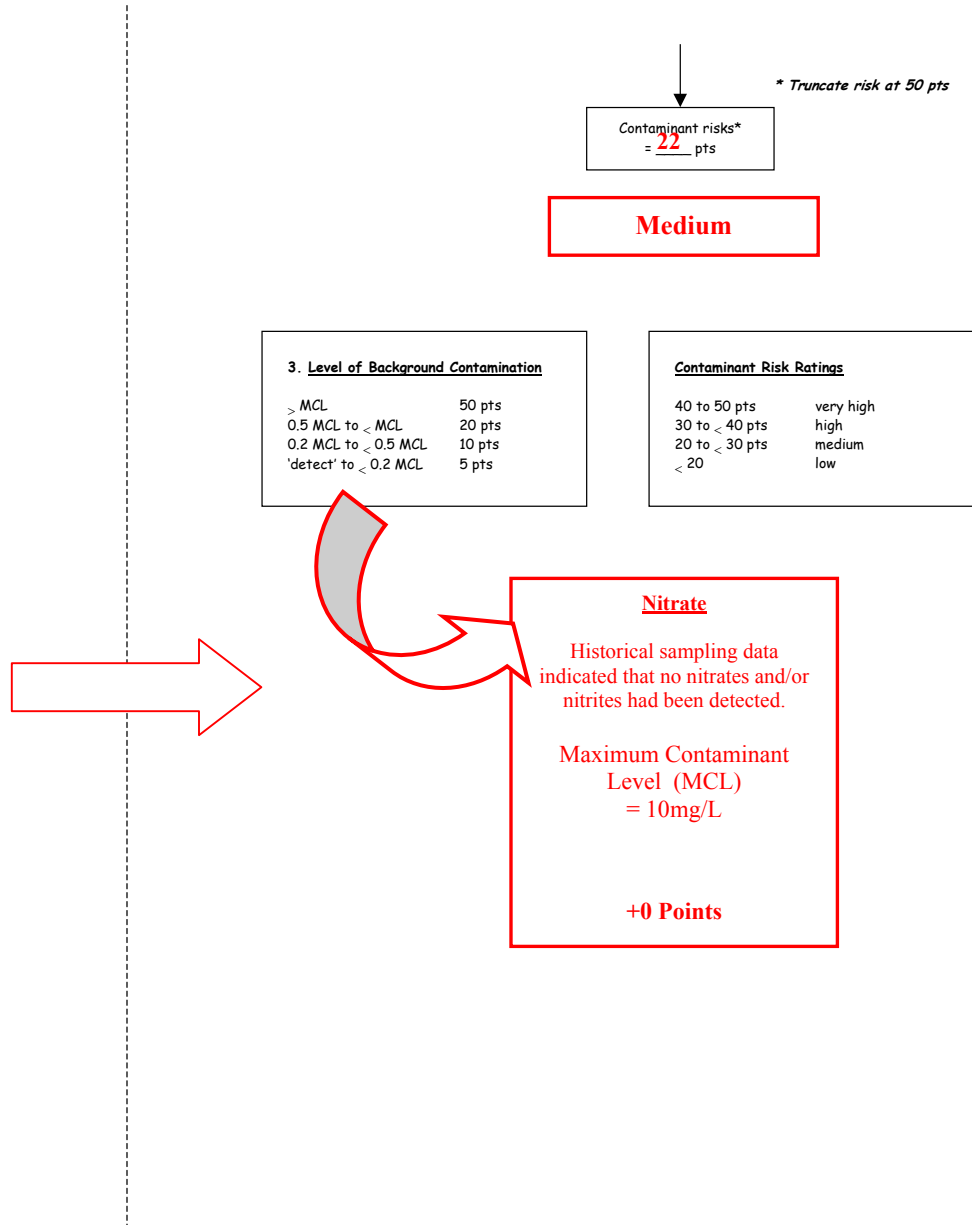
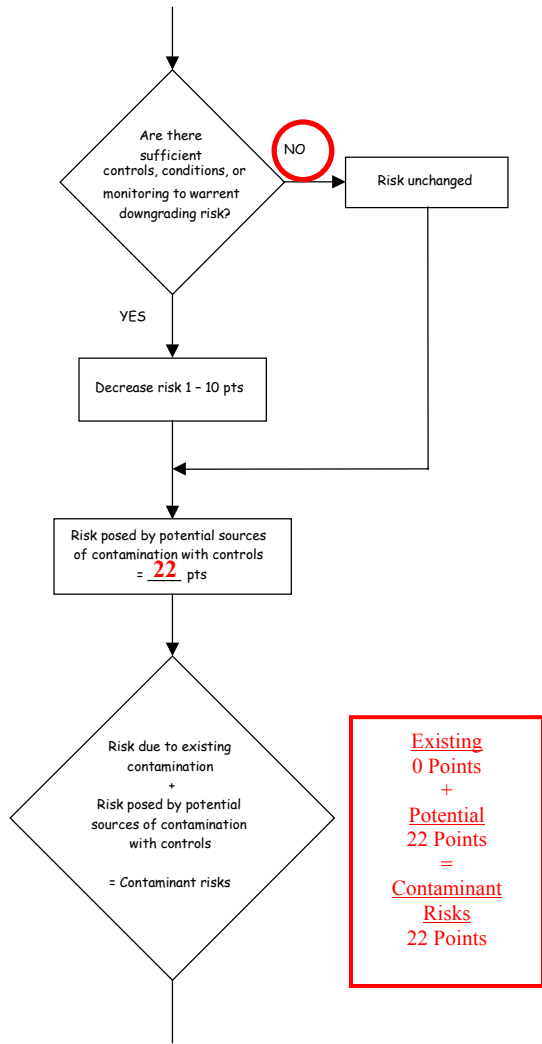


Table 2. Risk Matrix for Contaminant Sources for Spring Forest Homeowner’s Association – Nitrates and Nitrites

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	Septic systems, highways and 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 Spring Forest Homeowner's Association – Nitrates and Nitrites

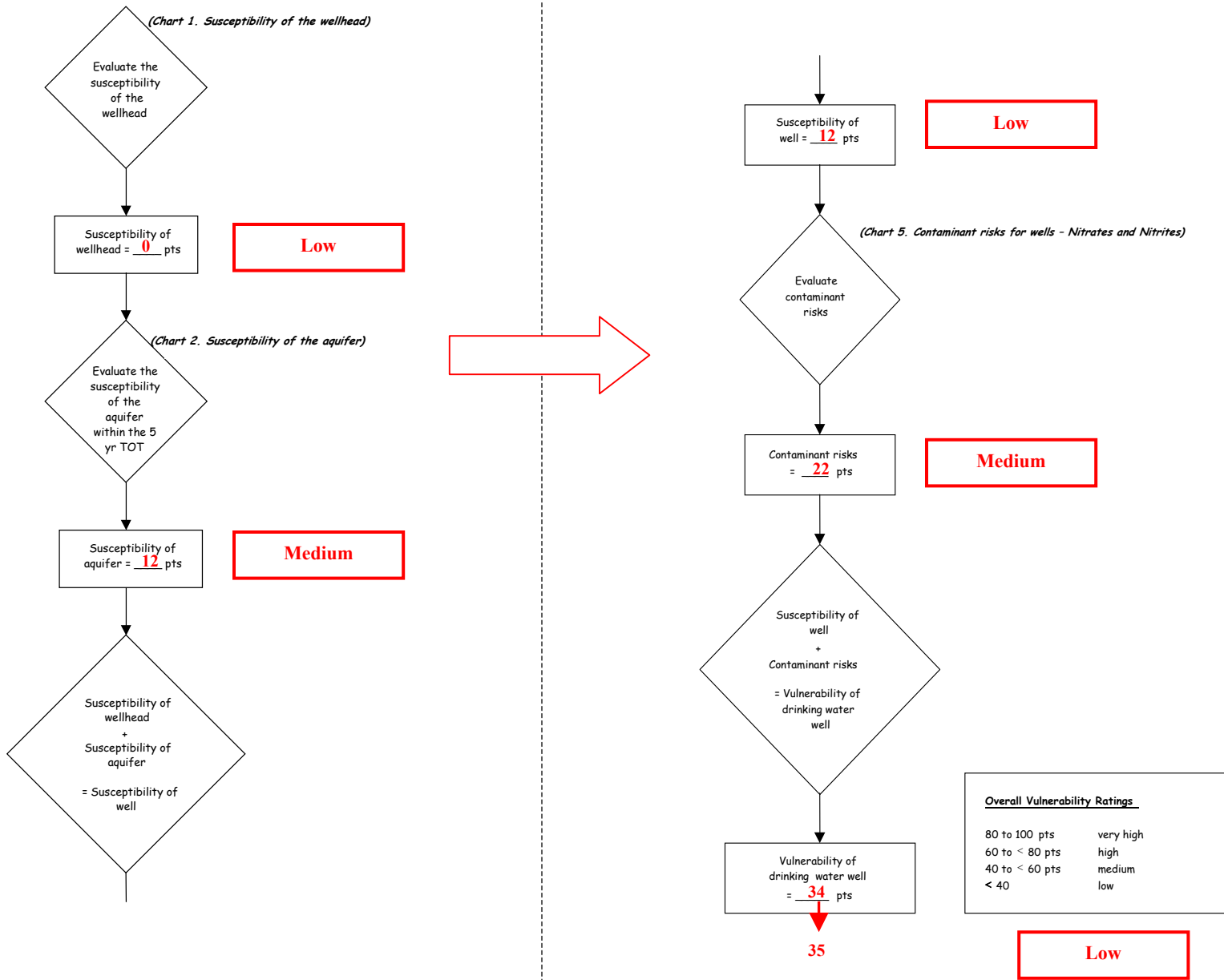


Chart 7. Contaminant risks for Spring Forest Homeowner's Association – Volatile Organic Chemicals

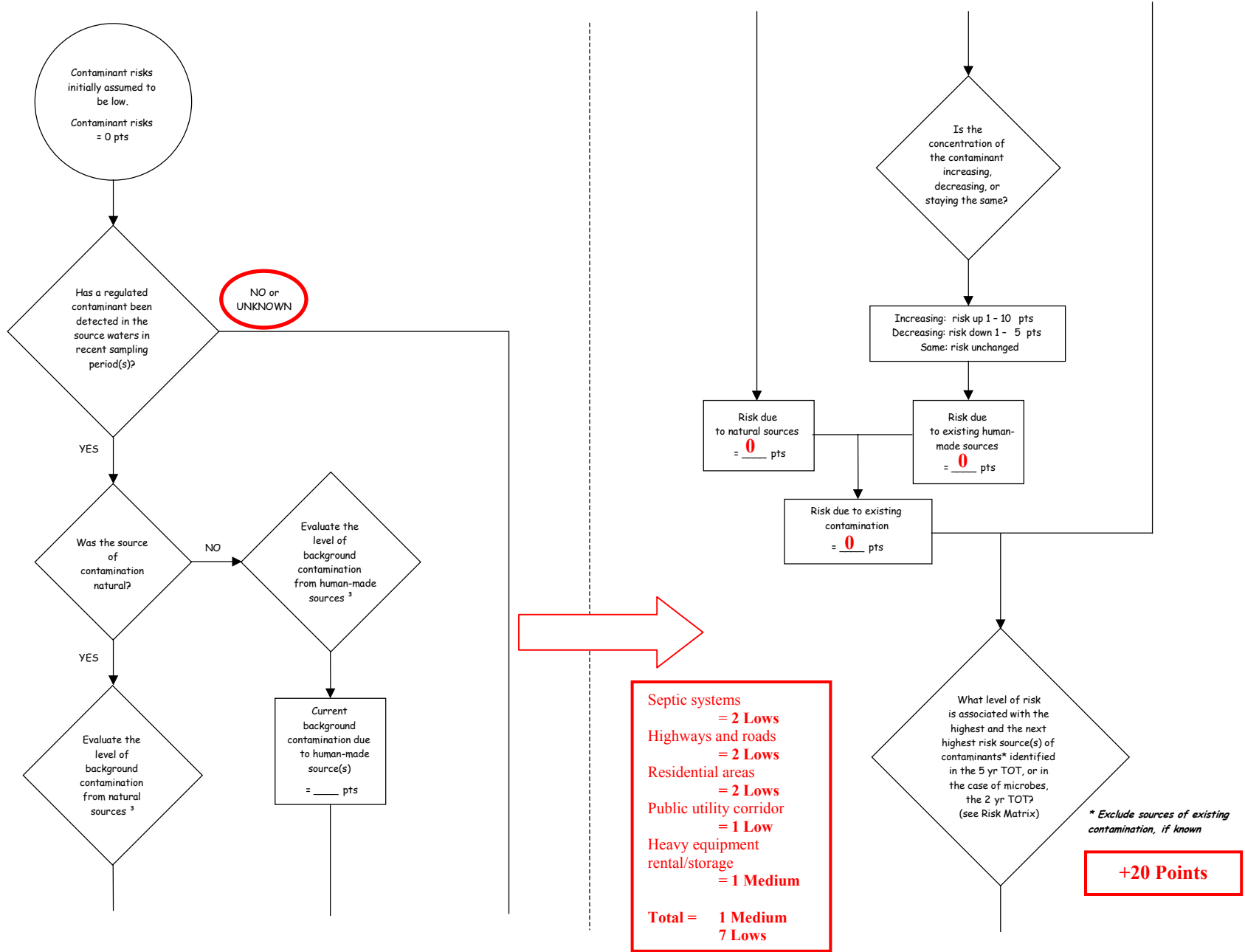
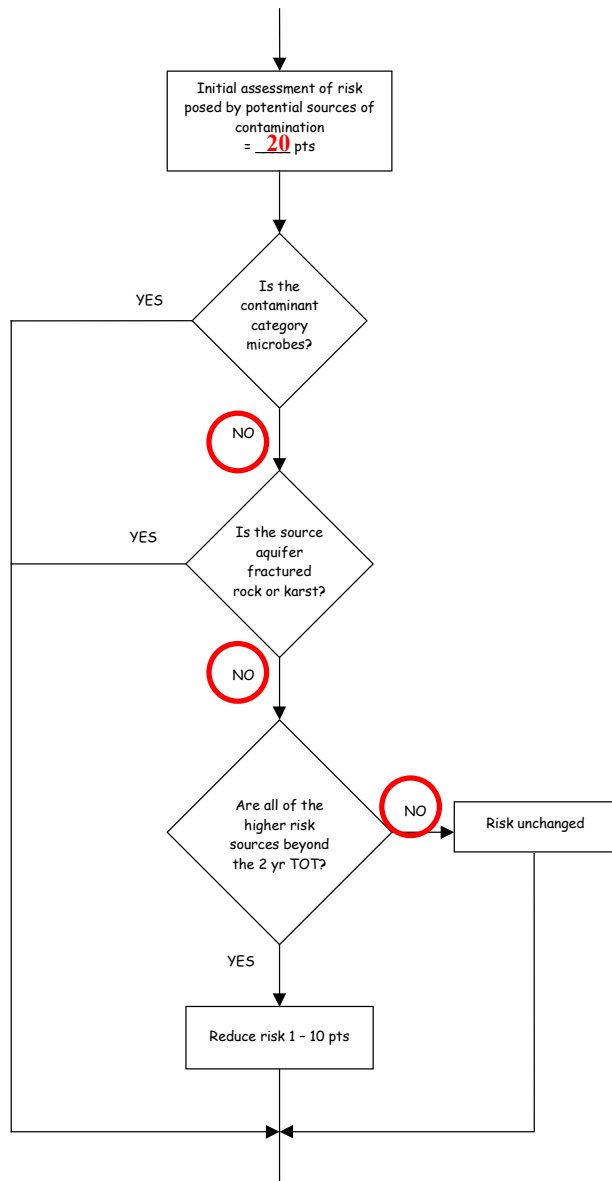
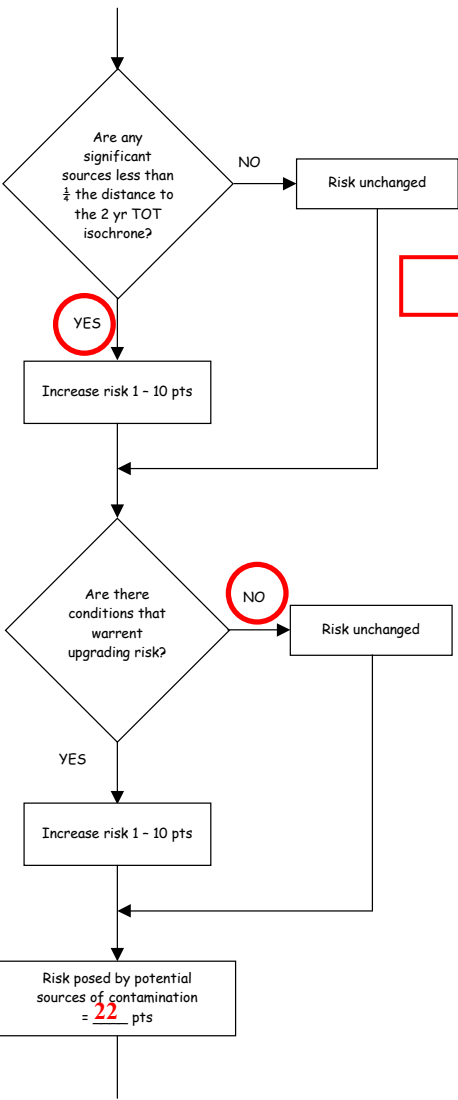
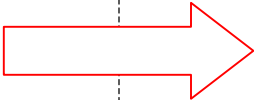


Chart 7. Contaminant risks for Spring Forest Homeowner's Association – Volatile Organic Chemicals (Continued)



Zone A
 Septic systems and highways and roads present significant sources of volatile organic chemicals.
 +2 Points



+ 2 Points

Chart 7. Contaminant risks for Spring Forest Homeowner's Association – Volatile Organic Chemicals (Continued)

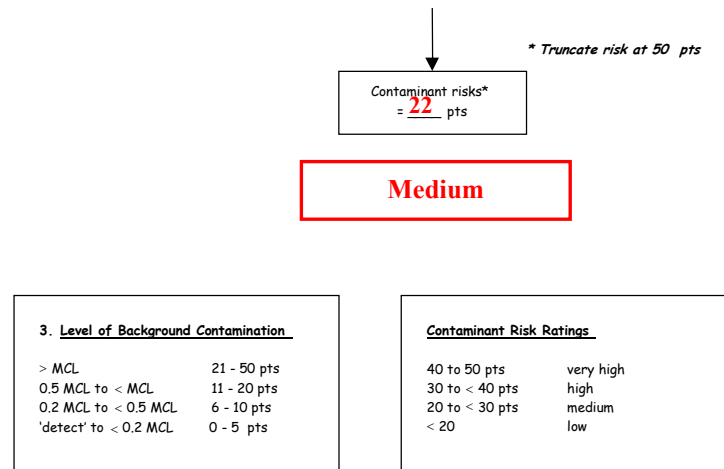
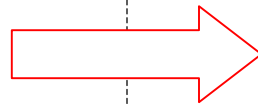
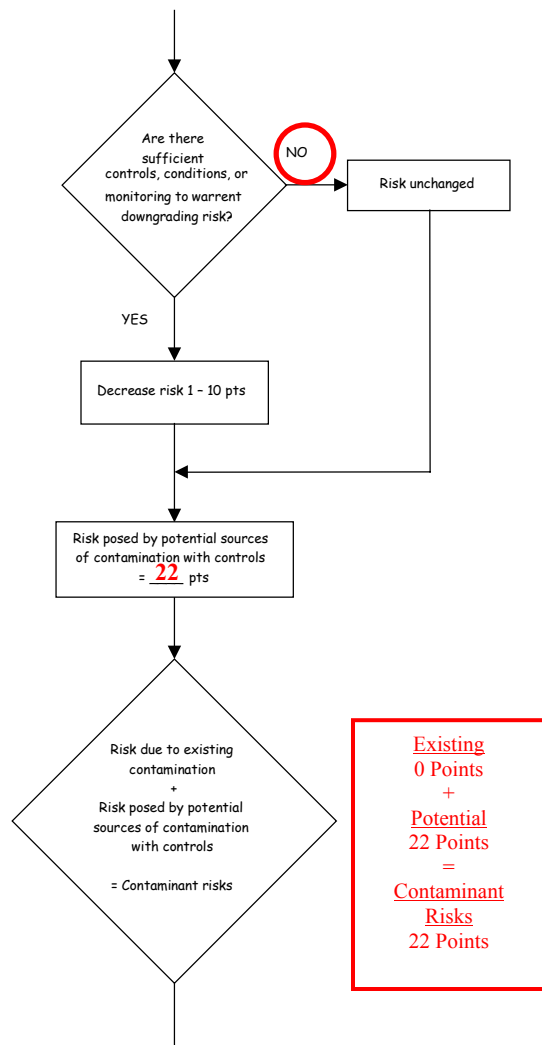


Table 3. Risk Matrix for Contaminant Sources for Spring Forest Homeowner’s Association – Volatile Organic Chemicals

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	Septic systems, highways and roads, residential areas, public utility corridor, heavy equipment rental/storage	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 Spring Forest Homeowner's Association – Volatile Organic Chemicals

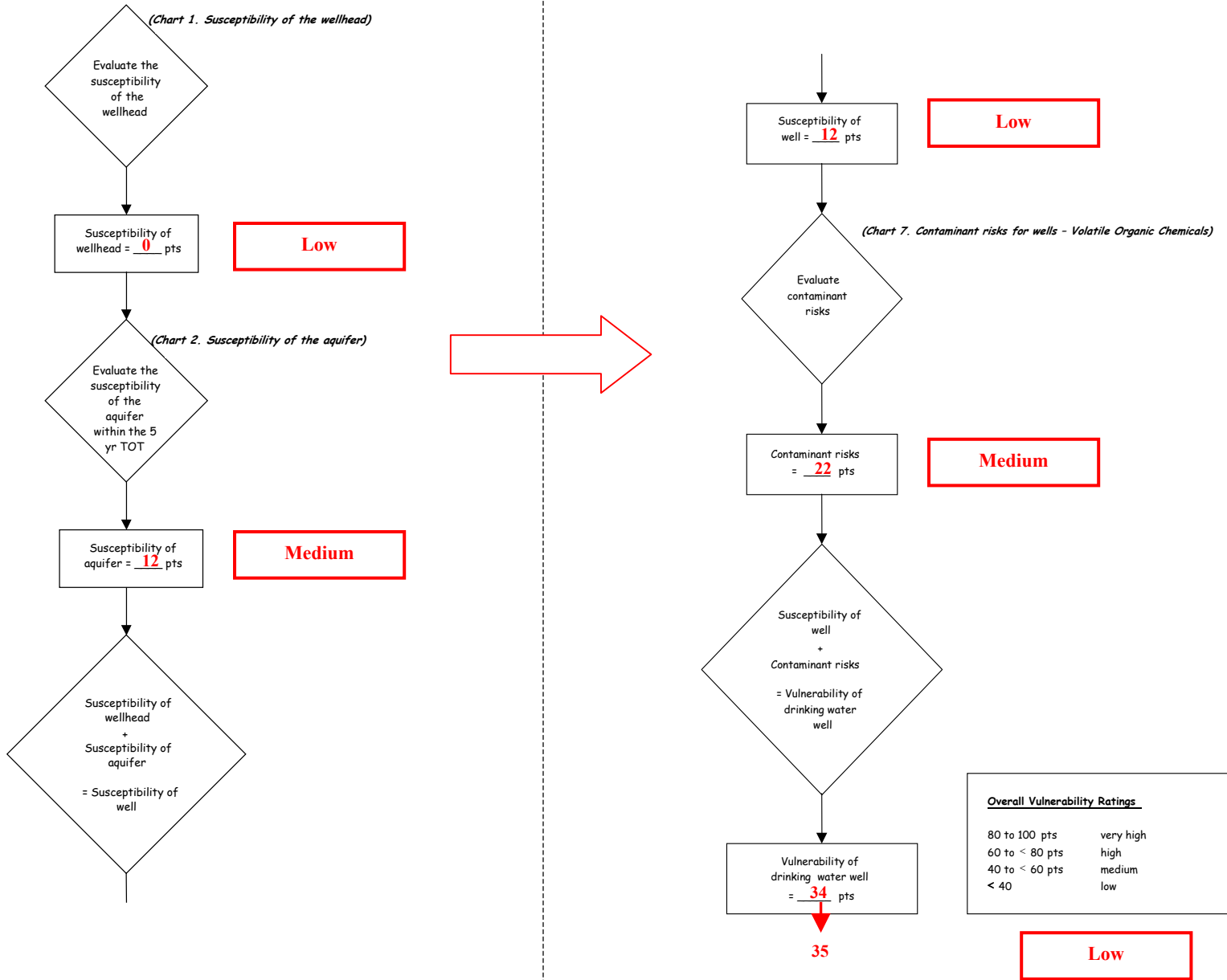


Chart 9. Contaminant risks for Spring Forest Homeowner's Association – Heavy Metals, Cyanide and Other Inorganic Chemicals

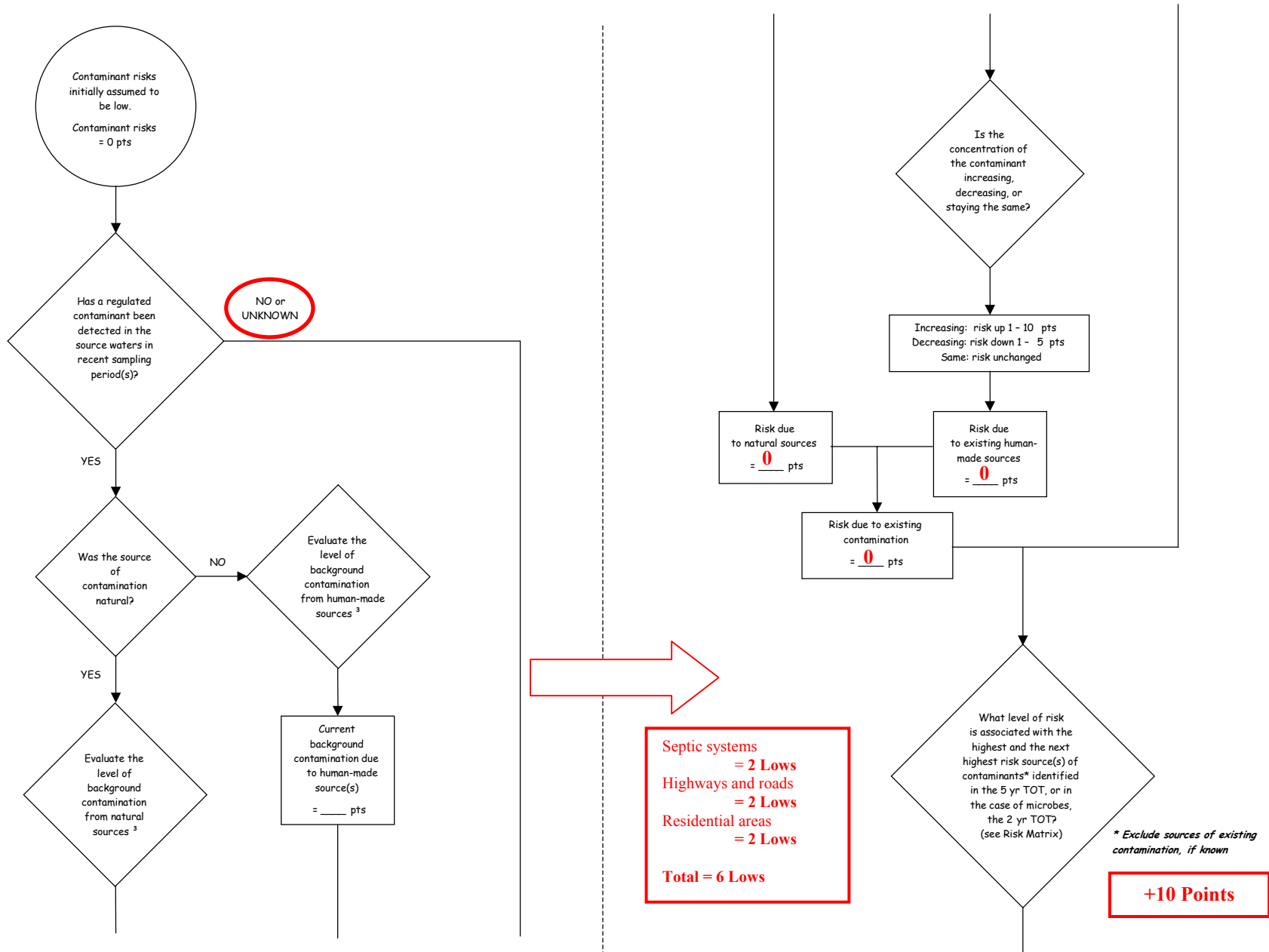
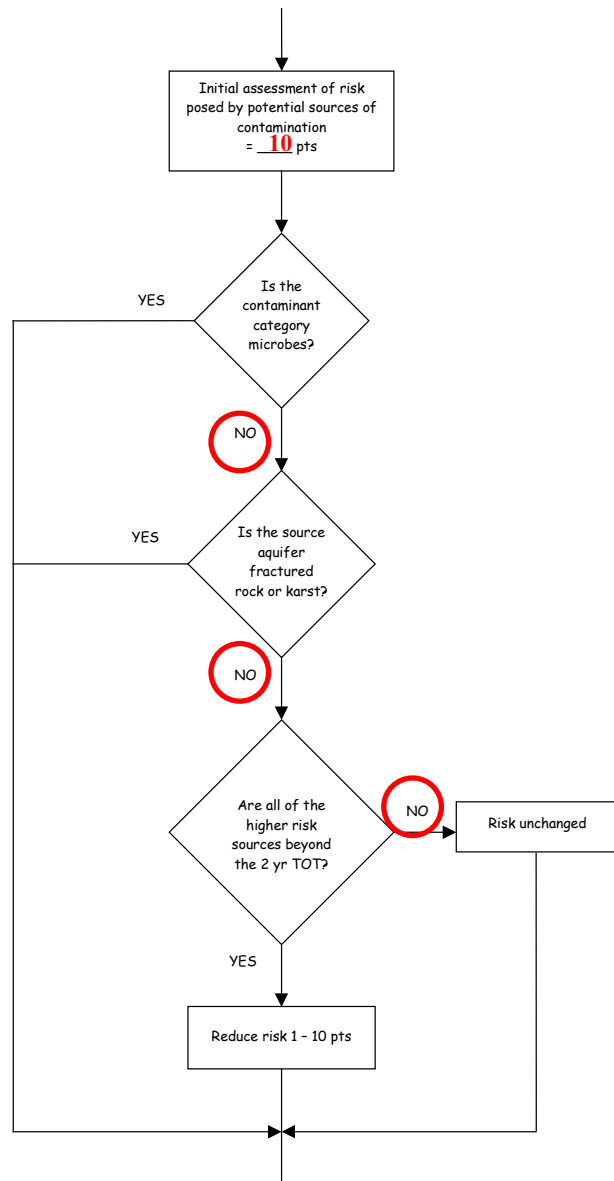
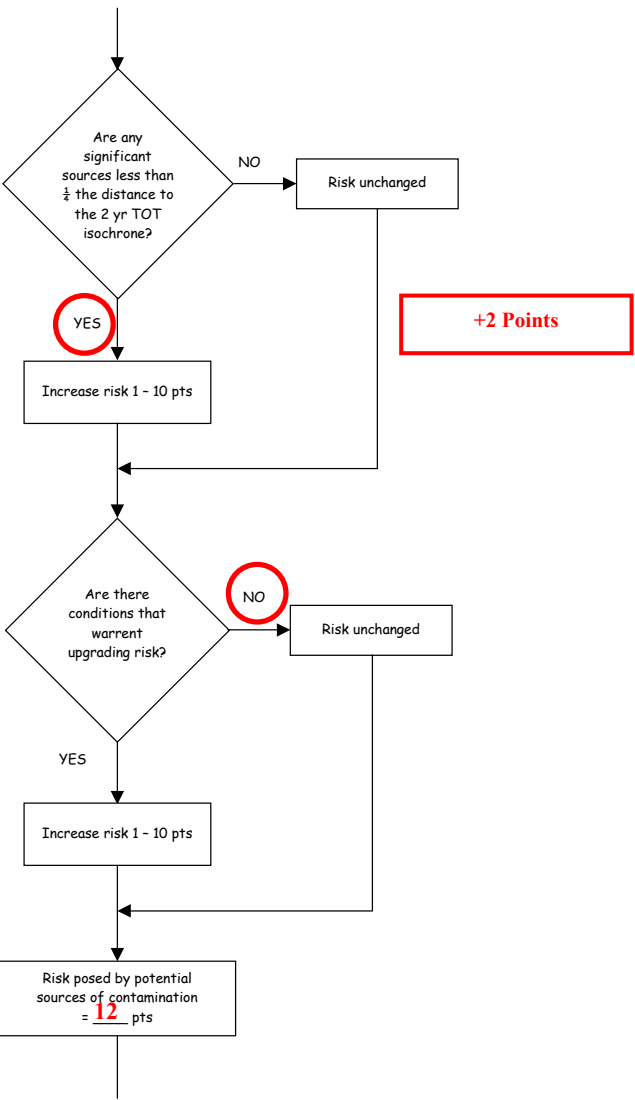
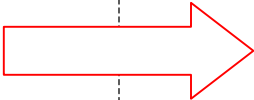


Chart 9. Contaminant risks for Spring Forest Homeowner's Association – Heavy Metals, Cyanide and Other Inorganic Chemicals (Continued)



Zone A
 Septic systems and highways and roads present significant sources of heavy metals, cyanide and other inorganic chemicals.
 +2 Points



+2 Points

Chart 9. Contaminant risks for Spring Forest Homeowner's Association – Heavy Metals, Cyanide and Other Inorganic Chemicals (Continued)

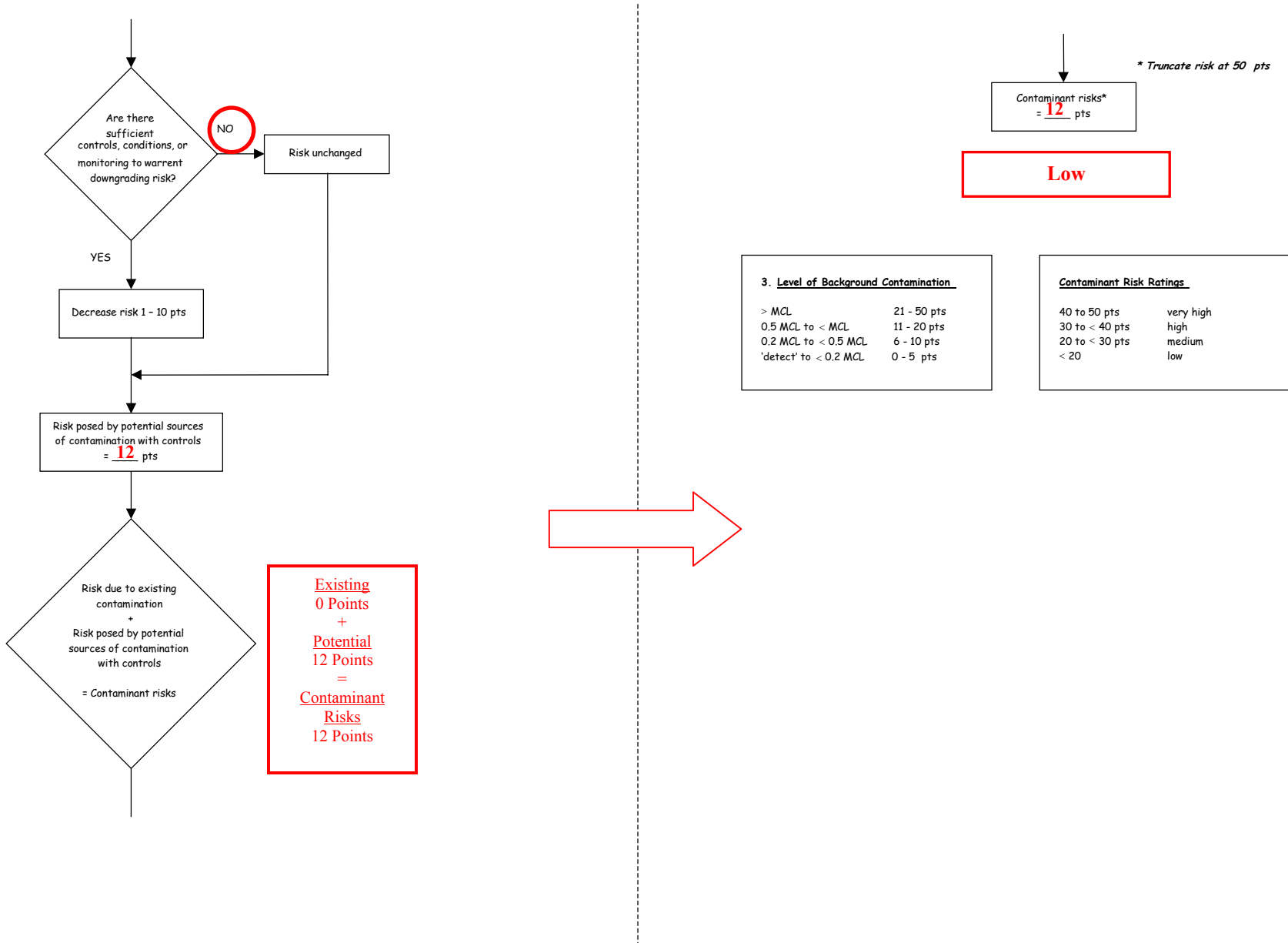


Table 4. Risk Matrix for Contaminant Sources for Spring Forest Homeowner’s Association – Heavy Metals, Cyanide and Other Inorganic Chemicals

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	Septic systems, 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 Spring Forest Homeowner's Association – Heavy Metals, Cyanide and Other Inorganic Chemicals

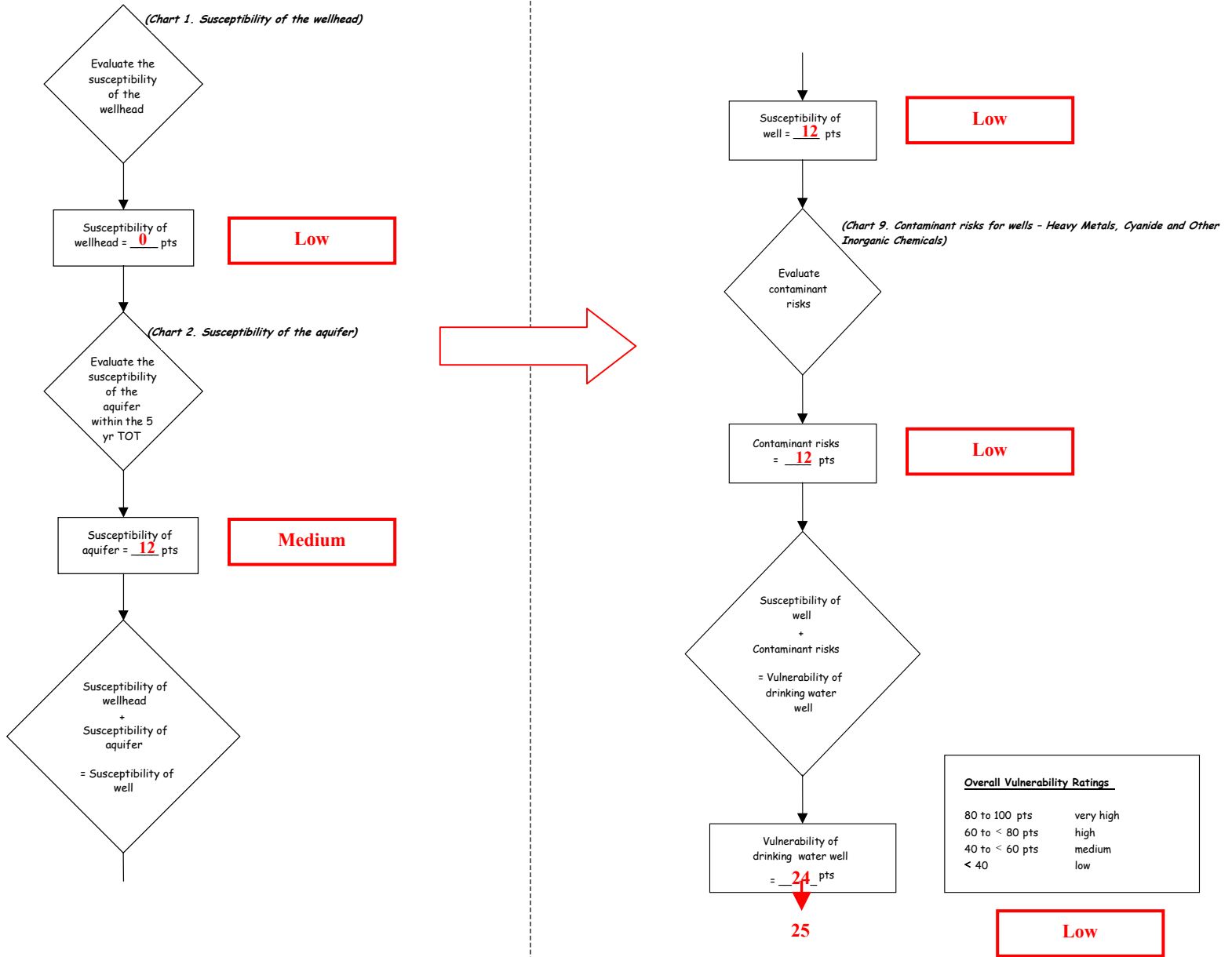


Chart 11. Contaminant risks for Spring Forest Homeowner's Association – Synthetic Organic Chemicals

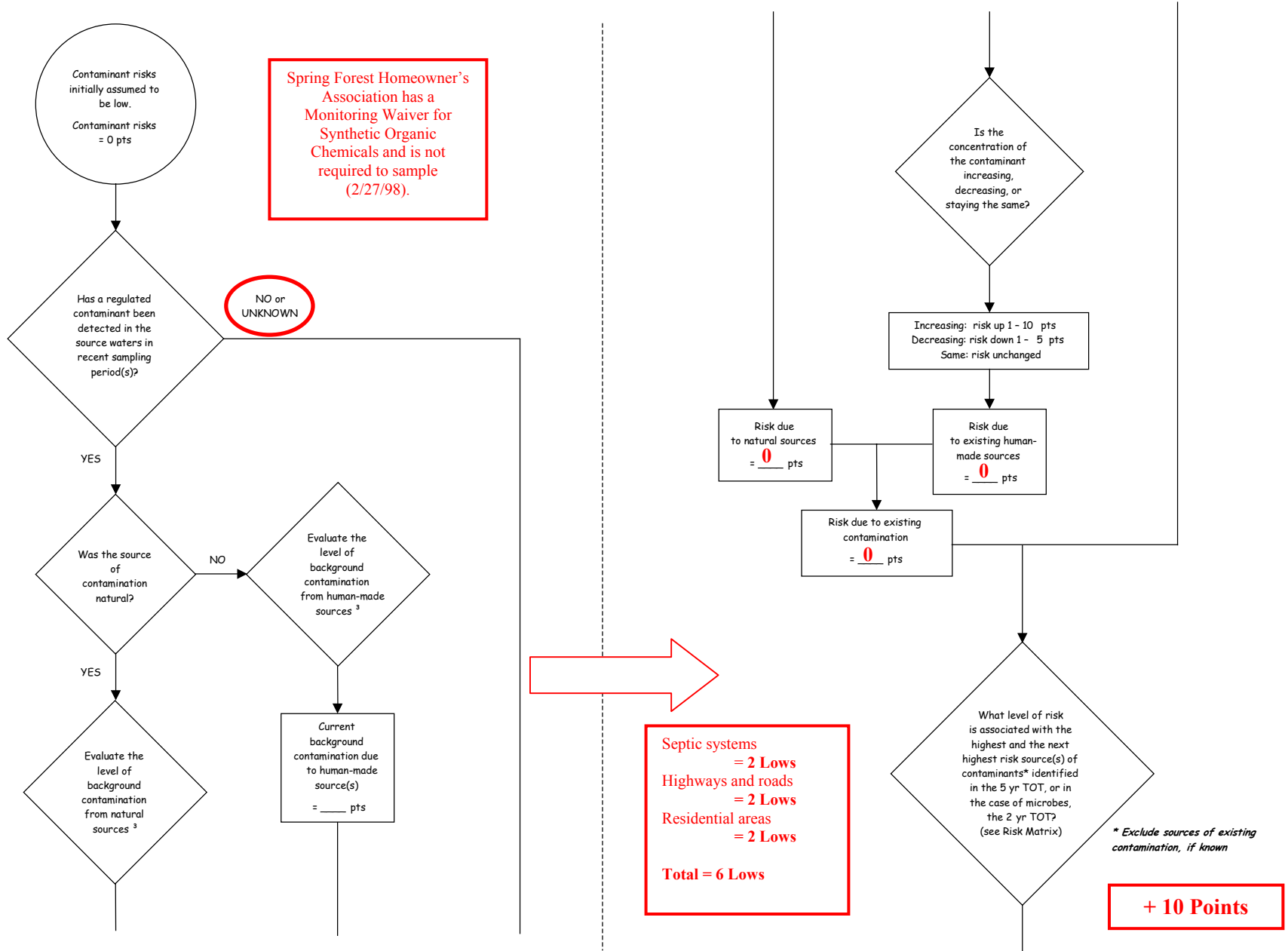
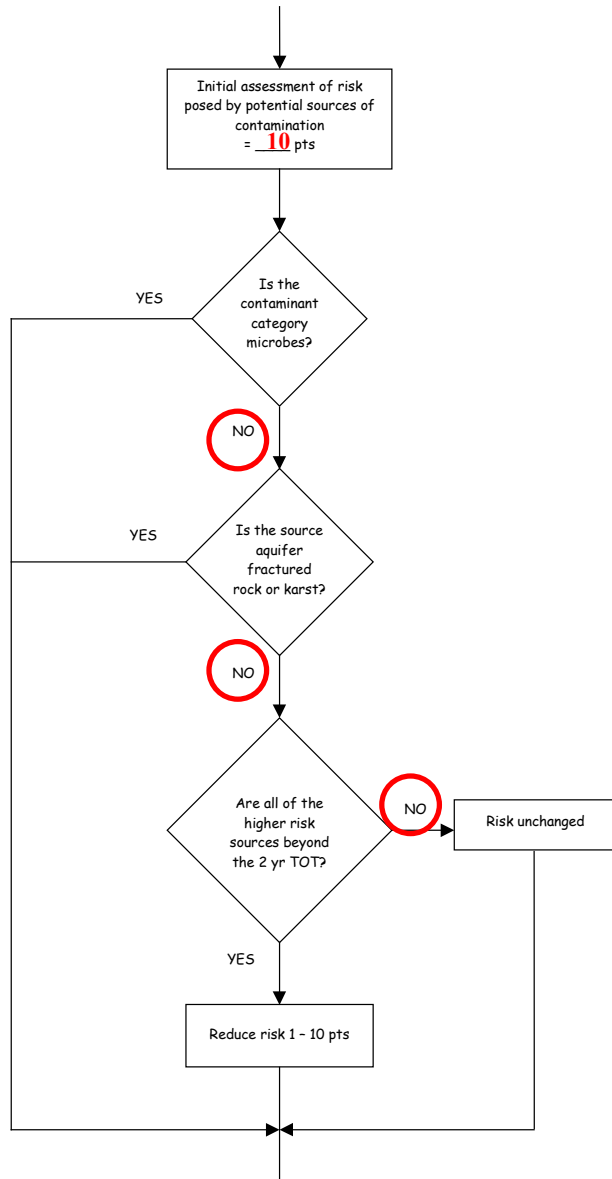
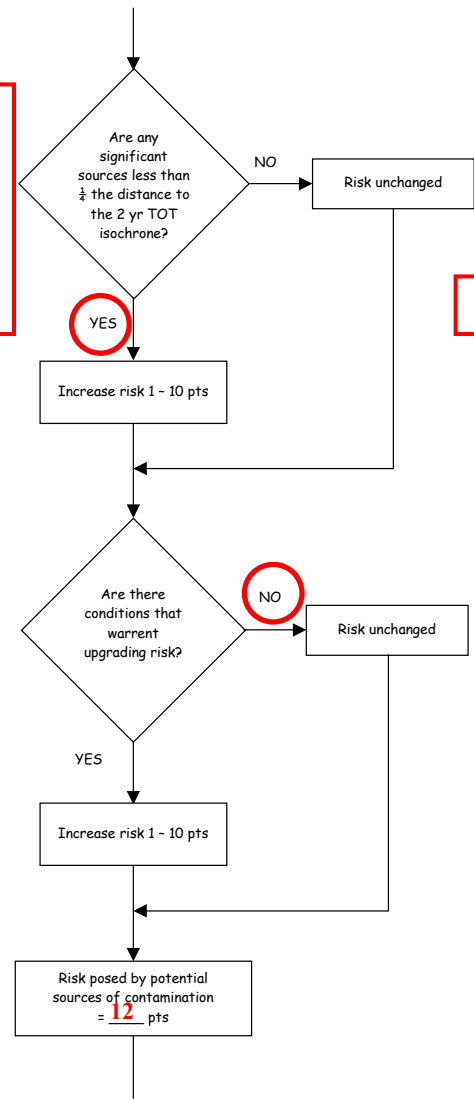
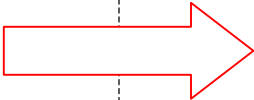


Chart 11. Contaminant risks for Spring Forest Homeowner's Association – Synthetic Organic Chemicals (Continued)



Zone A
 Residential septic systems present significant sources of synthetic organic chemicals.
 +2 Points



+ 2 Points

Chart 11. Contaminant risks for Spring Forest Homeowner's Association – Synthetic Organic Chemicals (Continued)

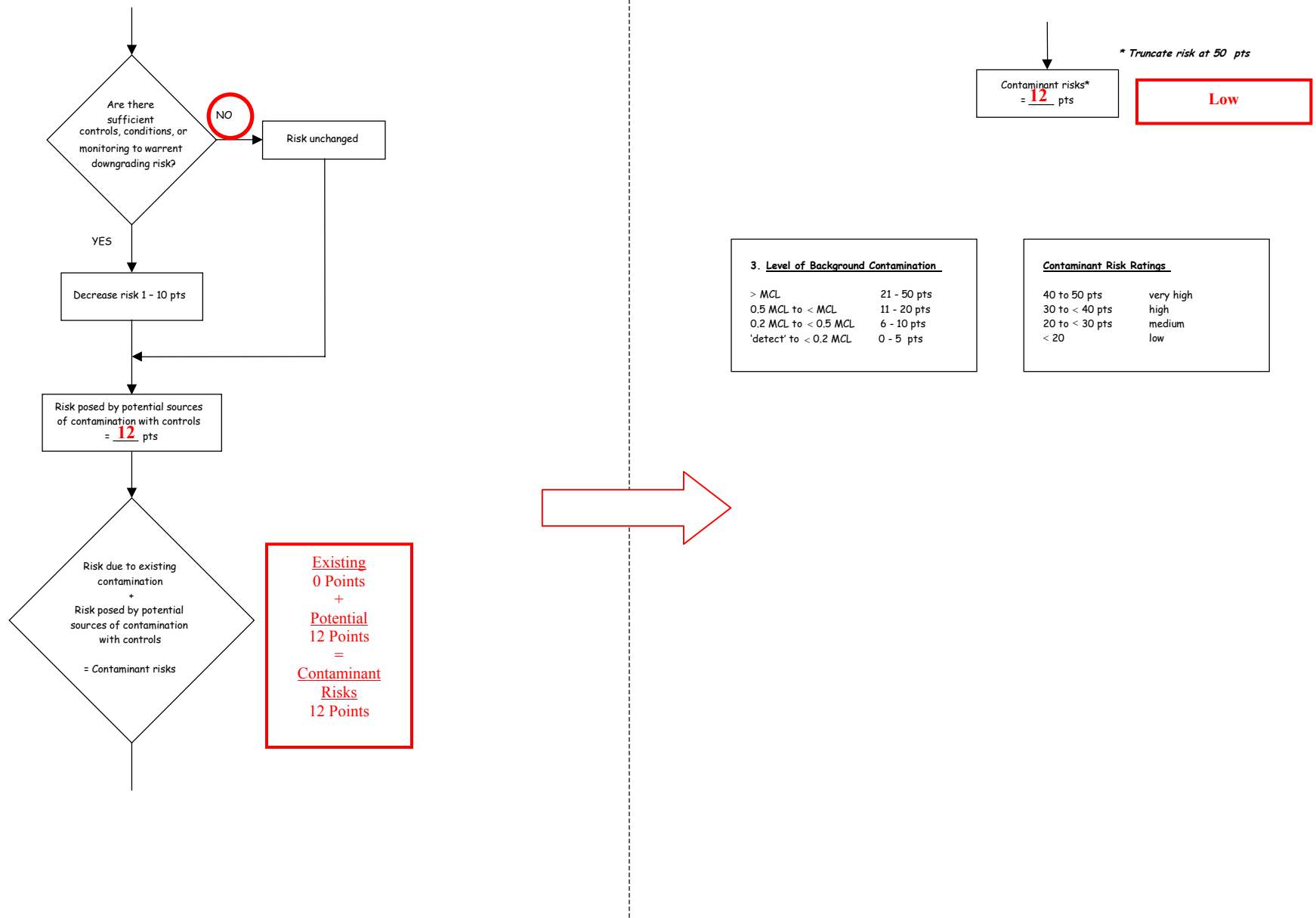


Table 5. Risk Matrix for Contaminant Sources for Spring Forest Homeowner’s Association – Synthetic Organic Chemicals

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	Septic systems, highways and 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 Seventh Day Adventist School – Synthetic Organic Chemicals

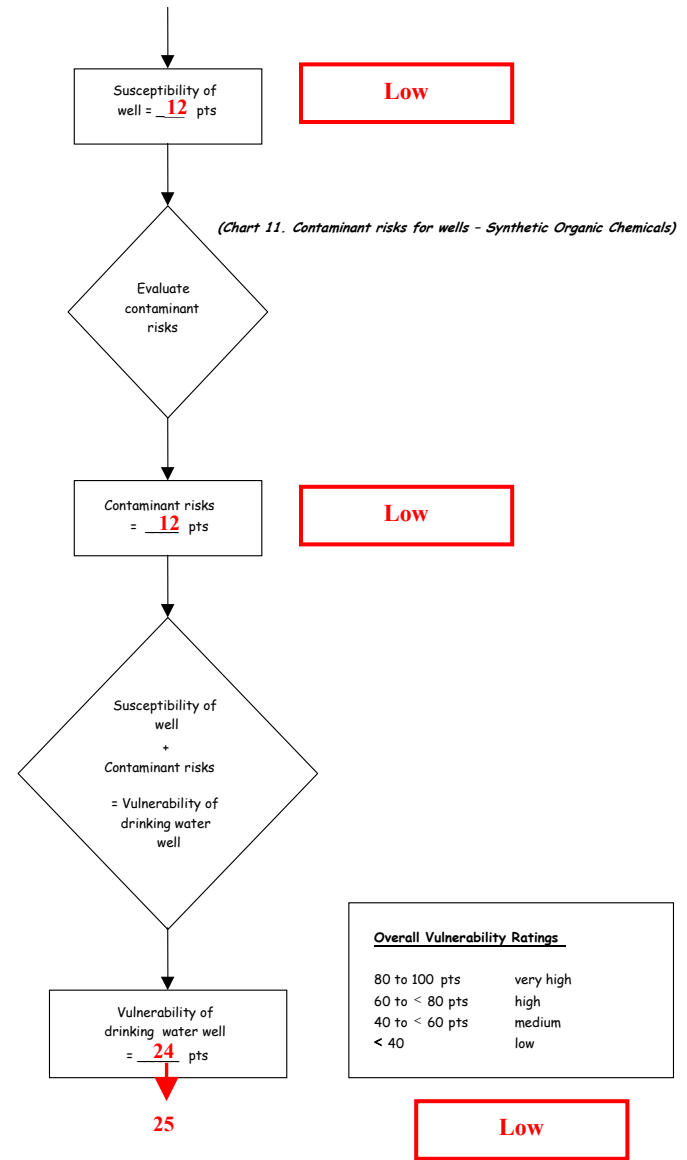
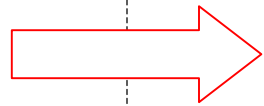
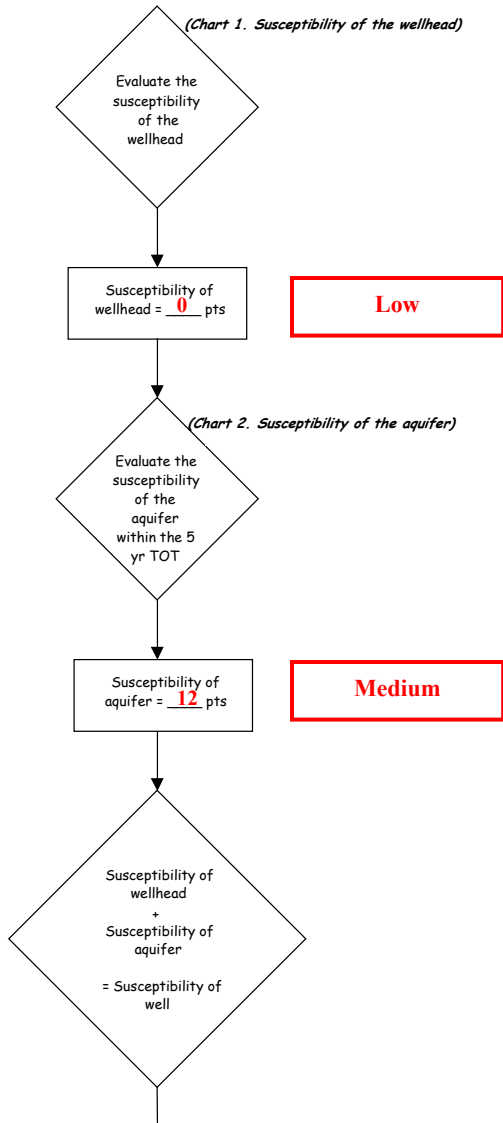


Chart 13. Contaminant risks for Spring Forest Homeowner's Association – Other Organic Chemicals

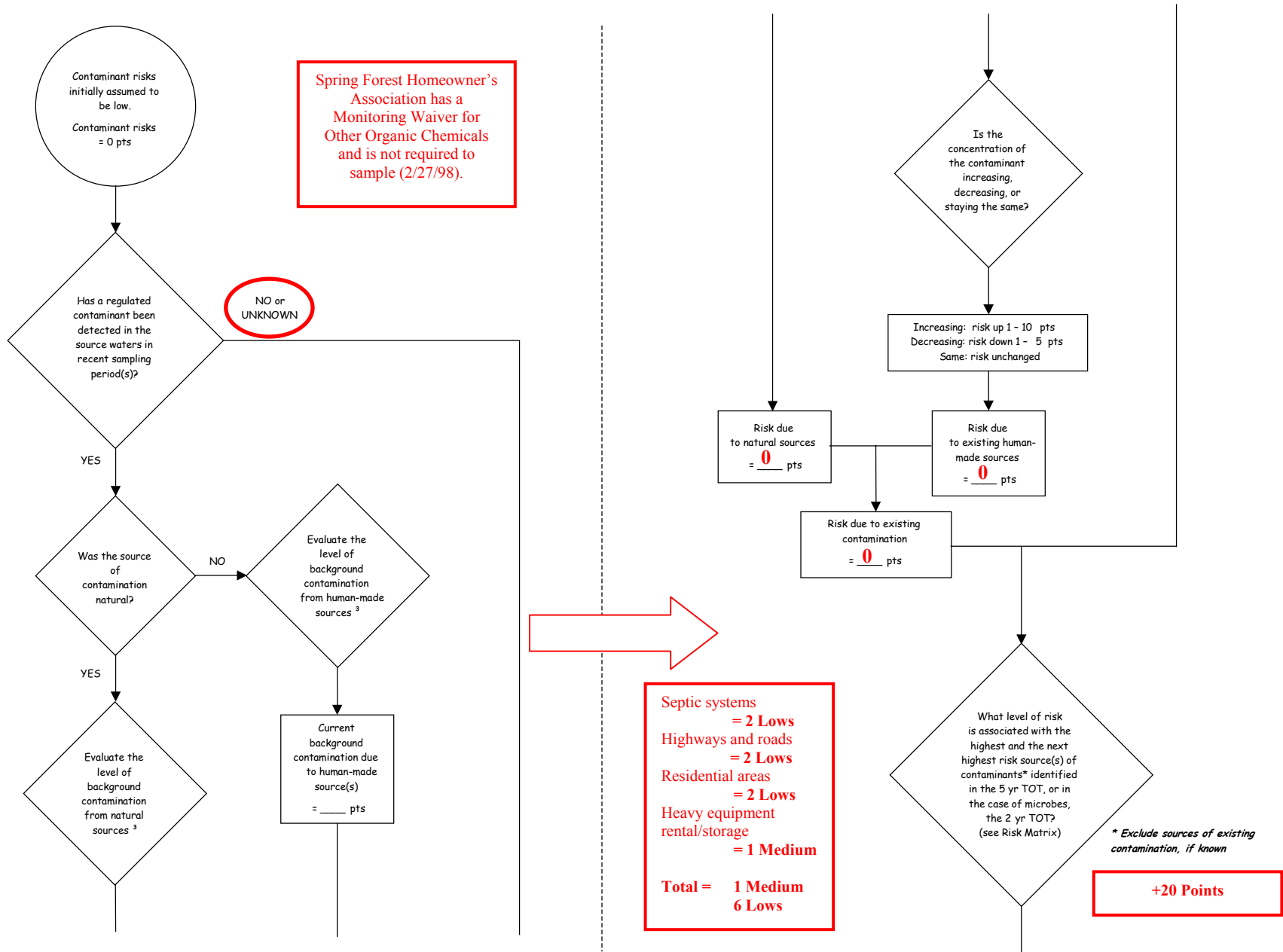
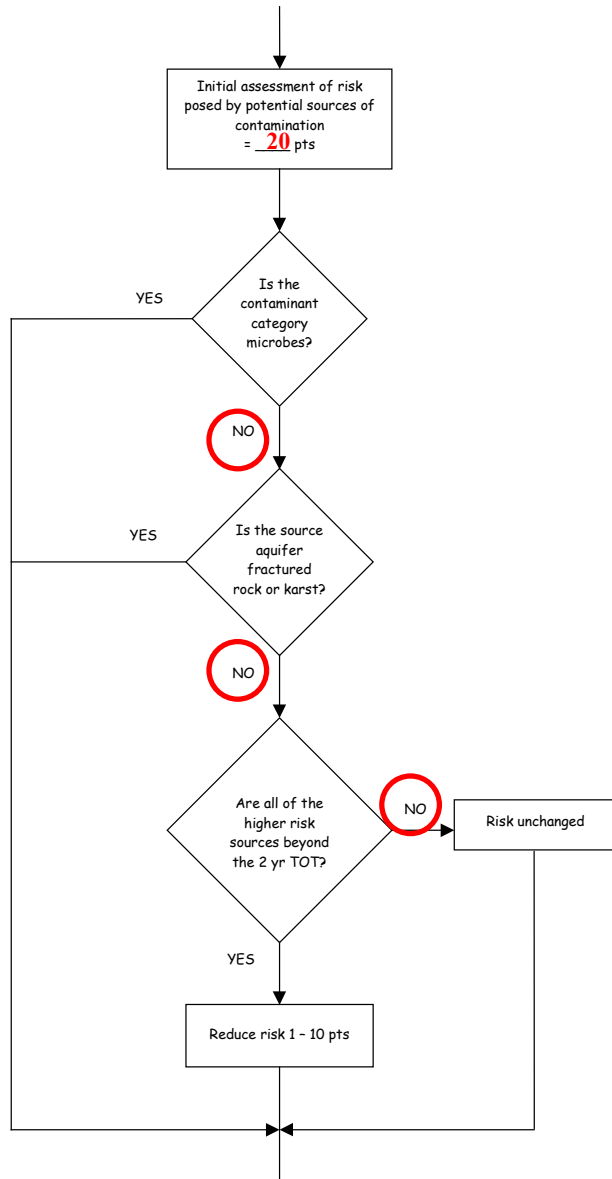


Chart 13. Contaminant risks for Spring Forest Homeowner's Association – Other Organic Chemicals (Continued)



Zone A
 Highways and roads and septic systems present significant sources of other organic chemicals.
 +2 points

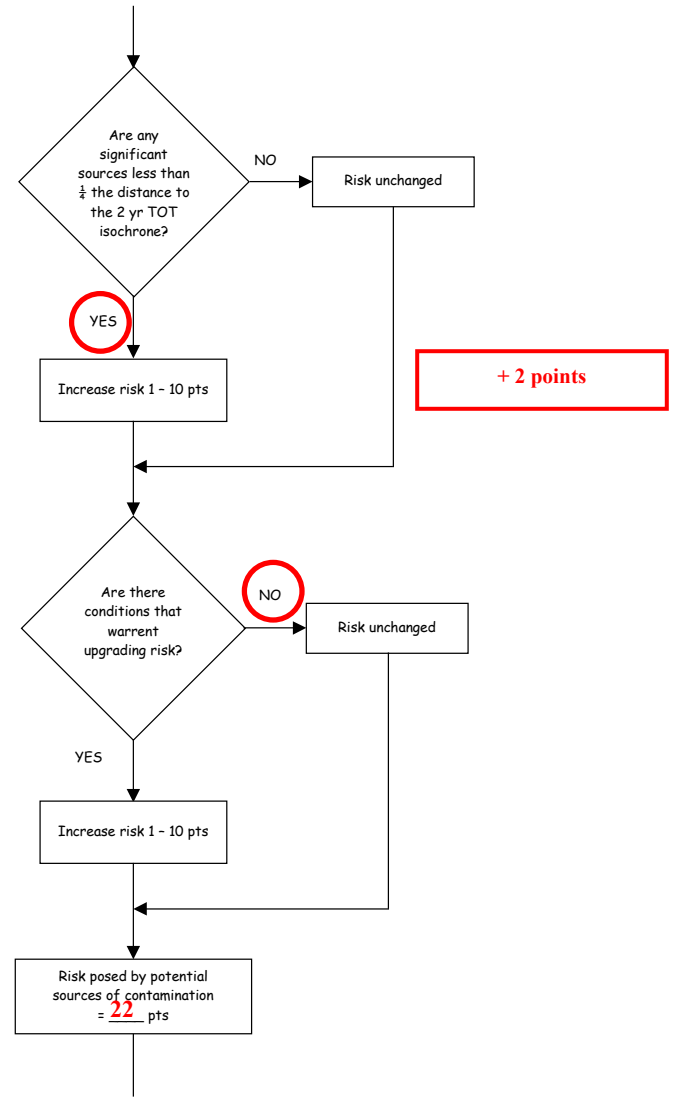
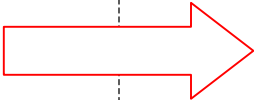


Chart 13. Contaminant risks for Spring Forest Homeowner's Association – Other Organic Chemicals (Continued)

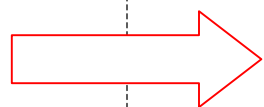
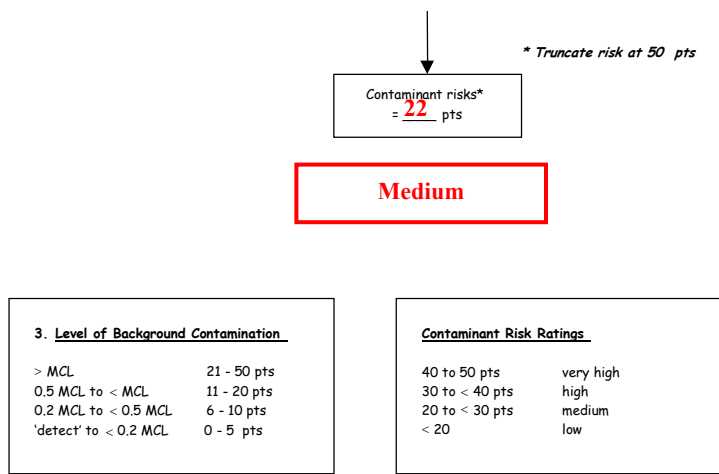
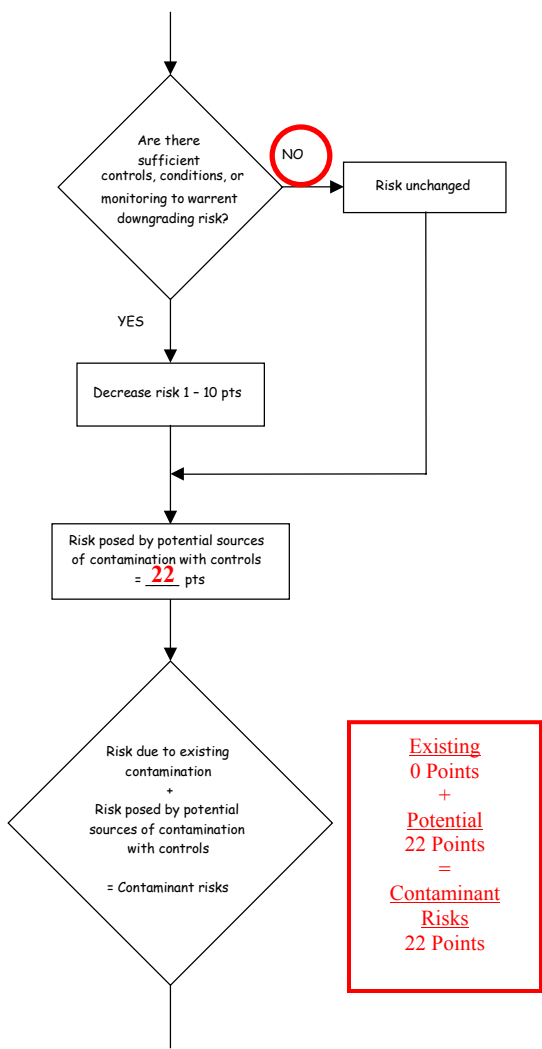


Table 6. Risk Matrix for Contaminant Sources for Spring Forest Homeowner’s Association – Other Organic Chemicals

Level of Risk Associated with the Highest Risk Sources

Next Highest Risk Sources(s)	Septic systems, highways and roads, residential areas, heavy equipment rental/storage	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 Spring Forest Homeowner's Association – Other Organic Chemicals

