Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for the Circle Washeteria Drinking Water System, Circle, Alaska

PWSID # 300769.001

June 2004

DRINKING WATER PROTECTION PROGRAM REPORT 1321
Alaska Department of Environmental Conservation

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The Drinking Water Protection Program (DWPP) is producing Source Water Assessments in compliance with the Safe Drinking Water Act Amendments of 1996. Each assessment includes a delineation of the source water area, an inventory of potential and existing contaminant sources that may impact the water, a risk ranking for each of these contaminants, and an evaluation of the potential vulnerability of these drinking water sources.

These assessments are intended to provide public water systems owners/operators, communities, and local governments with the best available information that may be used to protect the quality of their drinking water. The assessments combine information obtained from various sources, including the U.S. Environmental Protection Agency, Alaska Department of Environmental Conservation (ADEC), public water system owners/operators, and other public information sources. The results of this assessment are subject to change if additional data becomes available. It is anticipated this assessment will be updated every five years to reflect any changes in the vulnerability and/or susceptibility of public drinking water source. If you have any additional information that may affect the results of this assessment, please contact the Program Coordinator of DWPP, (907) 269-7521.

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Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

The Circle Washeteria Public Water System has two Public Water System (PWS) wells. The well (PWS No. 300769.001) has been used as a drinking water source since it was drilled in May of 1990. This source water assessment report is exclusively limited to PWSID #300769.001.

The well is a Class A (community and non-transient non-community) water system adjacent to the Yukon River in Circle, Alaska. Available records indicate that there is secondary storage of drinking water, with a capacity of 5,600-gallons, and that the drinking water source is treated with chlorination and filtration. This system operates year round and serves approximately 96 residents. The wellhead received a susceptibility rating of **Very High** and the aquifer received a susceptibility rating of **High**. Combining these two ratings produce a **High** rating for the natural susceptibility of the well.

Identified potential and current sources of contaminants for the public drinking water source include: domestic wastewater treatment processes, pit toilets, aboveground fuel storage tanks and open leaking underground fuel storage tanks. An inventory of potential or existing contamination sources can be found in Appendix B, Table 1. These identified potential and existing sources of contamination are considered sources of bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals, synthetic organic chemicals, and other organic chemicals contaminant categories.

Overall, the well received a vulnerability rating of **Very High** for bacteria and viruses, nitrates and nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals and other organic chemicals, and a vulnerability rating of **High** for synthetic organic chemicals.

PUBLIC DRINKING WATER SYSTEM

The Circle Washeteria Public Water System well is a Class A (community/non-transient/non-community) public water system. The system is adjacent to the Yukon River in Circle, Alaska (Sec. 31, T012N, R018E, Fairbanks Meridian, see Map A of Appendix A). The community of Circle is located at the edge of the Yukon Flats, approximately 160 miles northeast of Fairbanks. The community has a population of 96 (ADCED, 2003). Average annual precipitation in Circle is 6.5 inches, including approximately 43 inches of snowfall. Temperatures can be as extreme as -71 to 72°F.

The community of Circle obtains most of their water supply from the well at the washeteria. The schools use their own well water systems. The majority of the occupied households use honeybuckets or outhouses and most lack complete plumbing (ADCED, 2003). Circle receives electrical power from Circle Electric Inc; power-generating facilities are diesel powered. The local landfill is located at Mile 156.5 Steese Highway and is operated by Circle Village Council (ADCED, 2003).

According to information supplied by ADEC for the Circle Washeteria PWS, the depth of the well is 40 feet below the ground surface. Based on available well construction details, it is assumed that the well is completed in an unconfined aquifer. The well is located within a floodplain.

Information acquired from an April 1998 sanitary survey for the public water system indicated that the land surface was sloped away from the well. Generally, land surfaces that slope away from the wellhead promote surface water drainage, which reduces the potential of contaminant migration down the well casing annulus. The sanitary survey indicates that the well is grouted according to ADEC regulations. Proper grouting provides added protection against contaminants traveling along the well casing annulus and into source waters.

Circle is located on modern floodplain deposits laid down by the Yukon River. These recent deposits, and more ancient ones similar in nature, fill the Yukon Lowlands to a thickness of several hundred feet. These older sand and gravels are probably of Pleistocene age and older. They rest in turn on Birch

Creek Schist of Pre-Cambrian age. The modern floodplain sands and gravels are covered with a layer of sandy silt and silt, deposited by the Yukon during flood stage. An organic layer of moss and tree roots, together with a thick stand of black spruce trees provides the shade and insulation necessary for the formation of permafrost in the existing conditions.

DRINKING WATER PROTECTION AREA

In order to evaluate whether a drinking water source is at risk, we must first evaluate what are the most likely pathways for surface contamination to reach the groundwater. These areas are determined by looking at the characteristics of the soil, groundwater, aquifer, and well.

The most probable area for contamination to reach the drinking water well is the area that contributes water to the well, the groundwater recharge area. This area is designated as the drinking water protection area (DWPA). Because releases of contaminants within the protection area are most likely to impact the drinking water well, this area will serve as the focus for voluntary protection efforts. An analytical calculation was used to determine the size and shape of the DWPA for the Circle Washeteria Public Water System PWS. The input parameters describing the attributes of the aquifer in this calculation were adopted from Groundwater (Freeze and Cherry, 1979). Available geology and groundwater contours were also considered to take into account any uncertainties in groundwater flow and aquifer characteristics to arrive at a meaningful protection area.

The protection areas established for wells by the ADEC are usually separated into four zones, limited by the watershed. These zones correspond to differences in the time-of-travel (TOT) of the water moving through the aquifer to the well (Please refer to the Guidance Manual for Class A Public Water Systems for additional information).

The time of travel for contaminants within the water varies and is dependent on the physical and chemical characteristics of each contaminant. The following is a summary of the four protection area zones for wells and the calculated time-of-travel for each:

Table 1. Definition of Zones

Zone	Definition
A	¼ the distance for the 2-yr. time-of-travel
B	Less than the 2 year time-of-travel
C	Less Than the 5 year time-of-travel
D	Less than the 10 year time-of-travel

The DWPA for the Circle Washeteria Public Water System PWS was determined using an analytical calculation and includes Zones A, B, C, and D (See Map A of Appendix A).

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 Circle Washeteria Public Water System DWPA. This inventory was completed through a search of agency records and other publicly available information. Potential sources of contamination to the drinking water aquifer include 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 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.

The sources are displayed on Map C of Appendix C and summarized in Table 1 of Appendix B.

RANKING OF CONTAMINANT RISKS

Once the potential and existing sources of contamination have been identified, they are assigned a ranking 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. Rankings include:

- Low,
- Medium,
- High, and
- Very High.

The time-of-travel for contaminants within the water varies and is dependent on the physical and chemical characteristics of each contaminant. Bacteria and

Viruses are only inventoried in Zones A and B because of their short life span. Only "Very High" and "High" rankings are inventoried within the outer Zone D due to the probability of contaminant dilution by the time the contaminants get to the well. Tables 2 through 4 in Appendix B contain the ranking of potential and existing sources of contamination with respect to bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals, synthetic organic chemicals, and other organic chemicals.

VULNERABILITY OF THE DRINKING WATER SYSTEM

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

- Natural susceptibility, and
- Contaminant risks.

Appendix D contains fourteen charts, which together form the 'Vulnerability Analysis' for a source water assessment for a public drinking water source. 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. Chart 4 contains the 'Vulnerability Analysis for Bacteria and Viruses'. Charts 5 through 14 contain the Contaminant Risks and Vulnerability Analyses for nitrates and nitrites, volatile organic chemicals, heavy metals, cyanide and other inorganic chemicals, synthetic organic chemicals, and other organic chemicals, respectively.

A score for the Natural Susceptibility is reached by considering the properties of the well and the aquifer.

Susceptibility of the Wellhead (0 – 25 Points)
(Chart 1 of Appendix D)

+

Susceptibility of the Aquifer (0 – 25 Points)
(Chart 2 of Appendix D)

=

Natural Susceptibility (Susceptibility of the Well)
(0 – 50 Points)

A ranking is assigned for the Natural Susceptibility according to the point score:

Natural Susceptibility Ratings	
40 to 50 pts	Very High
30 to < 40 pts	High
20 to < 30 pts	Medium
< 20 pts	Low

The Circle Washeteria Public Water System's water well is in a confined aquifer. Confined aquifers are less susceptible to potential groundwater quality impacts posed by the migration of surface water contaminants downward from the surface. Table 2 shows the susceptibility scores and ratings for this PWS.

Table 2. Susceptibility

	Score	**Rating**
Susceptibility of the Wellhead	20	Very High
Susceptibility of the Aquifer	18	High
Natural Susceptibility	38	High

Contaminant risks to a drinking water source depend on the type, number or density, and distribution of contaminant sources. This score has been derived from an examination of existing and historical contamination that has been detected at the drinking water source through routine sampling. It also evaluates potential sources of contamination. Flow charts are used to assign a point score, and ratings are assigned in the same way as for the natural susceptibility:

Contaminant Risk Ratings	
40 to 50 pts	Very High
30 to < 40 pts	High
20 to < 30 pts	Medium
< 20 pts	Low

Table 3 summarizes the Contaminant Risks for each category of drinking water contaminants.

Table 3. Contaminant Risks

Category	Score	Rating
Bacteria and Viruses	50	Very High
Nitrates and/or Nitrites	50	Very High
Volatile Organic Chemicals	50	Very High
Heavy Metals, Cyanide and Other Inorganic Chemicals	50	Very High
Synthetic Organic Chemicals	35	High
Other Organic Chemicals	50	Very High

Finally, an overall vulnerability score is assigned for each water system by combining each of the contaminant risk scores with the natural susceptibility score:

Natural Susceptibility (0 – 50 points)

+

Contaminant Risks (0 – 50 points)

=

Vulnerability of the Drinking Water Source to Contamination (0 – 100).

Again, rankings are assigned according to a point score:

Overall Vulnerability Ratings	
80 to 100 pts	Very High
60 to < 80 pts	High
40 to < 60 pts	Medium
< 40 pts	Low

Table 4 contains the overall vulnerability scores (0 – 100) and ratings for each of the six categories of drinking water contaminants. Note: scores are rounded off to the nearest five.

Table 4. Overall Vulnerability

Category	Score	Rating
Bacteria and Viruses	90	Very High
Nitrates and Nitrites	90	Very High
Volatile Organic Chemicals	90	Very High
Heavy Metals, Cyanide and Other Inorganic Chemicals	90	Very High
Synthetic Organic Chemicals	75	High
Other Organic Chemicals	90	Very High

Bacteria and Viruses

The contaminant risk for bacteria and viruses is **Very High**. The risk is primarily attributed to the presence of a domestic wastewater collection system in Zone A. Numerous other potential contaminant sources are also found within the protection area (see Table 2 – Appendix B).

No positive bacteria counts have been reported in recent (within five years) sampling events (See Chart 3 – Contaminant Risks for Bacteria and Viruses in Appendix D). Only a small amount of bacteria and viruses are required to endanger public health.

After combining the contaminant risk for bacteria and viruses with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **Very High**.

Nitrates and Nitrites

The contaminant risk for nitrates and nitrites is **Very High**. The risk to this source of public drinking water is primarily attributed to the presence of a large capacity septic system and a domestic wastewater treatment disposal pond in Zone A. Numerous other potential contaminant sources are also found within the protection area (see Table 3 – Appendix B).

Nitrates are very mobile, moving at approximately the same rate as water. The sampling history for this well indicates that all recent Nitrates and Nitrites sampling data have been below detection levels. Nitrate concentrations in uncontaminated groundwater are typically less than 2 mg/L; therefore, nitrate concentrations above 2 mg/L may be indicative of man-made sources (See Chart 5 - Contaminant Risks for Nitrates and/or Nitrites in Appendix D).

After combining the contaminant risk for nitrates and nitrites with the natural susceptibility of the well, the overall vulnerability of the well to nitrate and nitrite contamination is **Very High.**

Volatile Organic Chemicals

The contaminant risk for volatile organic chemicals is **Very High**. The risk is primarily attributed to the presence of a petroleum product bulk station and an active ADEC recognized contaminated site in Zone A. Numerous other potential contaminant sources are also found within the protection area (see Table 4 – Appendix B).

Detectable concentrations of trihalomethanes were reported in recent sampling events for this public water system. However, the detectible

concentrations of trihalomethanes reported in 1998, 2000, and 2002, were well below the MCL of 0.08 mg/L (See Chart 7 – Contaminant Risks for Volatile Organic Chemicals in Appendix D). Trihalomethanes are considered byproducts of the water treatment process and are not from the source waters. Since the reported concentration of TTHM's in recent sampling events did not exceed the applicable MCL, risk points were not retained.

Possible sources of volatile organic chemicals include facilities with automobiles, residential areas, fuel tanks, and roads. See Table 4 in Appendix B for a complete listing.

After combining the contaminant risk for volatile organic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **Very High**.

Heavy Metals, Cyanide and Other Inorganic Chemicals

The contaminant risk for heavy metals, cyanide and other inorganic chemicals is **Very High**. The risk is primarily attributed to the presence of an abandoned well in Zone B (see Table 5 – Appendix B).

Based on review of recent sampling records for this public water system, extremely high levels copper have been detected, exceeding the MCL of 1.3 mg/L (see Chart 9 – Contaminant Risks for Heavy Metals, Cyanide, and Other Inorganic Chemicals in Appendix D).

The reported concentrations of copper in recent sampling events are likely representative of source water conditions. Risk points were assigned based on the exceedence of the copper MCL.

After combining the contaminant risk for heavy metals, cyanide and other inorganic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **Very High**.

Synthetic Organic Chemicals

The contaminant risk for synthetic organic chemicals is **High**. The risk is primarily attributed to an abandoned well in Zone B (see Table 6 – Appendix B).

No recent sampling data was available in ADEC records for the Circle Washeteria Public Water System (See Chart 11 – Contaminant Risks for Synthetic Organic Chemicals in Appendix D).

After combining the contaminant risk for synthetic organic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **High**.

Other Organic Chemicals

The contaminant risk for other organic chemicals is **High**. The risk is primarily attributed to the presence of an abandoned well in Zone B. Several other potential contaminant sources are also found within the protection area (see Table 7 – Appendix B).

No recent sampling data was available in ADEC records for the Circle Washeteria Public Water System (See Chart 13 – Contaminant Risks for Other Organic Chemicals in Appendix D).

After combining the contaminant risk for other organic chemicals with the natural susceptibility of the well, the overall vulnerability of the well to contamination is **Very High**.

Using the Source Water Assessment

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 the community of Circle 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 the drinking water source.

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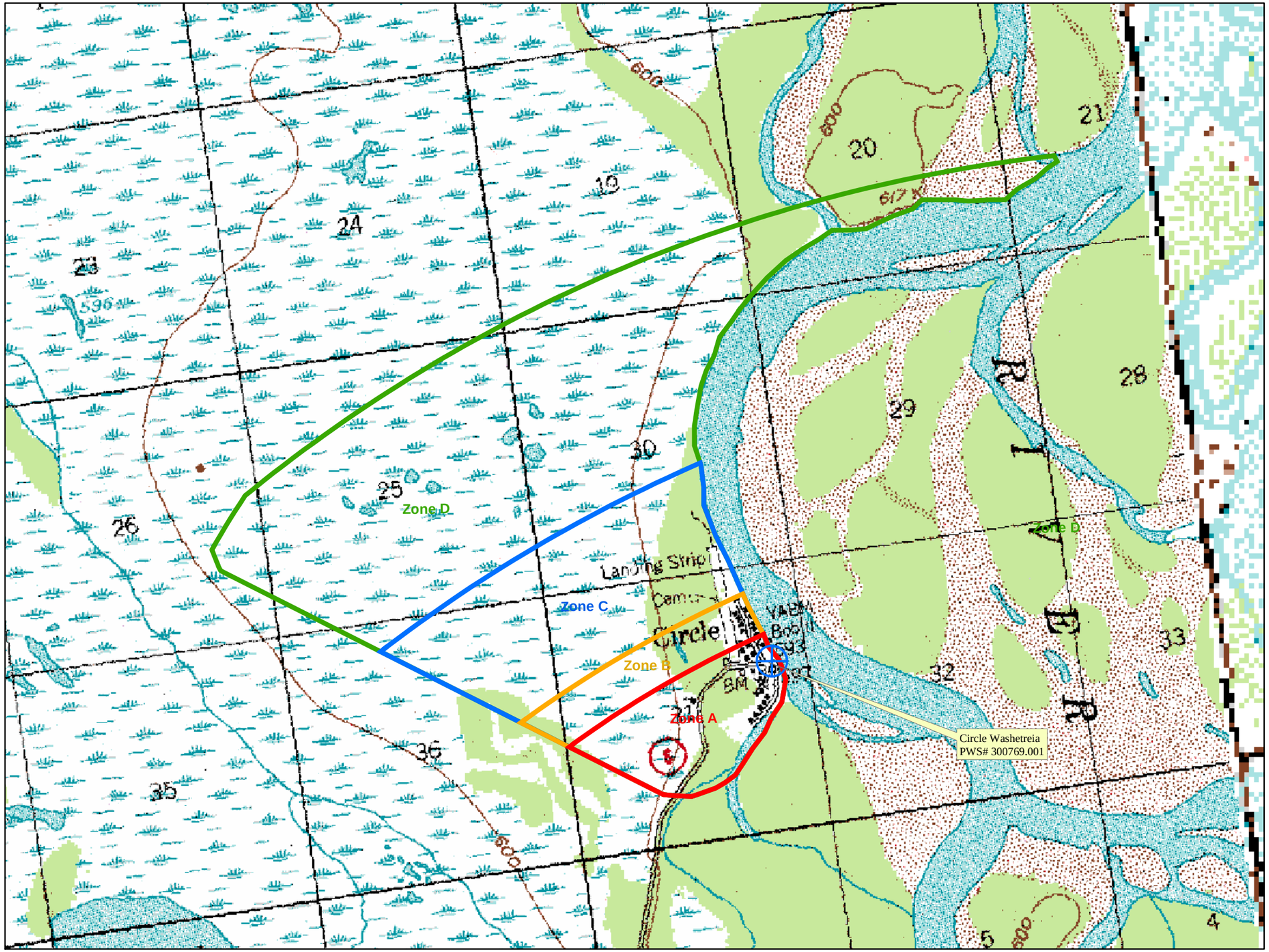
APPENDIX A

Drinking Water Protection Area Location Map
(Map A)

Public Water Well System for PWS # 300769.001 Circle Washeteria



LEGEND

Public Water System Well

Hydrography/Physical

- Parcels
- Stream
- Lake or Pond
- Contours

Transportation

- Primary Route (Class 1)
- Secondary Route (Class 2)
- Road (Class 3)
- Road (Class 4)
- Road (Class 5, Four-wheel drive)

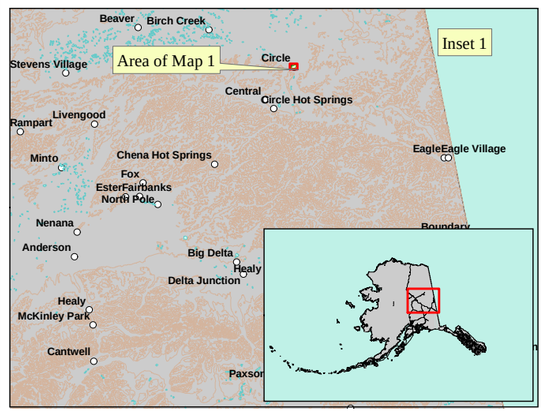
Groundwater Protection Zones

- Zone A Protection Area– Several Months Travel Time
- Zone B Protection Area– 2 Years Travel Time
- Zone C Protection Area– 5 Years Travel Time
- Zone D Protection Area– 10 Years Travel Time

Data Sources:
- Contaminant Sources, Public Water System Wells, Contours
  Alaska Department of Environmental Conservation (ADEC)
- Critical Facilities, Federal Emergency Management Agency (FEMA)

All other data:
- United States Geological Survey (USGS)
- Drinking Water Protection Areas based on "Alaska Drinking Water Protection Program - Guidance Manual for Class A Public Water Systems" published by ADEC

URS Corporation does not guarantee the accuracy or validity of the data provided.



Circle Washeteria
PWS# 300769.001

Appendix A Map A

APPENDIX B

Contaminant Source Inventory and Risk Ranking (Tables 1-7)

Table 1

Contaminant Source Inventory for ***Circle Washeteria***

PWSID 300769.00

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Gasoline stations (without repair shop)	C15	C15-01	A	C	
Motor /motor vehicle repair shops	C31	C31-01	A	C	Service Mainenance Shop
Domestic wastewater treatment plants	D05	D05-01	A	C	Wastewater Treatment Facility
Injection wells (Class V) Large-Capacity Septic System (Drainfie Disposal Method)	D10	D10-01	A	C	Yukon Trading Post
Pit toilets (open hole), nonresidential (one or more)	D16	D16-01	A	C	Assume 20 or less honeybucket pits/outhouses in Zone A
Tanks, heating oil, residential (above ground)	R08	R08-01	A	C	Assume 4 or less residential aboveground heating oil storage tanks in Zone
Tanks, diesel (above ground)	T06	T06-01	A	C	Power House Generator
Tanks, heating oil, nonresidential (aboveground)	T14	T14-01	A	C	Power House
Tanks, heating oil, nonresidential (aboveground)	T14	T14-02	A	C	Health Clinic
Tanks, heating oil, nonresidential (aboveground)	T14	T14-03	A	C	NC Company
Tanks, heating oil, nonresidential (aboveground)	T14	T14-04	A	C	Store
Tanks, heating oil, nonresidential (aboveground)	T14	T14-05	A	C	Teachers Quarters
Tanks, heating oil, nonresidential (aboveground)	T14	T14-06	A	C	Holy Trinity Church
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	A	C	Community Center
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	A	C	Tool Shed
Tanks, heating oil, nonresidential (aboveground)	T14	T14-09	A	C	Yutana Barge Line Storage
Tanks, heating oil, nonresidential (aboveground)	T14	T14-10	A	C	Fire Hall
Tanks, heating oil, nonresidential (aboveground)	T14	T14-11	A	C	Yukon Enterprises
Tanks, heating oil, nonresidential (aboveground)	T14	T14-12	A	C	Post Office
Tanks, heating oil, nonresidential (aboveground)	T14	T14-13	A	C	Health Clinic Med Tech Dish

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Tanks, heating oil, nonresidential (aboveground)	T14	T14-14	A	C	Satellite
Tanks, heating oil, nonresidential (aboveground)	T14	T14-15	A	C	Community Center
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-01	A	C	Yukon Trading Post
Municipal or city parks (with green areas)	X04	X04-01	A	C	Circle City Camping Park
Petroleum product bulk station/terminals	X11	X11-01	A	C	
Airports	X14	X14-01	A	C	Circle City Landing Strip
Boat yards and marinas	X15	X15-01	A	C	Boat Launch Pad
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	C	Steese Highway
Highways and roads, dirt/gravel	X24	X24-01	A	C	Assumes 20 or less roads in Zone A
Electric power generation (fossil fuels)	X36	X36-01	A	C	Power House
Firehouses	X38	X38-01	A	C	Fire Hall
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-01	A	C	Health Clinic
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	B	C	Sewage Lagoon
Pit toilets (open hole), nonresidential (one or more)	D16	D16-02	B	C	Assumes 20 or less honeybucket pits/outhouses in Zone B
Tanks, heating oil, nonresidential (aboveground)	T14	T14-16	B	C	Alascom
Tanks, heating oil, nonresidential (aboveground)	T14	T14-18	B	C	Circle Fish Company
Tanks, heating oil, nonresidential (aboveground)	T14	T14-19	B	C	School Utility Storage
Tanks, heating oil, nonresidential (aboveground)	T14	T14-20	B	C	Staellite Dish
Tanks, heating oil, nonresidential (aboveground)	T14	T14-21	B	C	School
Abandoned wells	W01	W01-01	B	C	
Airports	X14	X14-02	B	C	Dirt Airstrip
Tanks, heating oil, nonresidential (aboveground)	T14	T14-17	C	C	Calvary Northern Lights Mission
Airports	X14	X14-03	C	C	Gravel Runway

Table 2

Contaminant Source Inventory and Risk Ranking for Circle Washeteria

Sources of Bacteria and Viruses

PWSID 300769.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater treatment plants	D05	D05-01	A	Medium	C	Wastewater Treatment Facility
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	A	High	C	Yukon Trading Post
Pit toilets (open hole), nonresidential (one or more	D16	D16-01	A	Medium	C	Assumes 20 or less honeybucket pits/outhouses in Zone A
Municipal or city parks (with green areas)	X04	X04-01	A	Medium	C	Circle City Camping Park
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	C	Steese Highway
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assumes 20 or less roads in Zone A
Medical/veterinary facilities (doctor or dentist offic hospitals, nursing homes)	X40	X40-01	A	Medium	C	Health Clinic
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	B	High	C	Sewage Lagoon
Pit toilets (open hole), nonresidential (one or more	D16	D16-02	B	Medium	C	Assumes 20 or less honeybucket pits/outhouses in Zone B
Abandoned wells	W01	W01-01	B	Medium	C	

Table 3

Contaminant Source Inventory and Risk Ranking for Circle Washeteria

Sources of Nitrates/Nitrites

PWSID 300769.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater treatment plants	D05	D05-01	A	Medium	C	Wastewater Treatment Facility
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	A	High	C	Yukon Trading Post
Pit toilets (open hole), nonresidential (one or more	D16	D16-01	A	Medium	C	Assumes 20 or less honeybucket pits/outhouses in Zone A
Municipal or city parks (with green areas)	X04	X04-01	A	Medium	C	Circle City Camping Park
Airports	X14	X14-01	A	Low	C	Circle City Landing Strip
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	C	Steese Highway
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assumes 20 or less roads in Zone A
Medical/veterinary facilities (doctor or dentist offic hospitals, nursing homes)	X40	X40-01	A	Low	C	Health Clinic
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	B	High	C	Sewage Lagoon
Pit toilets (open hole), nonresidential (one or more	D16	D16-02	B	Medium	C	Assumes 20 or less honeybucket pits/outhouses in Zone B
Abandoned wells	W01	W01-01	B	High	C	
Airports	X14	X14-02	B	Low	C	Dirt Airstrip
Airports	X14	X14-03	C	Low	C	Gravel Runway

Table 4

Contaminant Source Inventory and Risk Ranking for Circle Washeteria

Sources of Volatile Organic Chemicals

PWSID 300769.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Gasoline stations (without repair shop)	C15	C15-01	A	High	C	
Motor /motor vehicle repair shops	C31	C31-01	A	Medium	C	Service Mainenance Shop
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Wastewater Treatment Facility
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	A	Low	C	Yukon Trading Post
Pit toilets (open hole), nonresidential (one or more	D16	D16-01	A	Low	C	Assumes 20 or less honeybucket pits/outhouses in Zone A
Tanks, heating oil, residential (above ground)	R08	R08-01	A	Medium	C	Assumes 4 or less residential aboveground heating oil storage tanks in Zone
Tanks, diesel (above ground)	T06	T06-01	A	Medium	C	Power House Generator
Tanks, heating oil, nonresidential (aboveground)	T14	T14-01	A	Low	C	Power House
Tanks, heating oil, nonresidential (aboveground)	T14	T14-02	A	Low	C	Health Clinic
Tanks, heating oil, nonresidential (aboveground)	T14	T14-03	A	Low	C	NC Company
Tanks, heating oil, nonresidential (aboveground)	T14	T14-04	A	Low	C	Store
Tanks, heating oil, nonresidential (aboveground)	T14	T14-05	A	Low	C	Teachers Quarters
Tanks, heating oil, nonresidential (aboveground)	T14	T14-06	A	Low	C	Holy Trinity Church
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	A	Low	C	Community Center
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	A	Low	C	Tool Shed
Tanks, heating oil, nonresidential (aboveground)	T14	T14-09	A	Low	C	Yutana Barge Line Storage
Tanks, heating oil, nonresidential (aboveground)	T14	T14-10	A	Low	C	Fire Hall
Tanks, heating oil, nonresidential (aboveground)	T14	T14-11	A	Low	C	Yukon Enterprises
Tanks, heating oil, nonresidential (aboveground)	T14	T14-12	A	Low	C	Post Office
Tanks, heating oil, nonresidential (aboveground)	T14	T14-13	A	Low	C	Health Clinic Med Tech Dish

Table 4 (continued)

Contaminant Source Inventory and Risk Ranking for Circle Washeteria

Sources of Volatile Organic Chemicals

PWSID 300769.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Tanks, heating oil, nonresidential (aboveground)	T14	T14-14	A	Low	C	Satellite
Tanks, heating oil, nonresidential (aboveground)	T14	T14-15	A	Low	C	Community Center
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-01	A	High	C	Yukon Trading Post
Petroleum product bulk station/terminals	X11	X11-01	A	Very High	C	
Airports	X14	X14-01	A	High	C	Circle City Landing Strip
Boat yards and marinas	X15	X15-01	A	Low	C	Boat Launch Pad
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	C	Steese Highway
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assumes 20 or less roads in Zone A
Electric power generation (fossil fuels)	X36	X36-01	A	Medium	C	Power House
Firehouses	X38	X38-01	A	Low	C	Fire Hall
Medical/veterinary facilities (doctor or dentist offic hospitals, nursing homes)	X40	X40-01	A	Low	C	Health Clinic
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	B	Low	C	Sewage Lagoon
Pit toilets (open hole), nonresidential (one or more	D16	D16-02	B	Low	C	Assumes 20 or less honeybucket pits/outhouses in Zone B
Tanks, heating oil, nonresidential (aboveground)	T14	T14-16	B	Low	C	Alascom
Tanks, heating oil, nonresidential (aboveground)	T14	T14-18	B	Low	C	Circle Fish Company
Tanks, heating oil, nonresidential (aboveground)	T14	T14-19	B	Low	C	School Utility Storage
Tanks, heating oil, nonresidential (aboveground)	T14	T14-20	B	Low	C	Staellite Dish
Tanks, heating oil, nonresidential (aboveground)	T14	T14-21	B	Low	C	School
Abandoned wells	W01	W01-01	B	High	C	

Contaminant Source Inventory and Risk Ranking for Circle Washeteria

Sources of Volatile Organic Chemicals

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Airports	X14	X14-02	B	High	C	Dirt Airstrip
Tanks, heating oil, nonresidential (aboveground)	T14	T14-17	C	Low	C	Calvary Northern Lights Mission
Airports	X14	X14-03	C	High	C	Gravel Runway

Table 5

Contaminant Source Inventory and Risk Ranking for Circle Washeteria

PWSID 300769.001

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Gasoline stations (without repair shop)	C15	C15-01	A	Low	C	
Motor /motor vehicle repair shops	C31	C31-01	A	Medium	C	Service Mainenance Shop
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Wastewater Treatment Facility
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	A	Low	C	Yukon Trading Post
Pit toilets (open hole), nonresidential (one or more	D16	D16-01	A	Low	C	Assumes 20 or less honeybucket pits/outhouses in Zone A
Tanks, heating oil, nonresidential (aboveground)	T14	T14-01	A	Low	C	Power House
Tanks, heating oil, nonresidential (aboveground)	T14	T14-02	A	Low	C	Health Clinic
Tanks, heating oil, nonresidential (aboveground)	T14	T14-03	A	Low	C	NC Company
Tanks, heating oil, nonresidential (aboveground)	T14	T14-04	A	Low	C	Store
Tanks, heating oil, nonresidential (aboveground)	T14	T14-05	A	Low	C	Teachers Quarters
Tanks, heating oil, nonresidential (aboveground)	T14	T14-06	A	Low	C	Holy Trinity Church
Tanks, heating oil, nonresidential (aboveground)	T14	T14-07	A	Low	C	Community Center
Tanks, heating oil, nonresidential (aboveground)	T14	T14-08	A	Low	C	Tool Shed
Tanks, heating oil, nonresidential (aboveground)	T14	T14-09	A	Low	C	Yutana Barge Line Storage
Tanks, heating oil, nonresidential (aboveground)	T14	T14-10	A	Low	C	Fire Hall
Tanks, heating oil, nonresidential (aboveground)	T14	T14-11	A	Low	C	Yukon Enterprises
Tanks, heating oil, nonresidential (aboveground)	T14	T14-12	A	Low	C	Post Office
Tanks, heating oil, nonresidential (aboveground)	T14	T14-13	A	Low	C	Health Clinic Med Tech Dish
Tanks, heating oil, nonresidential (aboveground)	T14	T14-14	A	Low	C	Satellite
Tanks, heating oil, nonresidential (aboveground)	T14	T14-15	A	Low	C	Community Center

Contaminant Source Inventory and Risk Ranking for Circle Washeteria

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Municipal or city parks (with green areas)	X04	X04-01	A	Low	C	Circle City Camping Park
Petroleum product bulk station/terminals	X11	X11-01	A	Low	C	
Airports	X14	X14-01	A	Low	C	Circle City Landing Strip
Boat yards and marinas	X15	X15-01	A	Low	C	Boat Launch Pad
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	C	Steese Highway
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assumes 20 or less roads in Zone A
Electric power generation (fossil fuels)	X36	X36-01	A	Medium	C	Power House
Firehouses	X38	X38-01	A	Low	C	Fire Hall
Medical/veterinary facilities (doctor or dentist offic hospitals, nursing homes)	X40	X40-01	A	Low	C	Health Clinic
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	B	Low	C	Sewage Lagoon
Pit toilets (open hole), nonresidential (one or more	D16	D16-02	B	Low	C	Assumes 20 or less honeybucket pits/outhouses in Zone B
Tanks, heating oil, nonresidential (aboveground)	T14	T14-16	B	Low	C	Alascom
Tanks, heating oil, nonresidential (aboveground)	T14	T14-18	B	Low	C	Circle Fish Company
Tanks, heating oil, nonresidential (aboveground)	T14	T14-19	B	Low	C	School Utility Storage
Tanks, heating oil, nonresidential (aboveground)	T14	T14-20	B	Low	C	Staellite Dish
Tanks, heating oil, nonresidential (aboveground)	T14	T14-21	B	Low	C	School
Abandoned wells	W01	W01-01	B	Very High	C	
Airports	X14	X14-02	B	Low	C	Dirt Airstrip
Tanks, heating oil, nonresidential (aboveground)	T14	T14-17	C	Low	C	Calvary Northern Lights Mission

Contaminant Source Inventory and Risk Ranking for Circle Washeteria

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Airports	X14	X14-03	C	Low	C	Gravel Runway

Table 6

Contaminant Source Inventory and Risk Ranking for Circle Washeteria

PWSID 300769.001

Sources of Synthetic Organic Chemicals

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Wastewater Treatment Facility
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	A	Low	C	Yukon Trading Post
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-01	A	Low	C	Yukon Trading Post
Municipal or city parks (with green areas)	X04	X04-01	A	Low	C	Circle City Camping Park
Petroleum product bulk station/terminals	X11	X11-01	A	Low	C	
Airports	X14	X14-01	A	Medium	C	Circle City Landing Strip
Medical/veterinary facilities (doctor or dentist offic hospitals, nursing homes)	X40	X40-01	A	Low	C	Health Clinic
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	B	Low	C	Sewage Lagoon
Abandoned wells	W01	W01-01	B	High	C	
Airports	X14	X14-02	B	Medium	C	Dirt Airstrip
Airports	X14	X14-03	C	Medium	C	Gravel Runway

Table 7

Contaminant Source Inventory and Risk Ranking for Circle Washeteria

Sources of Other Organic Chemicals

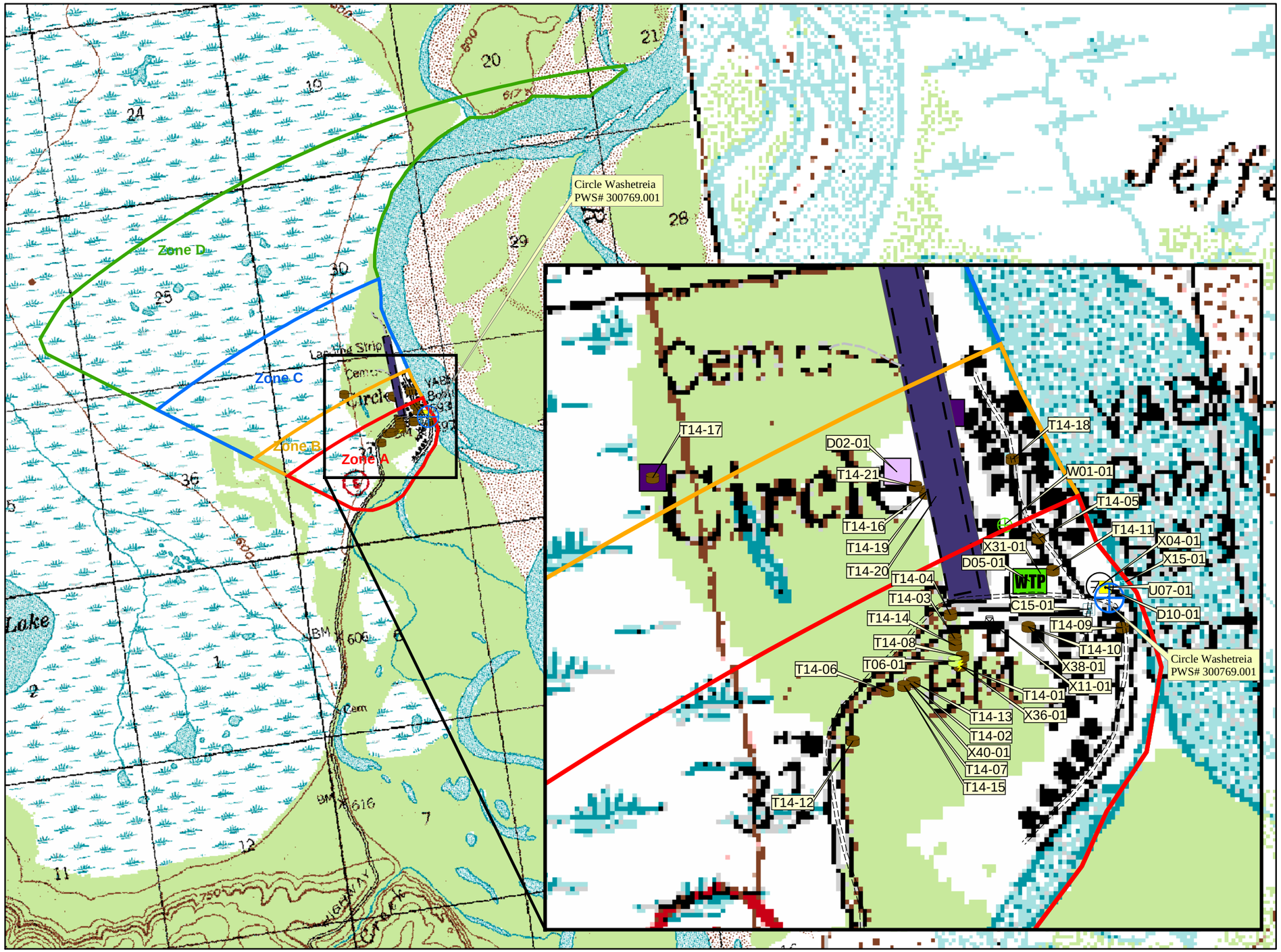
PWSID 300769.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Gasoline stations (without repair shop)	C15	C15-01	A	Low	C	
Motor /motor vehicle repair shops	C31	C31-01	A	Medium	C	Service Mainenance Shop
Domestic wastewater treatment plants	D05	D05-01	A	Low	C	Wastewater Treatment Facility
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	A	Low	C	Yukon Trading Post
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-01	A	Low	C	Yukon Trading Post
Petroleum product bulk station/terminals	X11	X11-01	A	High	C	
Airports	X14	X14-01	A	Medium	C	Circle City Landing Strip
Boat yards and marinas	X15	X15-01	A	Low	C	Boat Launch Pad
Highways and roads, paved (cement or asphalt)	X20	X20-01	A	Low	C	Steese Highway
Highways and roads, dirt/gravel	X24	X24-01	A	Low	C	Assumes 20 or less roads in Zone A
Electric power generation (fossil fuels)	X36	X36-01	A	High	C	Power House
Domestic wastewater treatment plant disposal ponds/lagoons	D02	D02-01	B	Low	C	Sewage Lagoon
Abandoned wells	W01	W01-01	B	High	C	
Airports	X14	X14-02	B	Medium	C	Dirt Airstrip
Airports	X14	X14-03	C	Medium	C	Gravel Runway

APPENDIX C

Drinking Water Protection Area
and Potential and Existing Contaminant Sources
(Map C)

Public Water Well System for PWS # 300769.001 Circle Washeteria
Sources of Potential and Existing Contamination



LEGEND

Public Water System Well

Hydrography/Physical

- Parcels
- Stream
- Lake or Pond
- Contours

Transportation

- Primary Route (Class 1)
- Secondary Route (Class 2)
- Road (Class 3)
- Road (Class 4)
- Road (Class 5, Four-wheel drive)

Groundwater Protection Zones

- Zone A Protection Area– Several Months Travel Time
- Zone B Protection Area– 2 Years Travel Time
- Zone C Protection Area– 5 Years Travel Time
- Zone D Protection Area– 10 Years Travel Time

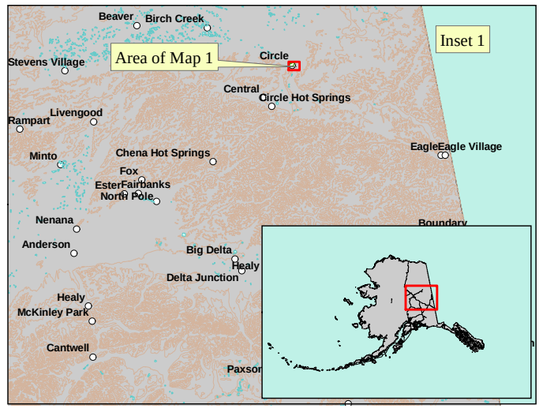
Existing or Potential Contaminant Sources

- Gasoline stations without repair shops (C15)
- Motor/motor vehicle repair shops (C31)
- Injection Wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method) (D10)
- Domestic wastewater treatment plant (D05)
- Tanks, diesel (aboveground) (T06)
- Tanks, heating oil, nonresidential (aboveground) (T14)
- Open Leaking Underground Storage Tank (LUST) (lubricants or other petroleum products) (U07)
- Abandoned wells (W01)
- Municipal or City Parks (X04)
- Petroleum product bulk station/terminals (X11)
- Boat yards and marinas (X15)
- Electric Power Generation (fossil fuels) (X36)
- Firehouses (X38)
- Medical/veterinary facilities (X40)
- Domestic Wastewater Treatment pond or lagoon (D02)
- Landfill, municipal, Class III (D51)
- Airport or landing strip (X14)

Data Sources:
- Contaminant Sources, Public Water System Wells, Contours Alaska Department of Environmental Conservation (ADEC)
- Critical Facilities, Federal Emergency Management Agency (FEMA)

All other data:
- United States Geological Survey (USGS)
- Drinking Water Protection Areas based on "Alaska Drinking Water Protection Program - Guidance Manual for Class A Public Water Systems" published by ADEC

URS Corporation does not guarantee the accuracy or validity of the data provided.



0 0.35 0.7 1.4 2.1 2.8 Miles

Circle Washeteria
PWS# 300769.001
Appendix C Map C

APPENDIX D

Vulnerability Analysis for Public Drinking Water Source (Charts 1-14)

Chart 1. Susceptibility of the wellhead - Circle Washeteria (PWS No. 300769.001)

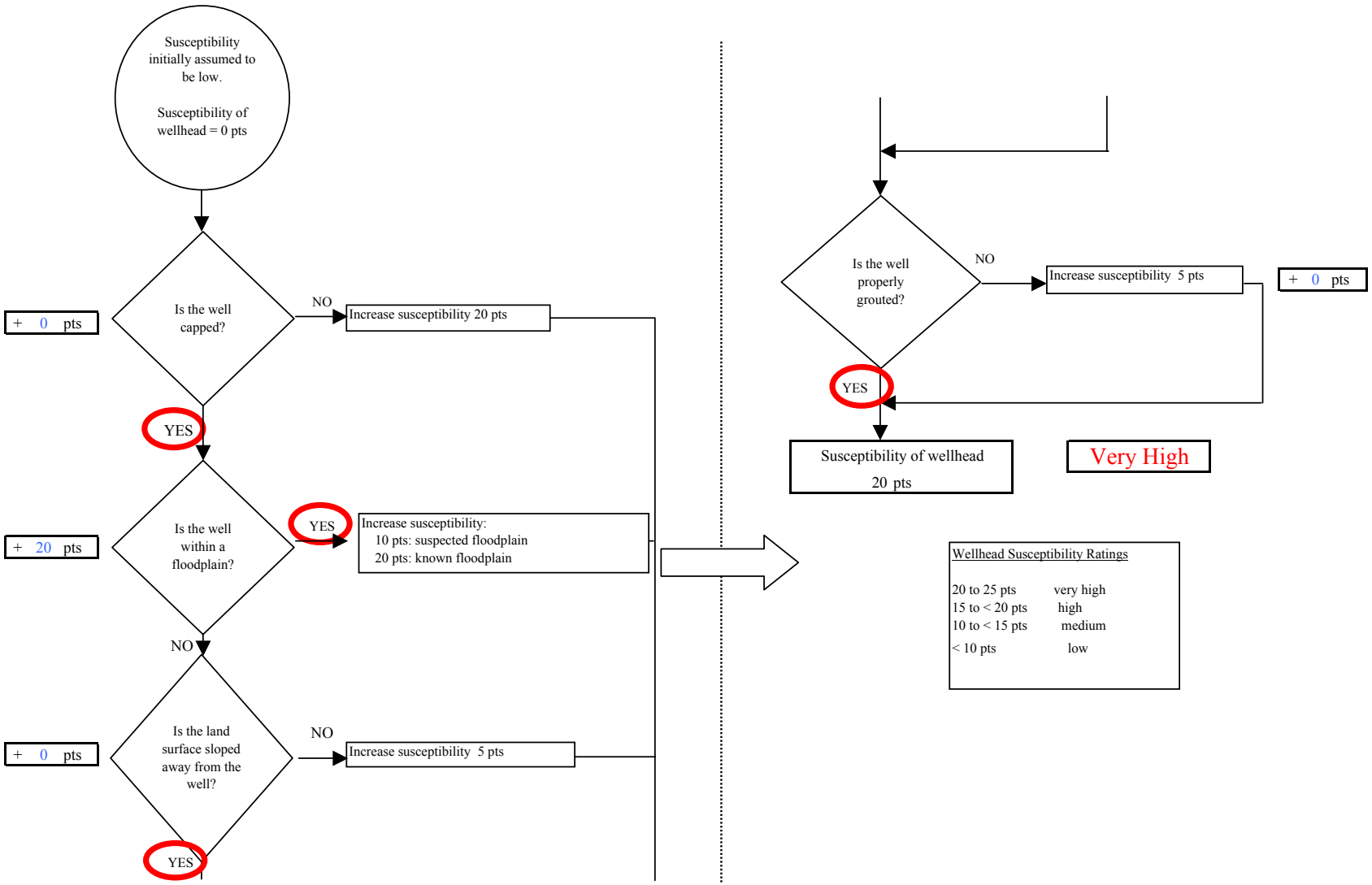


Chart 2. Susceptibility of the aquifer Circle Washeteria (PWS No. 300769.001)

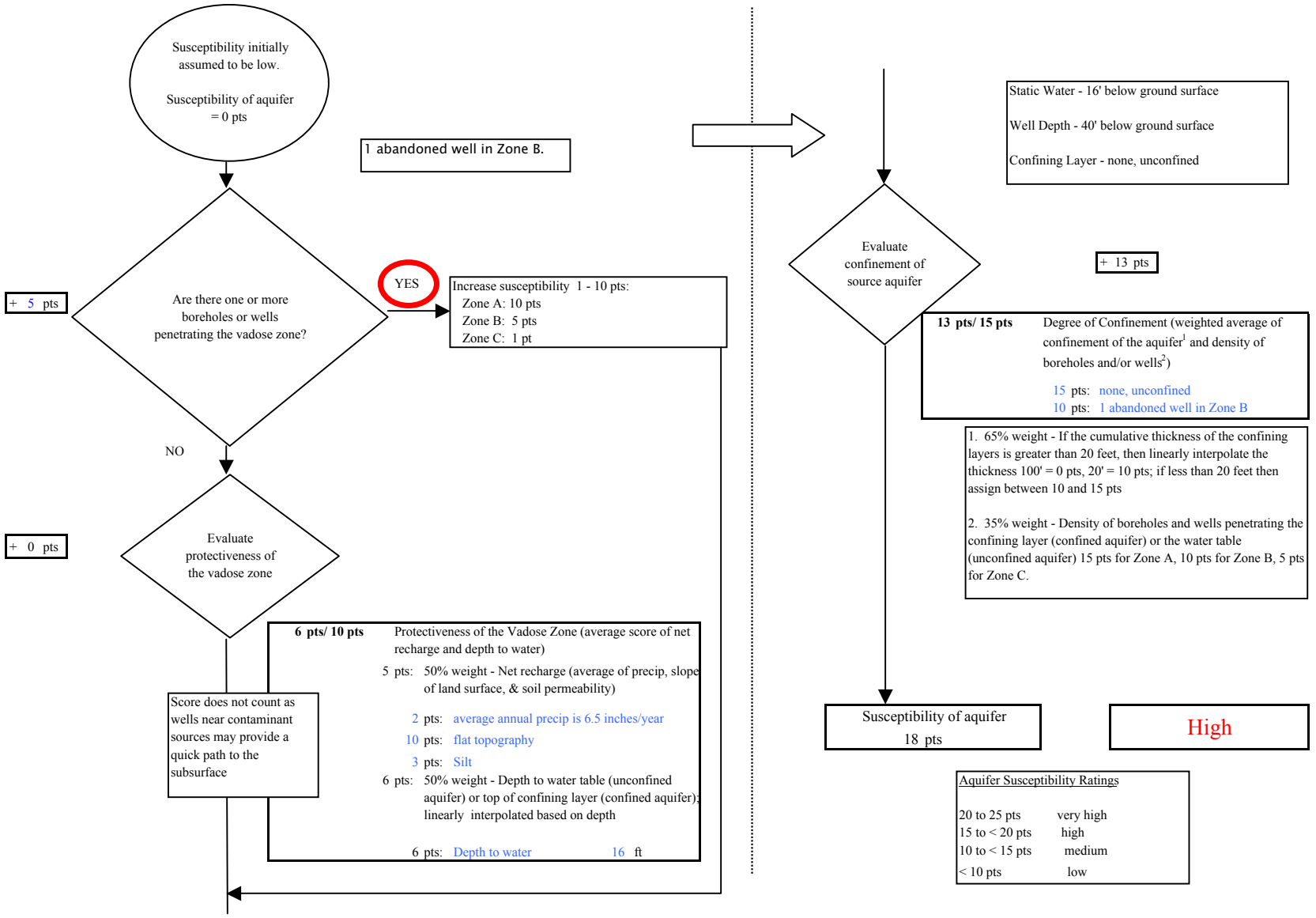
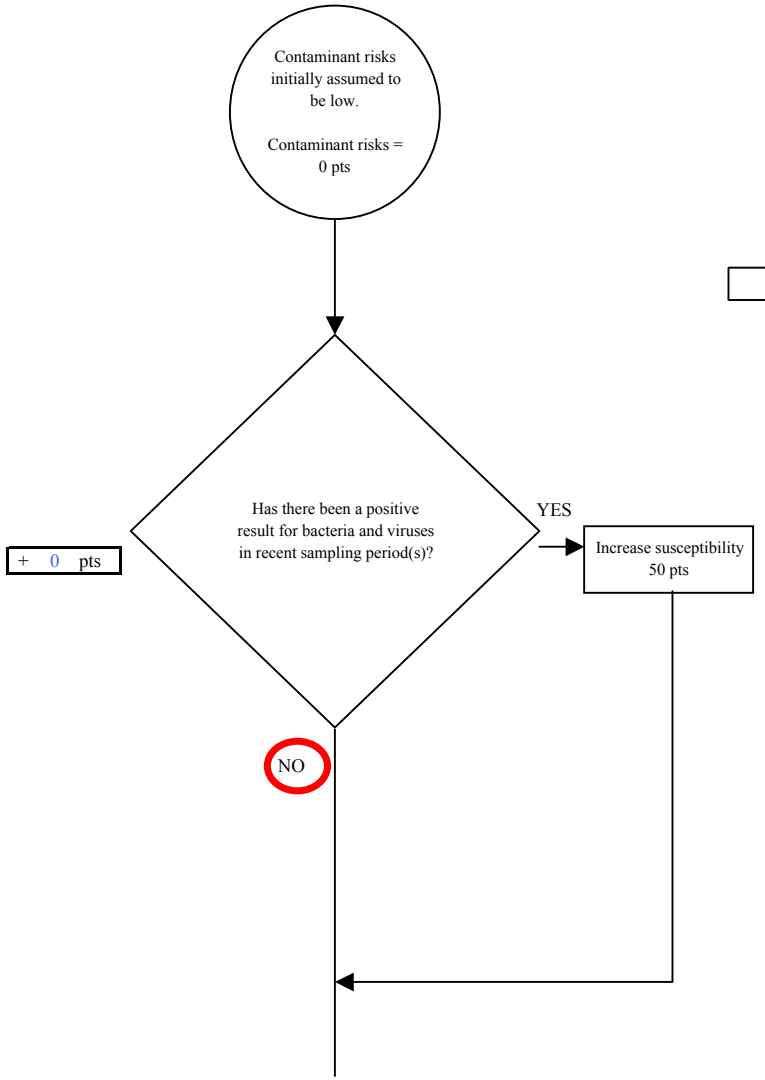
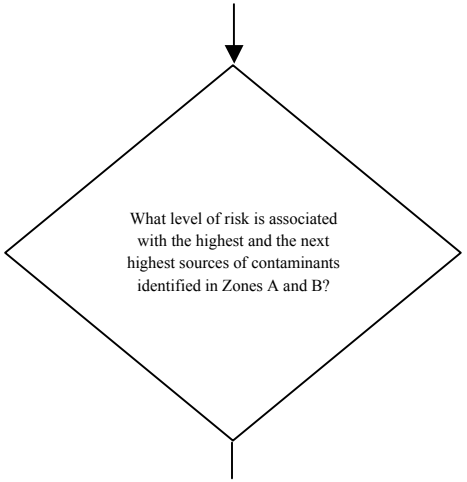


Chart 3. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Bacteria & Viruses





+ 40 pts

Risk Rankings for Contaminant Sources Identified in Zones A and B

	Zone A	Zone B	Total
Very Highs(s)	0	0	0
High(s)	1	1	2
Medium(s)	23	21	44
Low(s)	1	0	1

	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

Matrix Score 40

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individual contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.

Chart 3. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Bacteria & Viruses

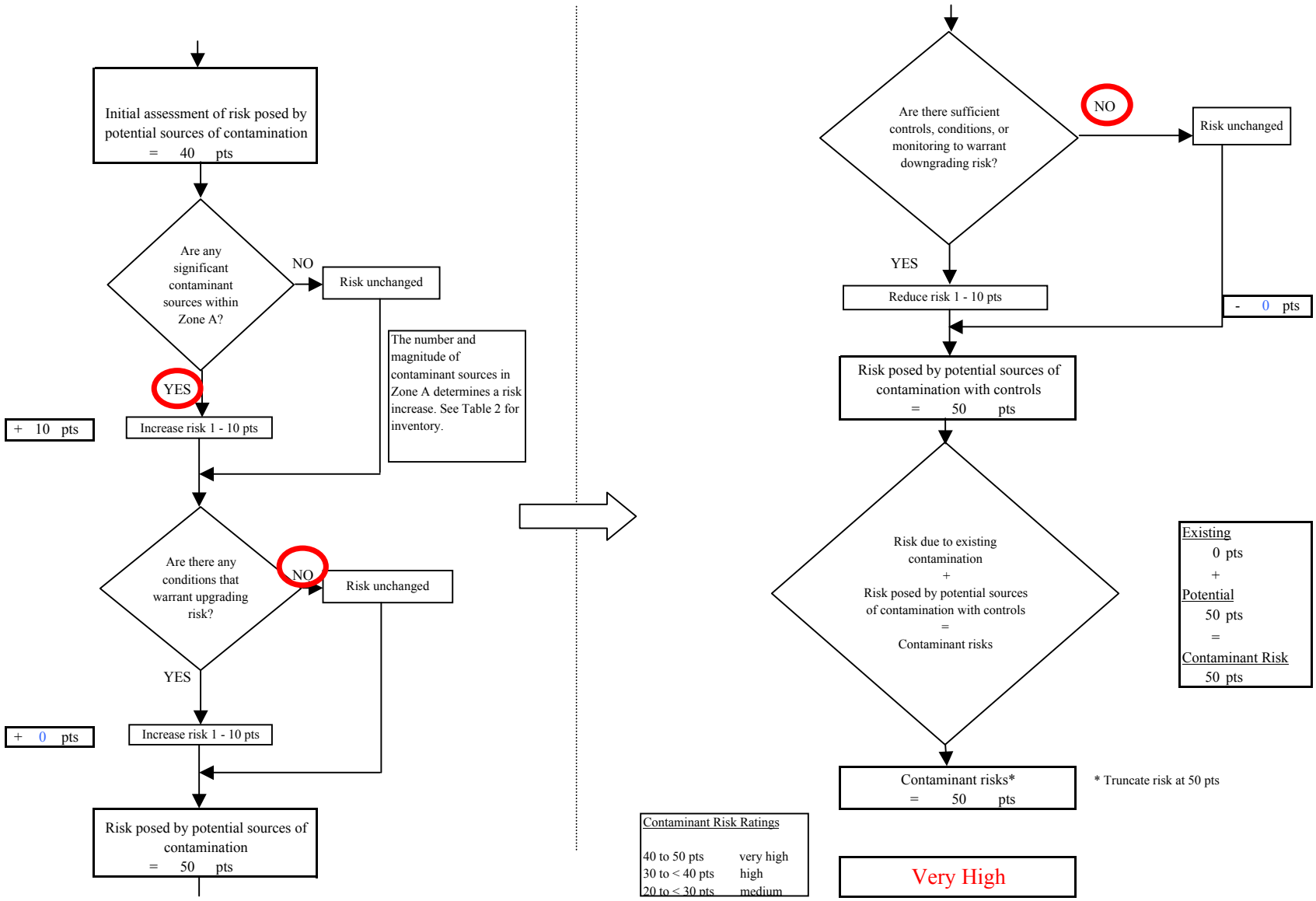


Chart 4. Vulnerability analysis for Circle Washeteria (PWS No. 300769.001) - Bacteria & Viruses

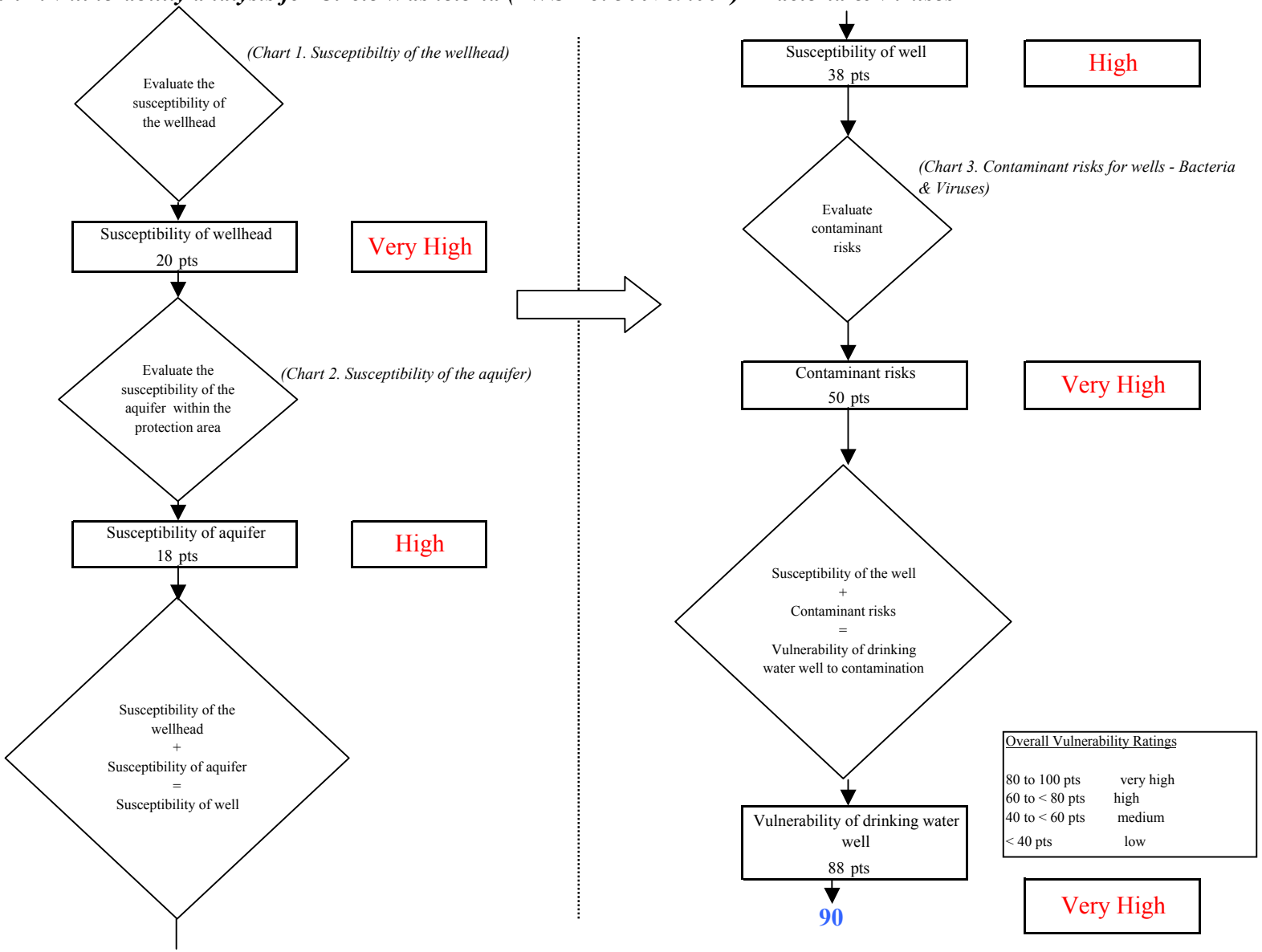


Chart 5. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Nitrates and Nitrites

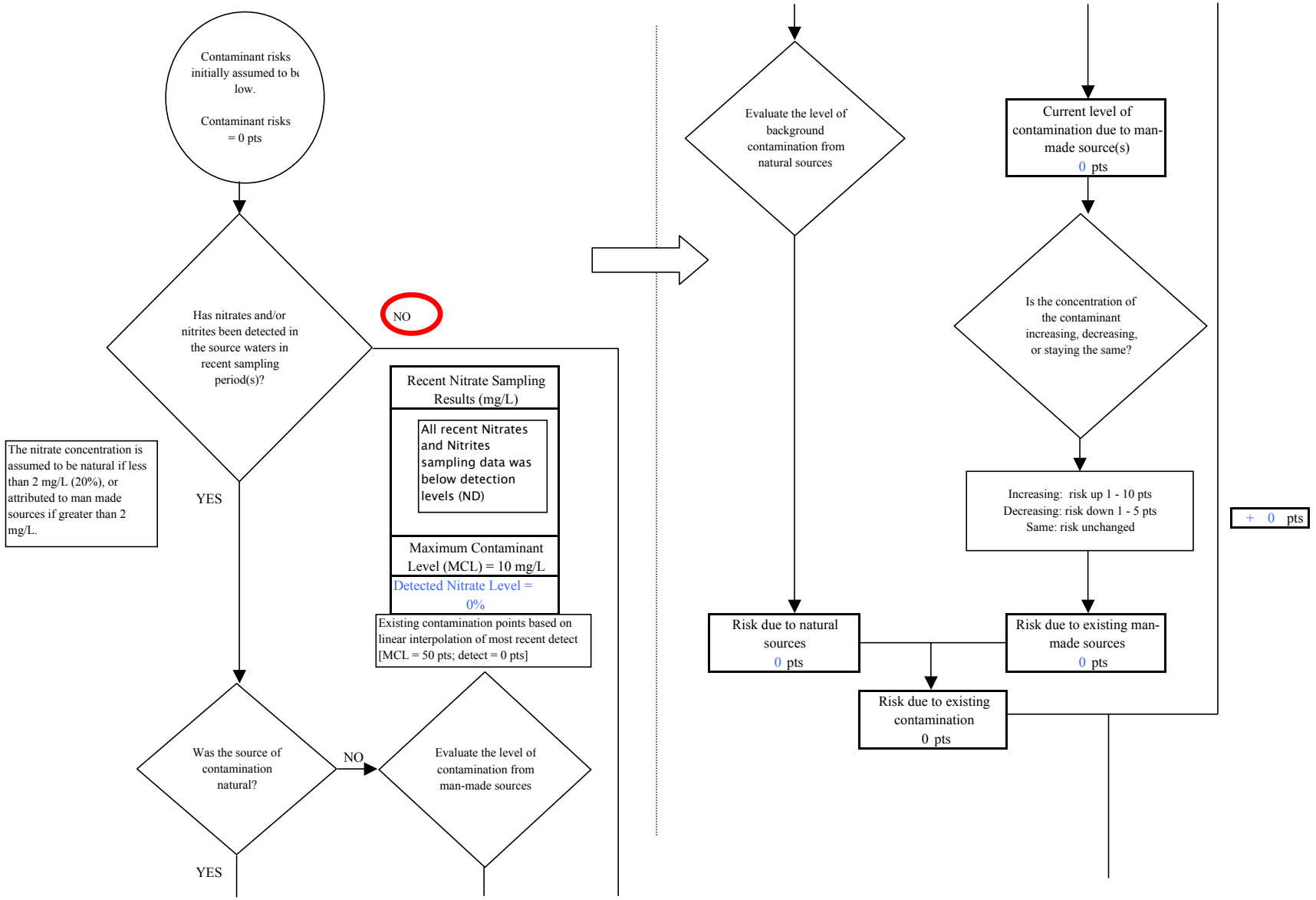
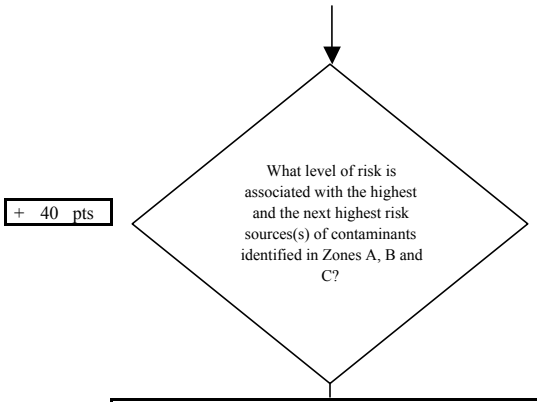


Chart 5. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Nitrates and Nitrites



Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	1	2	3
Medium(s)	22	20	42
Low(s)	3	2	5

	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

Matrix Score	40

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individua contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.

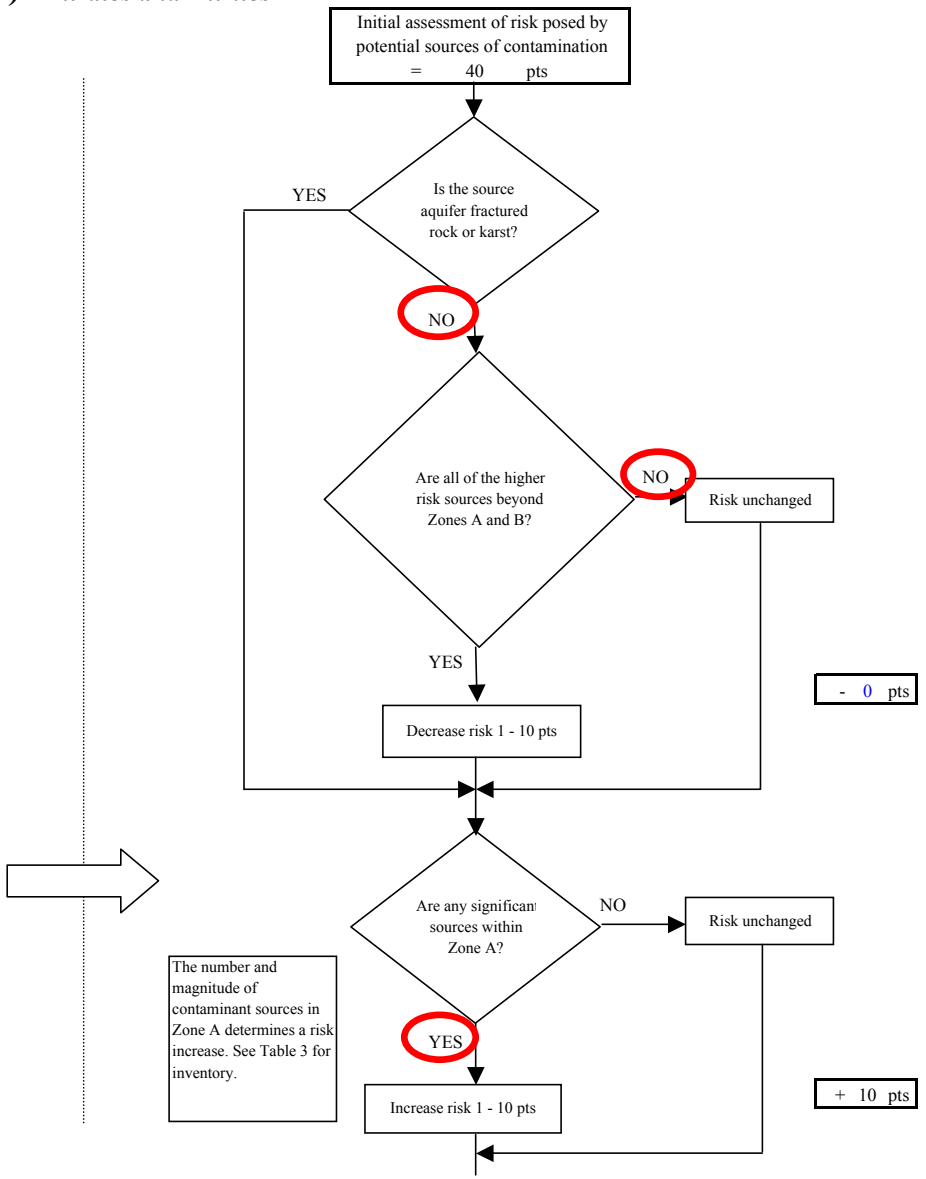


Chart 5. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Nitrates and Nitrites

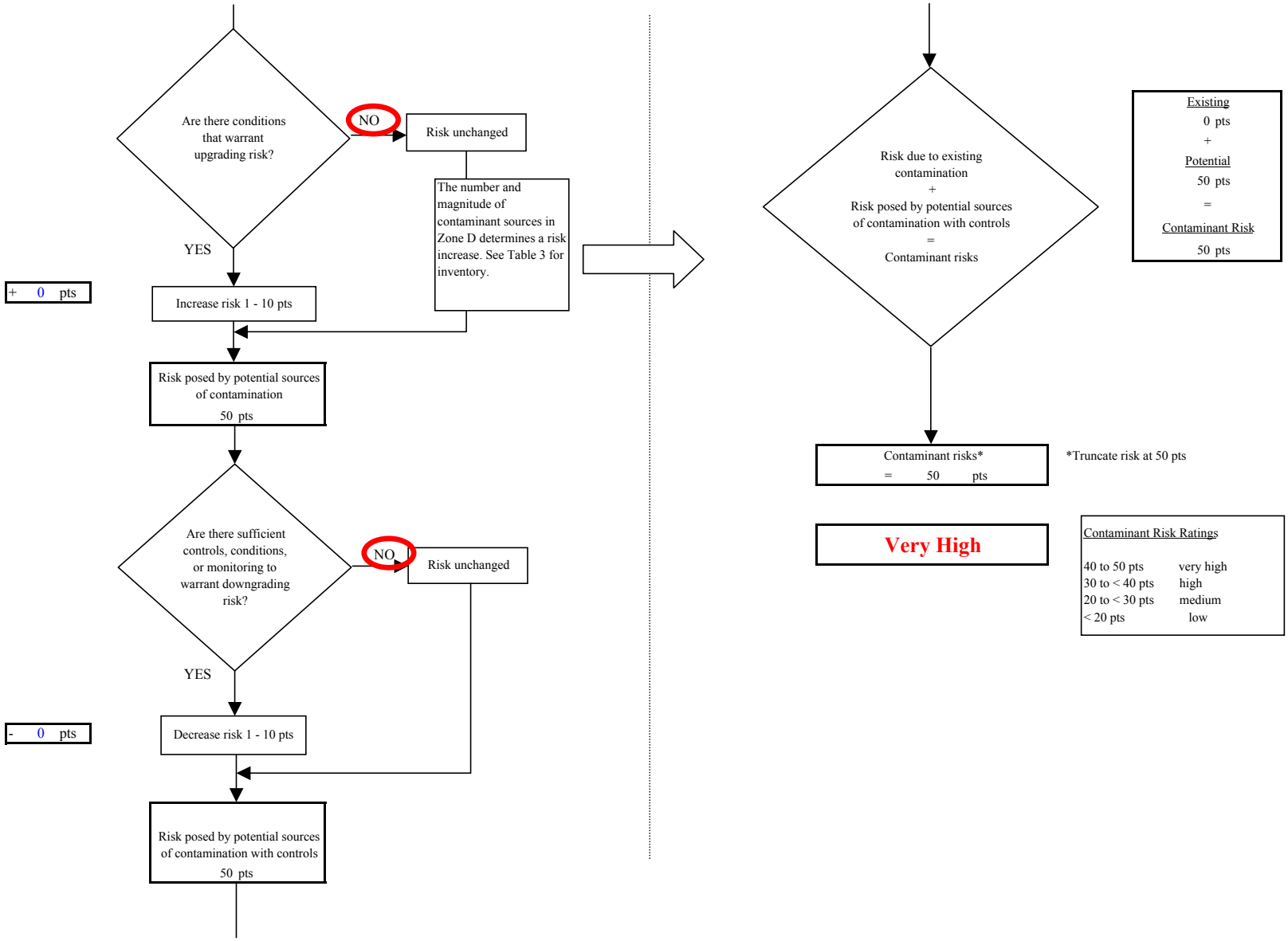


Chart 6. Vulnerability analysis for Circle Washeteria (PWS No. 300769.001) - Nitrates and Nitrites

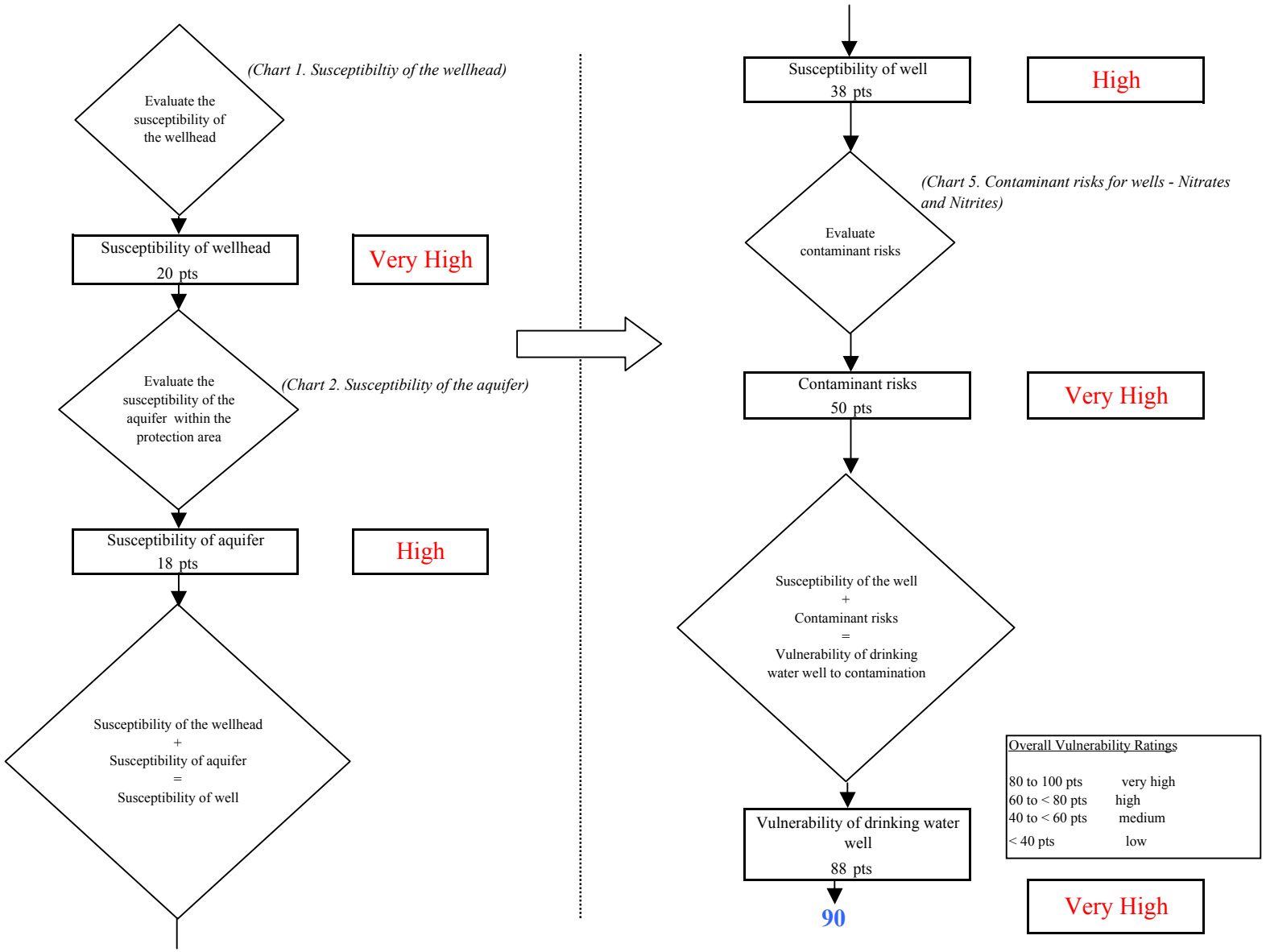


Chart 7. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Volatile Organic Chemicals

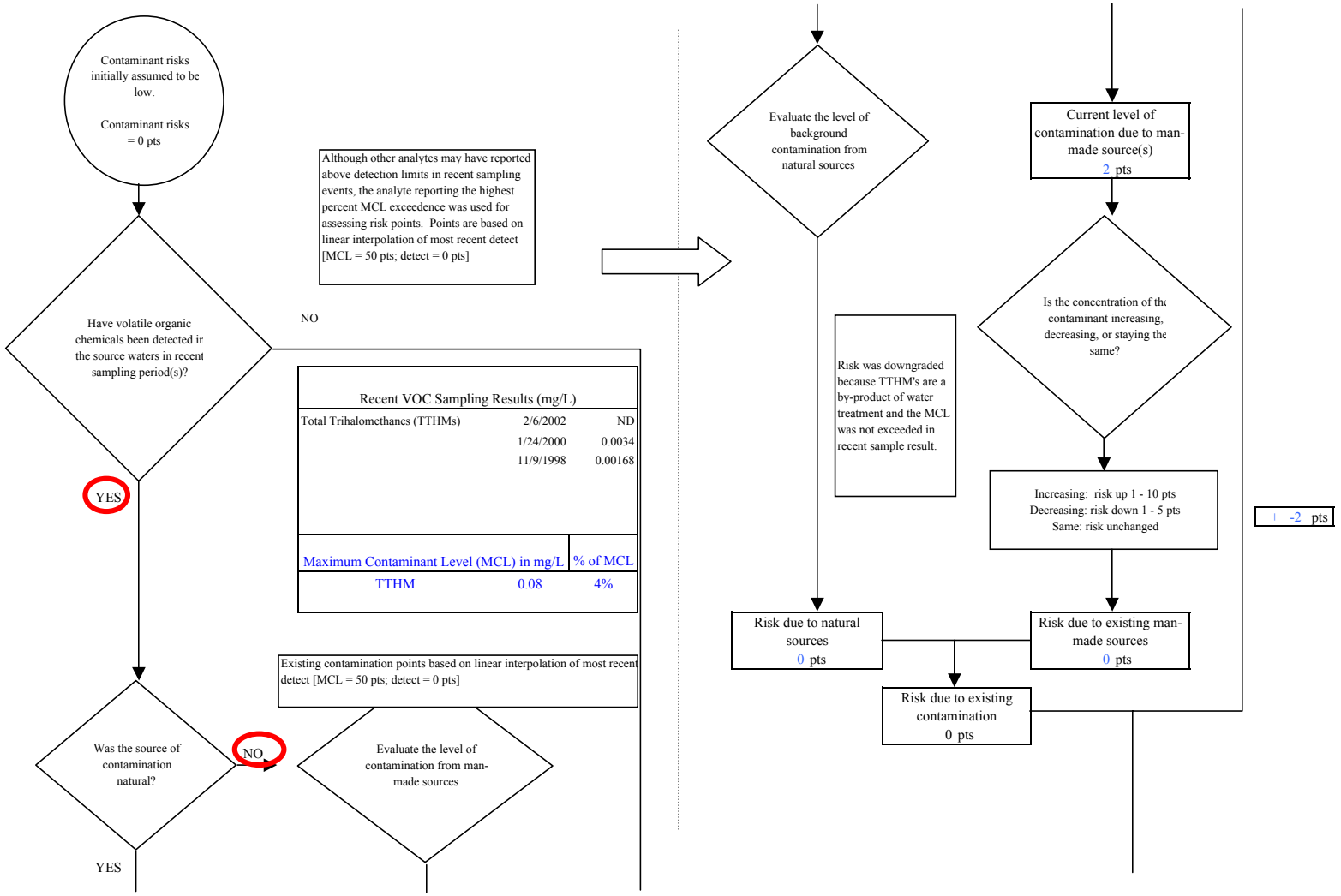
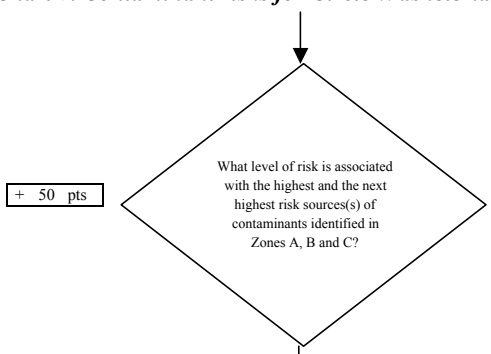


Chart 7. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Volatile Organic Chemicals



+ 50 pts

Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	1	0	1
High(s)	3	3	6
Medium(s)	7	0	7
Low(s)	41	27	68

	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

Matrix Score 50

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individual contaminant source in tl CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.

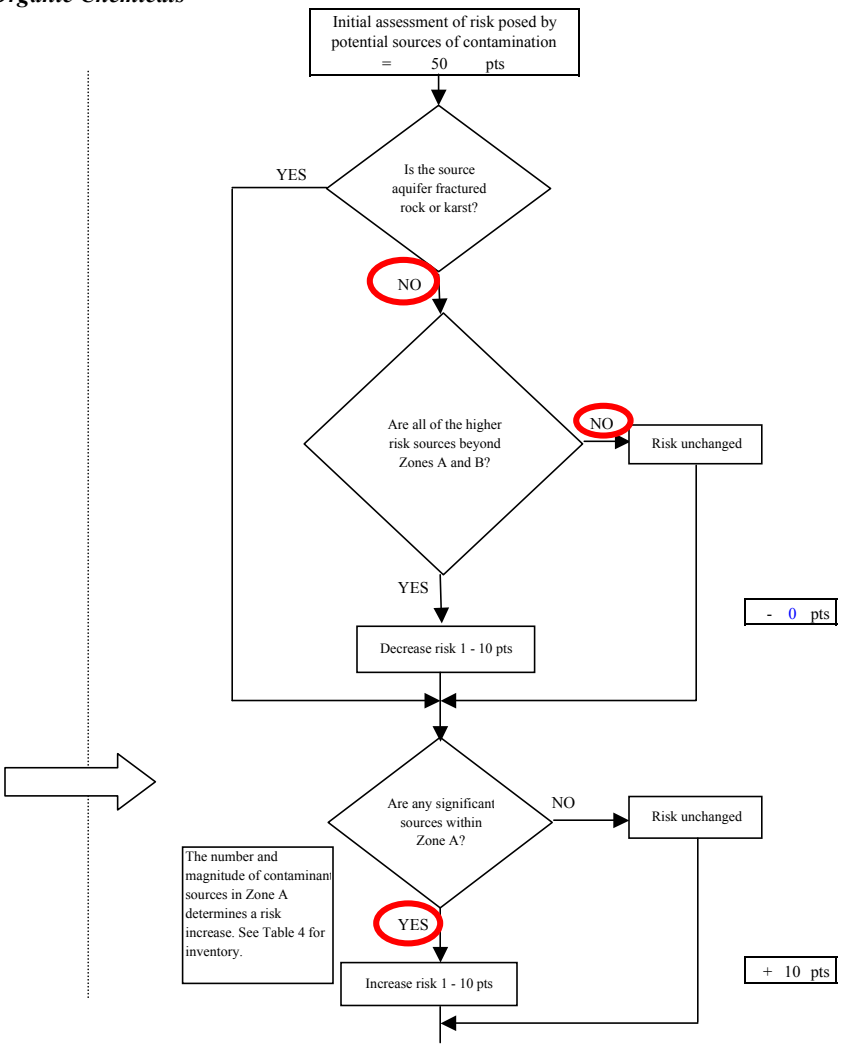


Chart 7. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Volatile Organic Chemicals

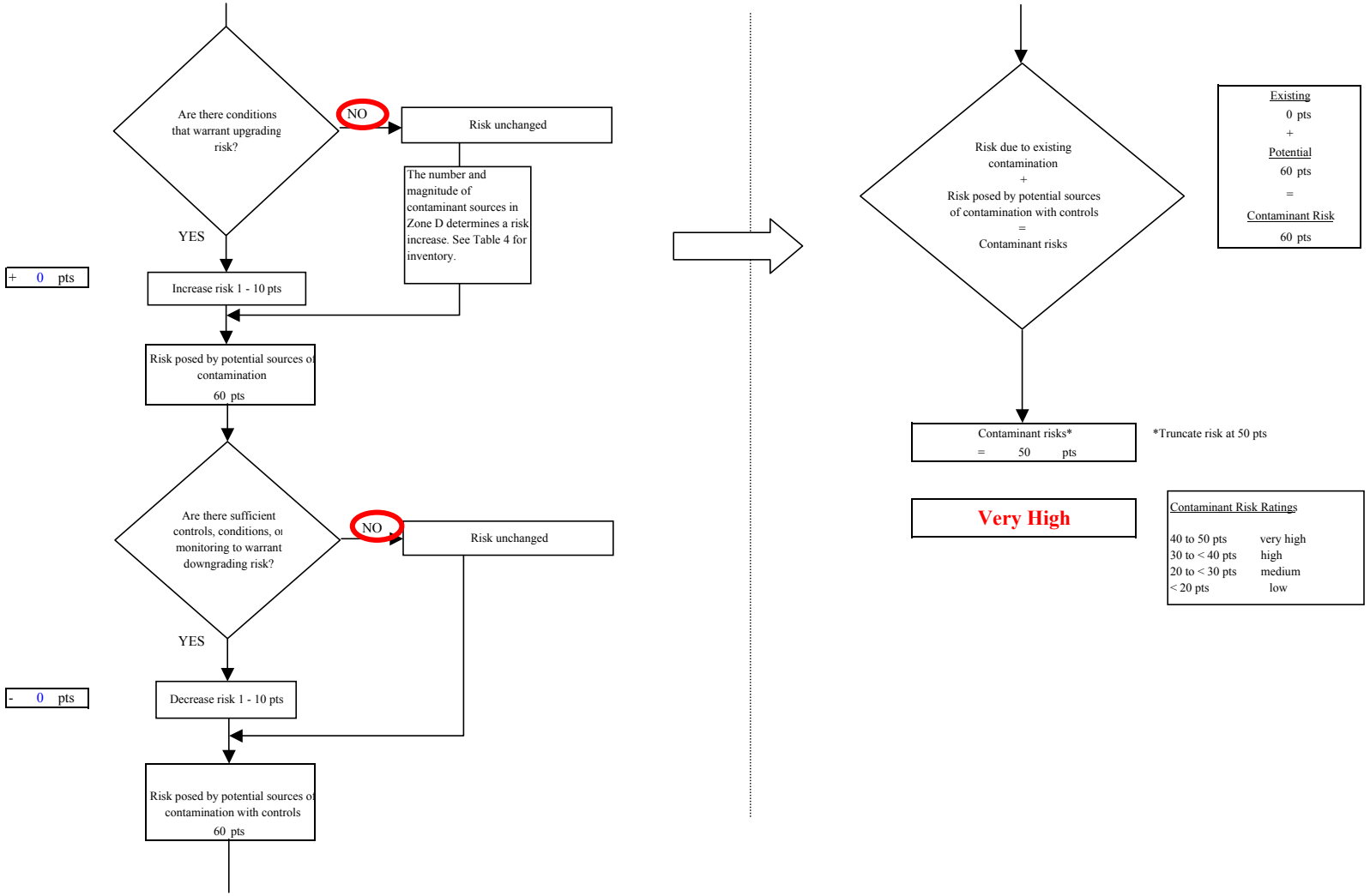


Chart 8. Vulnerability analysis for Circle Washeteria (PWS No. 300769.001) - Volatile Organic Chemicals

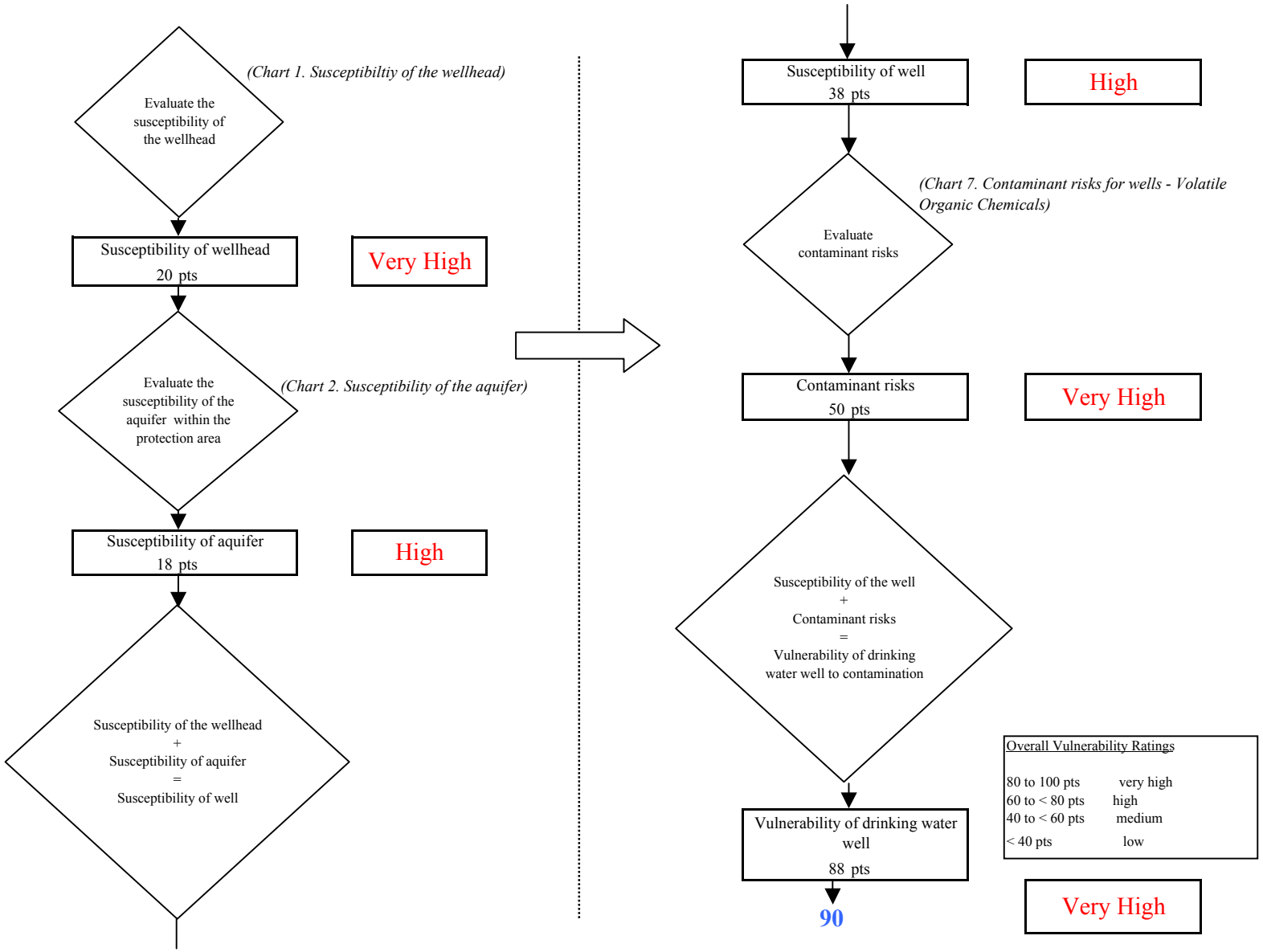


Chart 9. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals

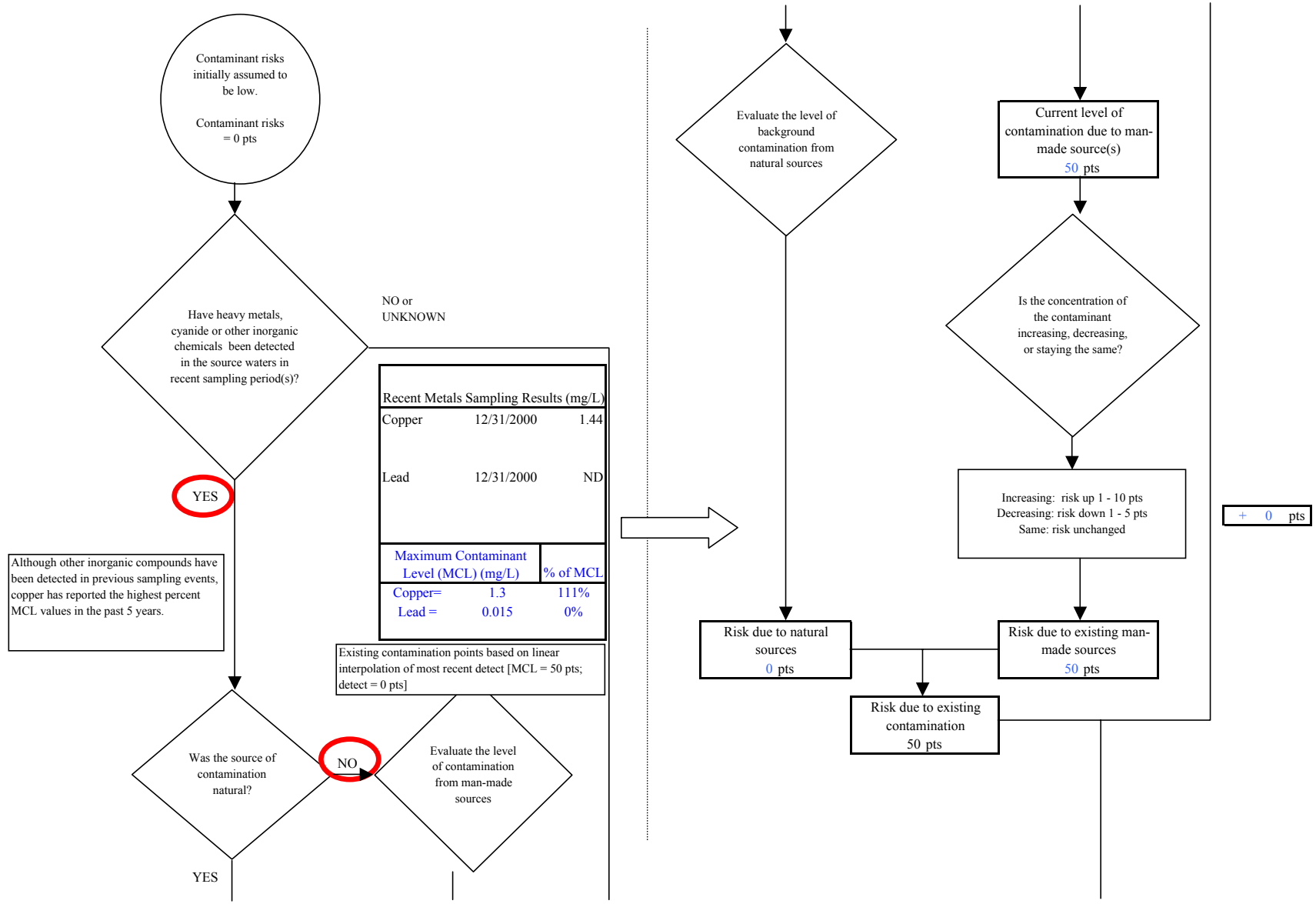
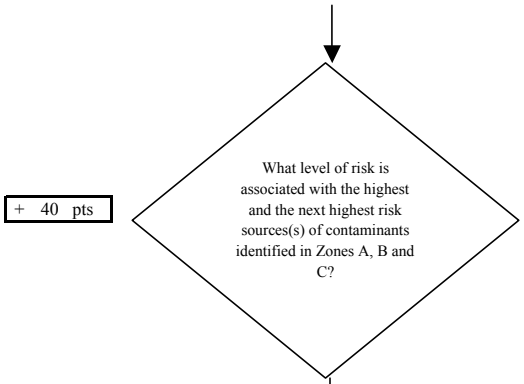


Chart 9. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals



+ 40 pts

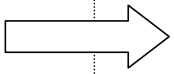
Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	0	1	1
High(s)	0	0	0
Medium(s)	2	0	2
Low(s)	45	29	74

	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

Matrix Score 40

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individual contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.



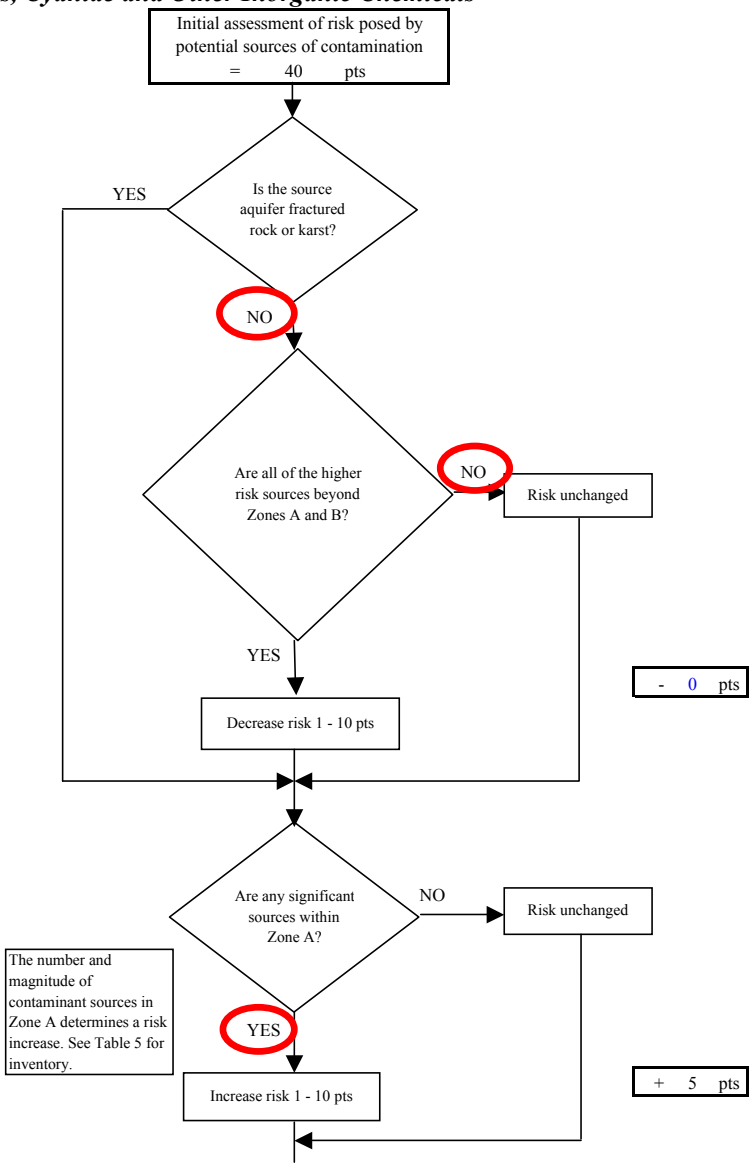


Chart 9. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals

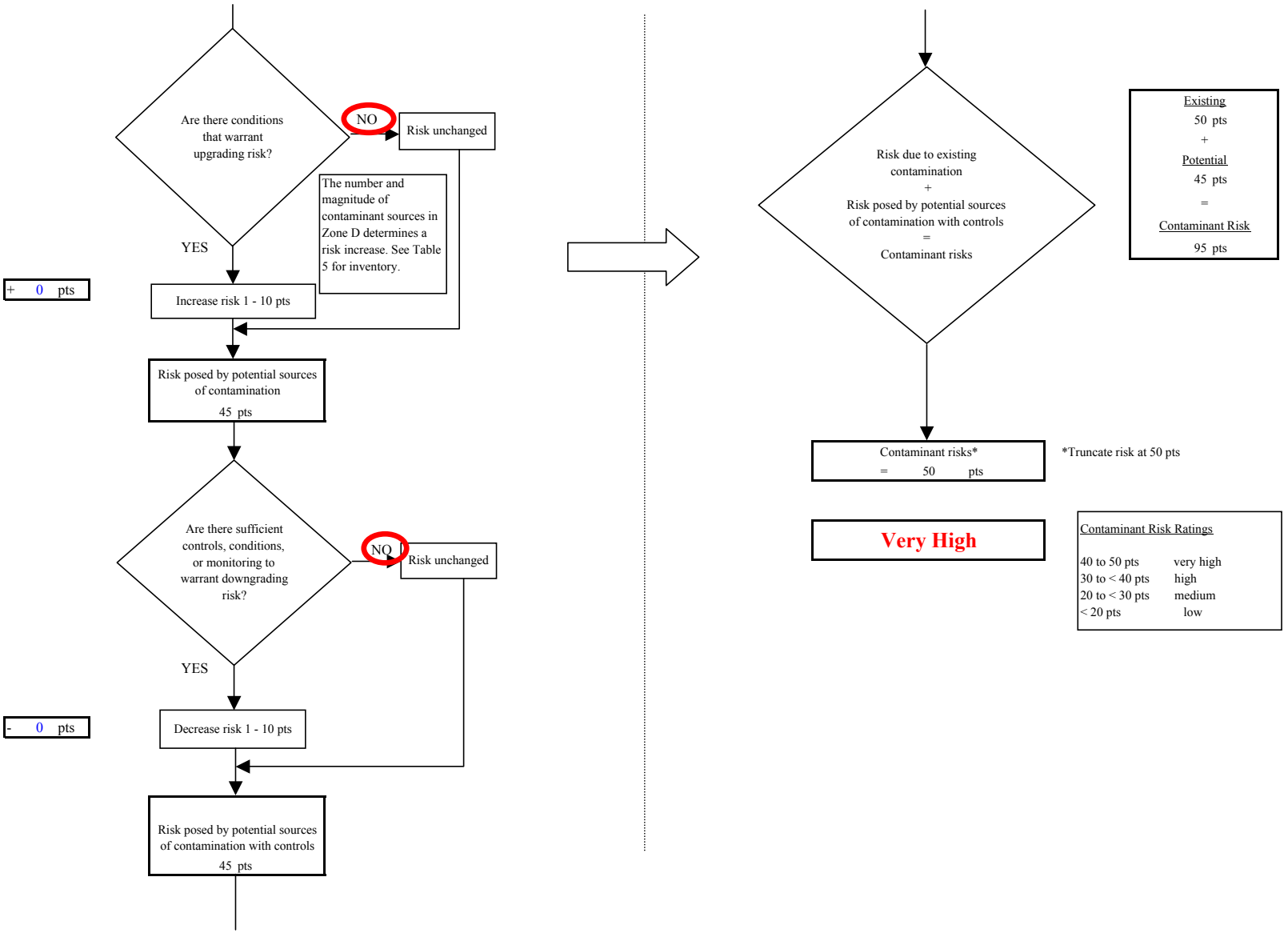


Chart 10. Vulnerability analysis for Circle Washeteria (PWS No. 300769.001) - Heavy Metals, Cyanide and Other Inorganic Chemicals

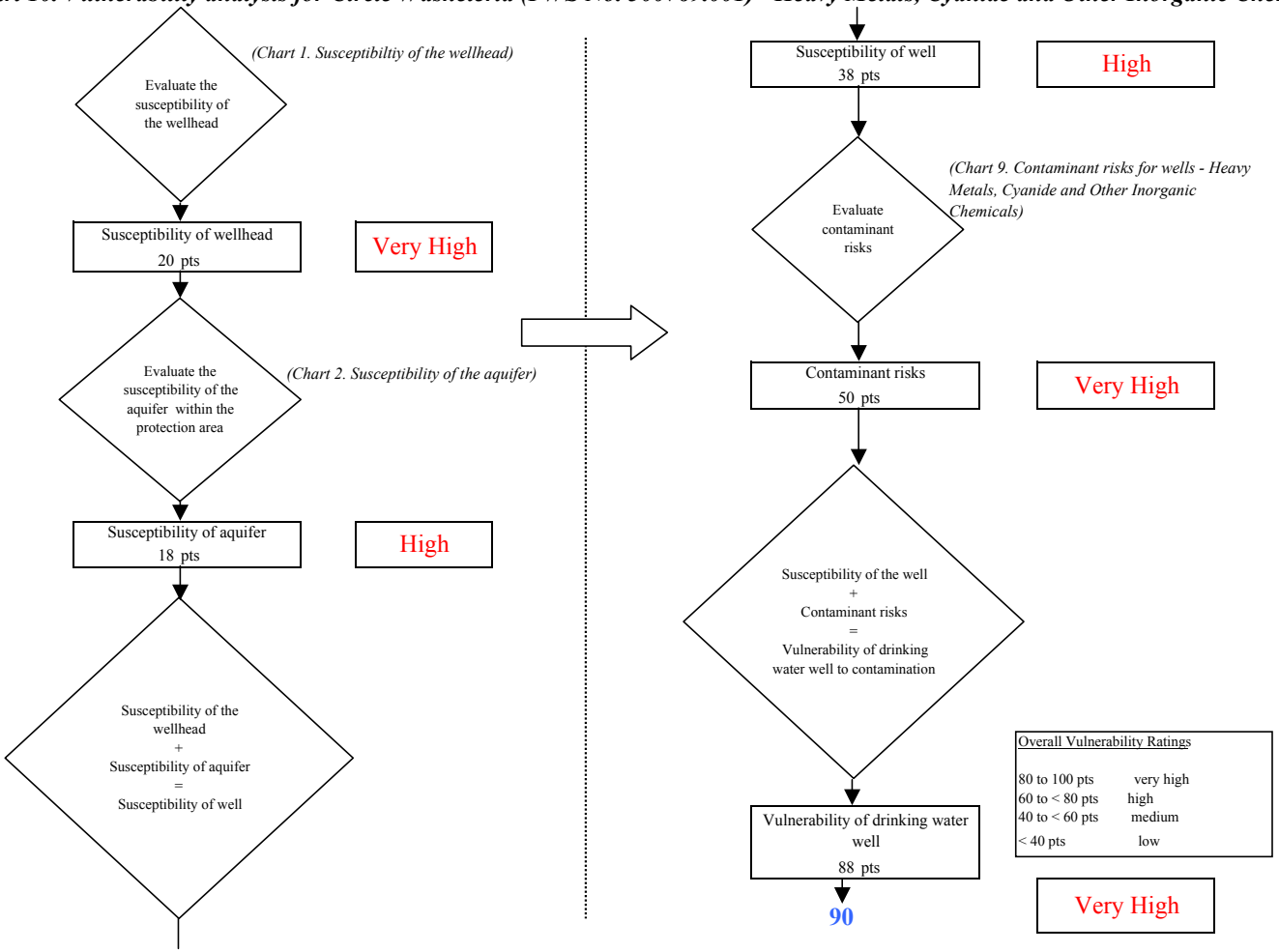


Chart 11. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Synthetic Organic Chemicals

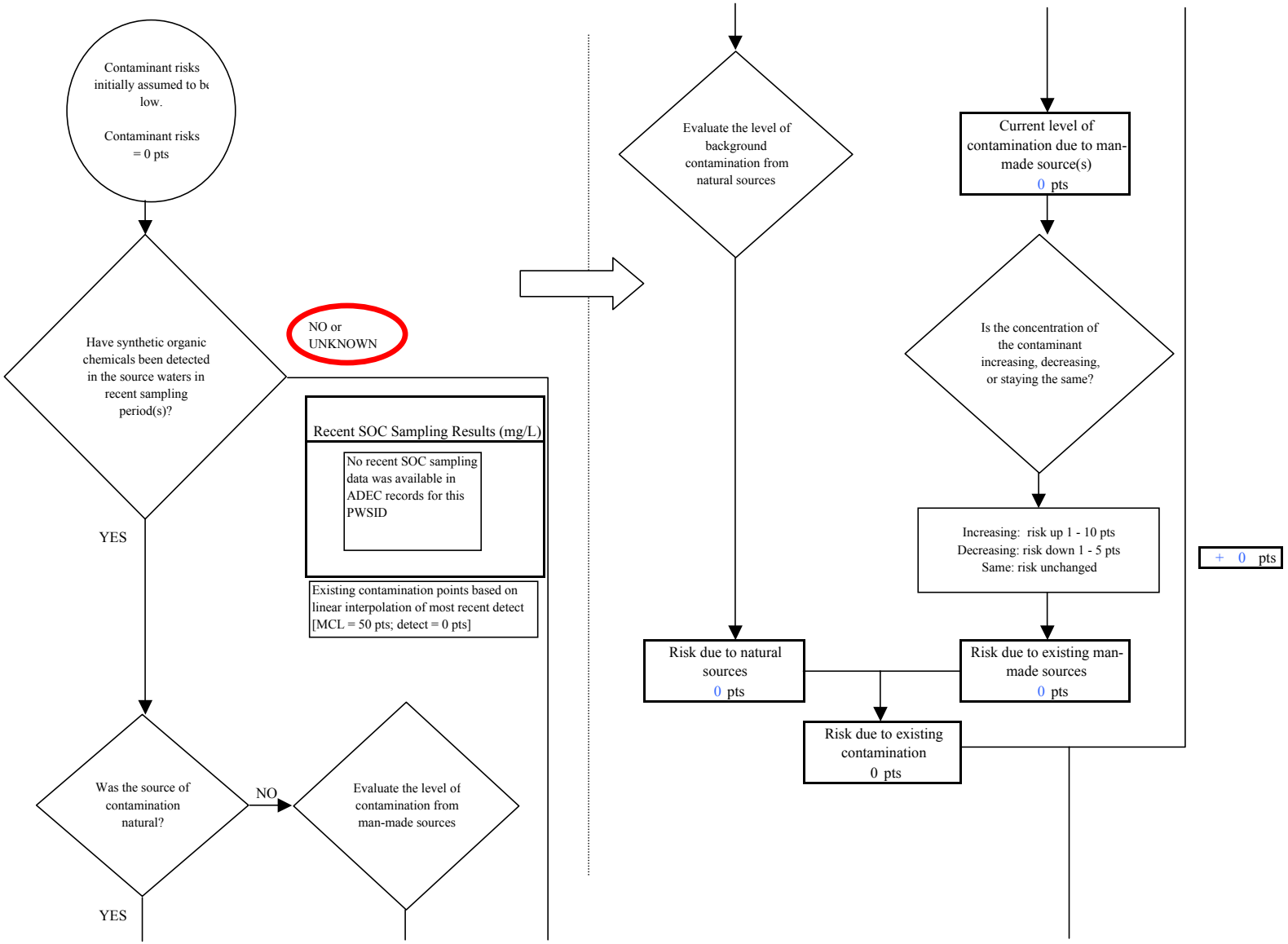
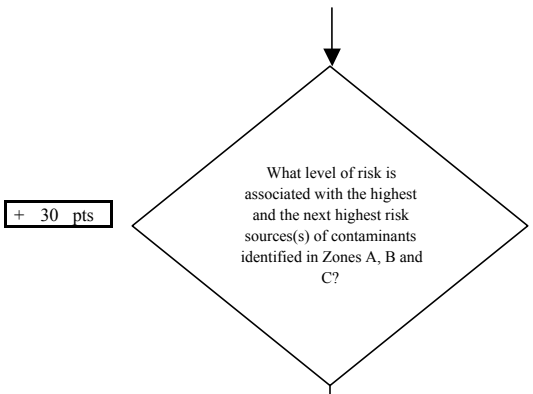


Chart 11. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Synthetic Organic Chemicals



+ 30 pts

Risk Levels for Contaminant Sources identified in Zones A, B and C

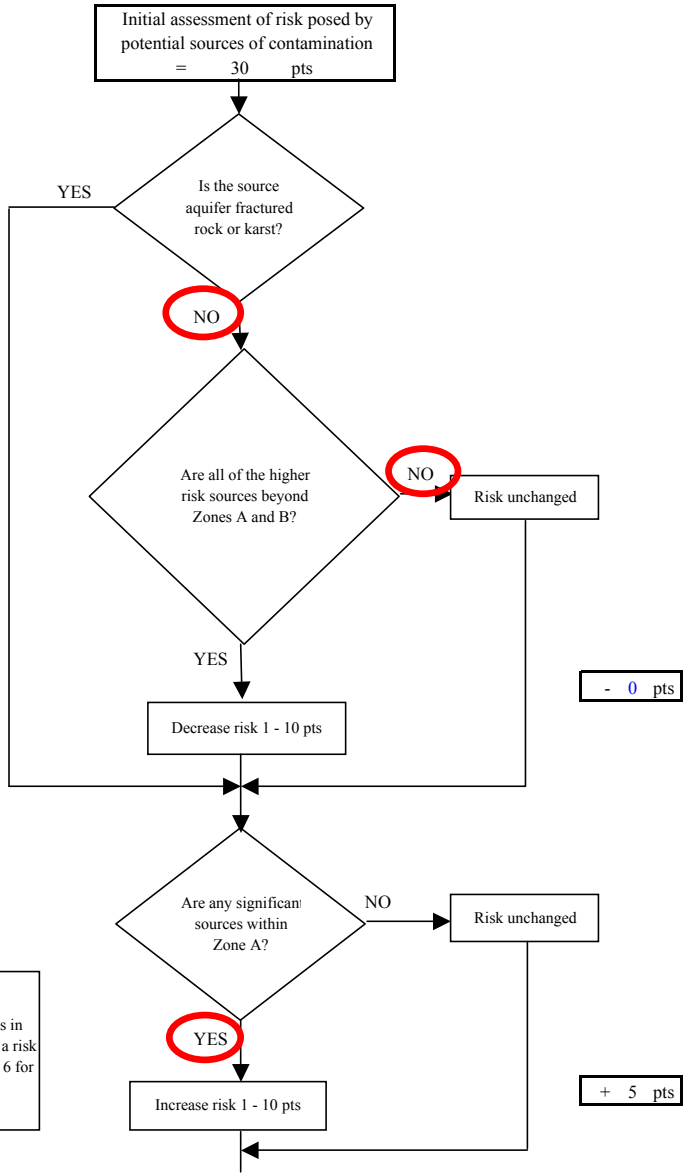
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	1	1
Medium(s)	1	2	3
Low(s)	6	1	7

	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

Matrix Score 30

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individua contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.

The number and magnitude of contaminant sources in Zone A determines a risk increase. See Table 6 for inventory.



- 0 pts

+ 5 pts

Chart 11. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Synthetic Organic Chemicals

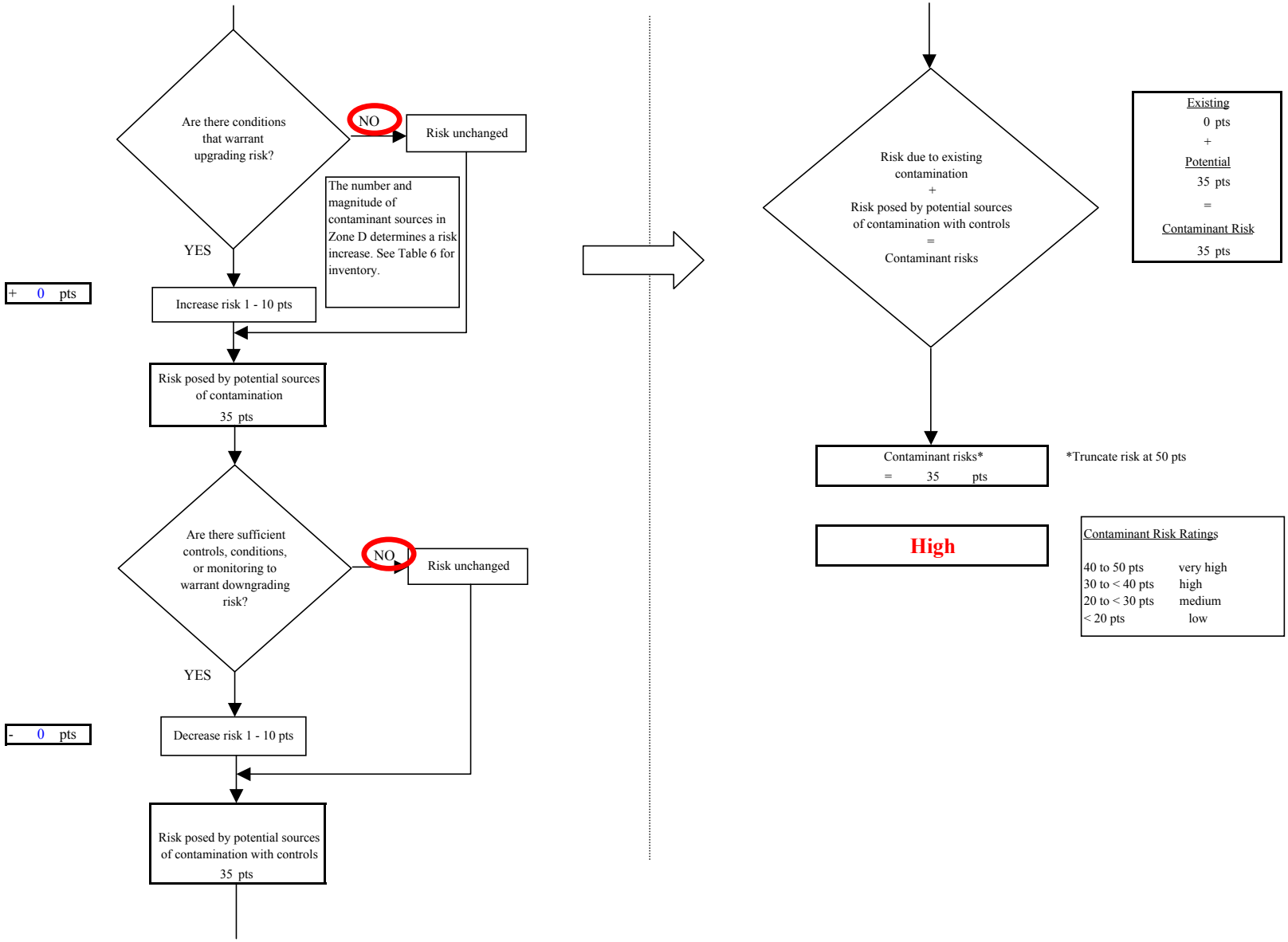


Chart 12. Vulnerability analysis for Circle Washeteria (PWS No. 300769.001) - Synthetic Organic Chemicals

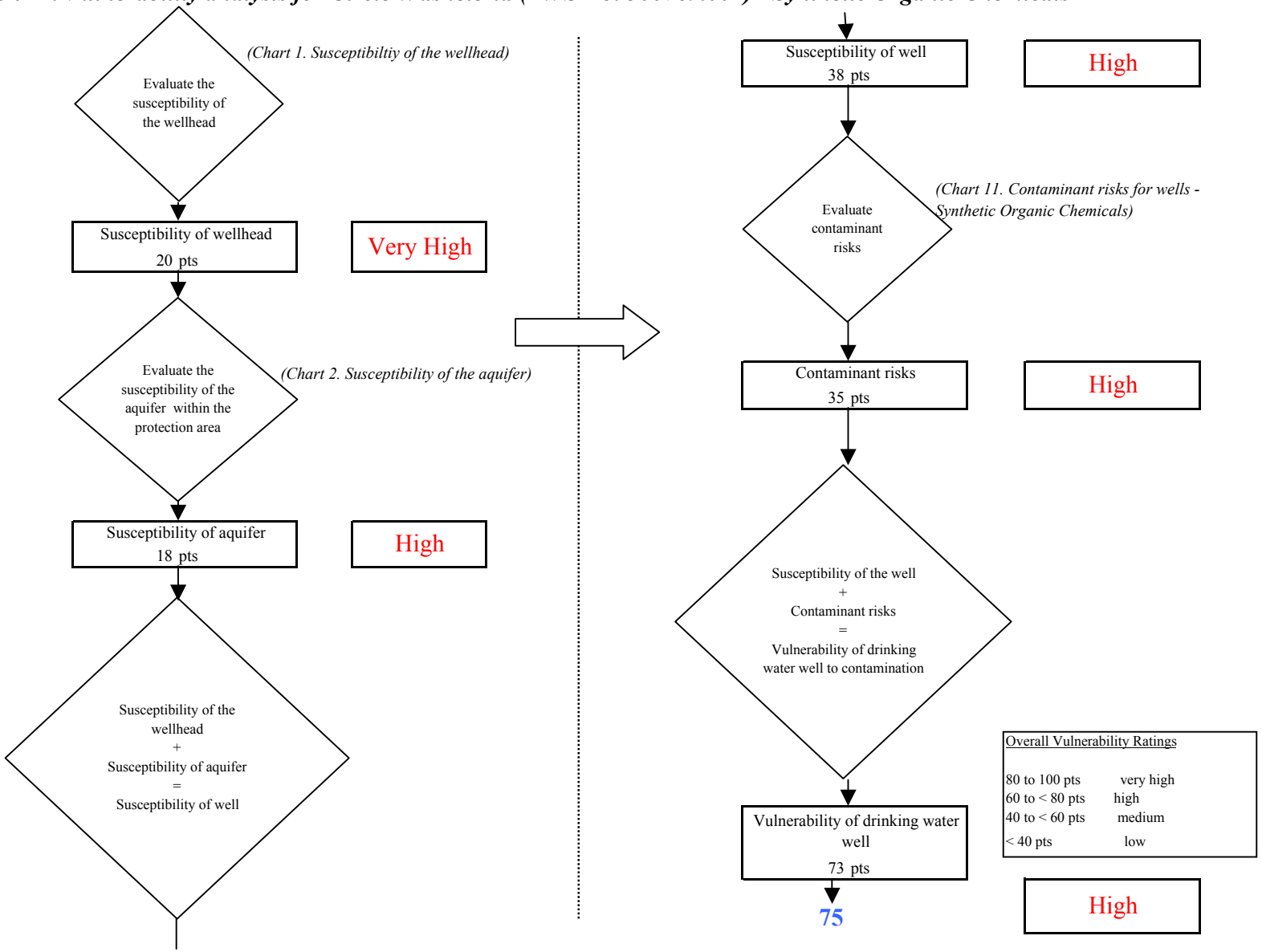


Chart 13. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Other Organic Chemicals

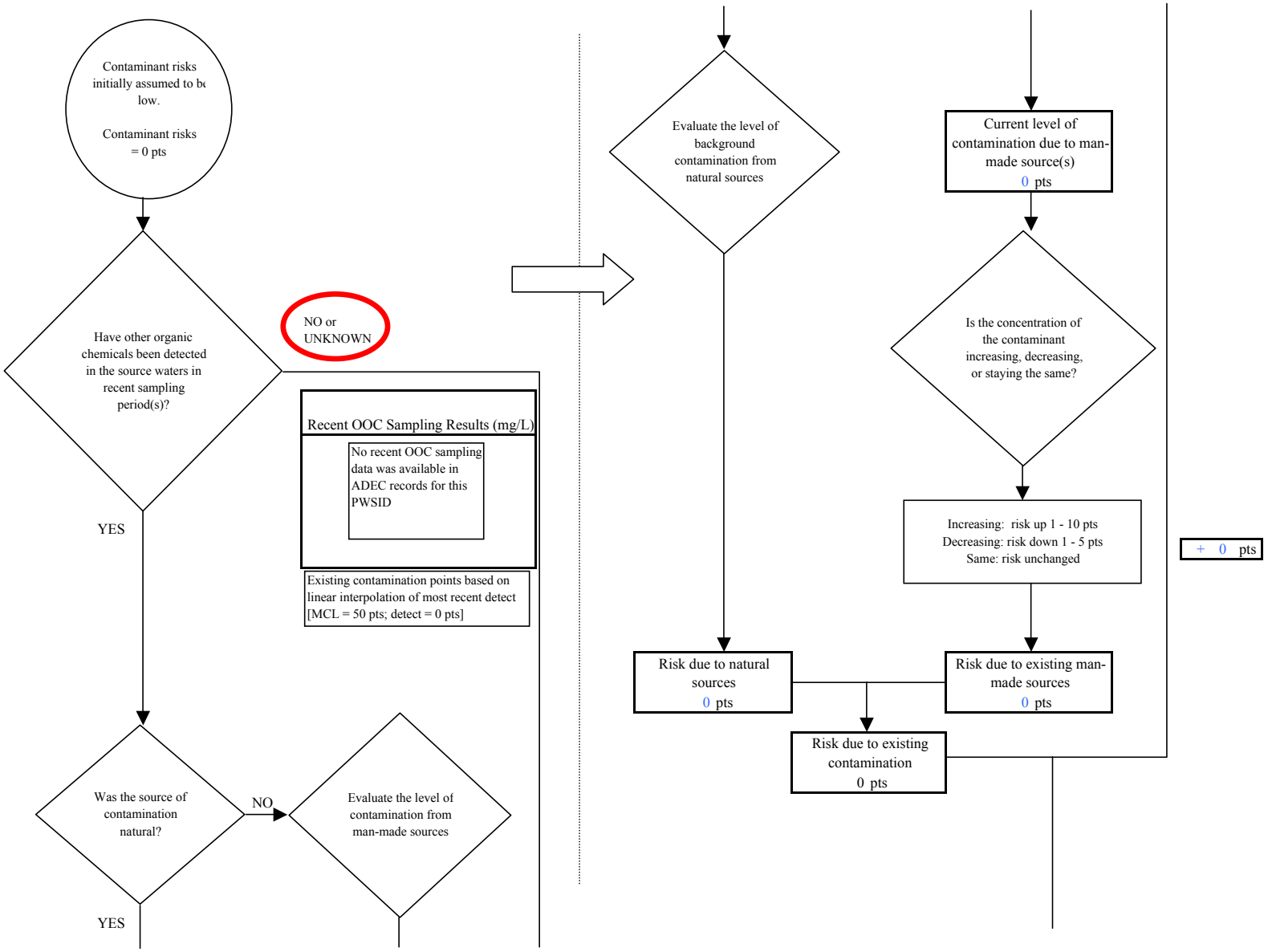
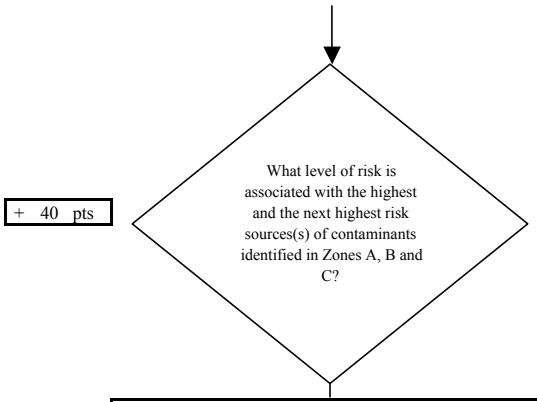


Chart 13. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Other Organic Chemicals



+ 40 pts

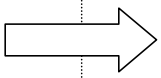
Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	2	1	3
Medium(s)	2	2	4
Low(s)	6	1	7

	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

Matrix Score 40

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each individua contaminant source in the CSI. The VA, however, counts these contaminant sources as a group and assigns a calculated number of either "lows" or "mediums" based on the density.



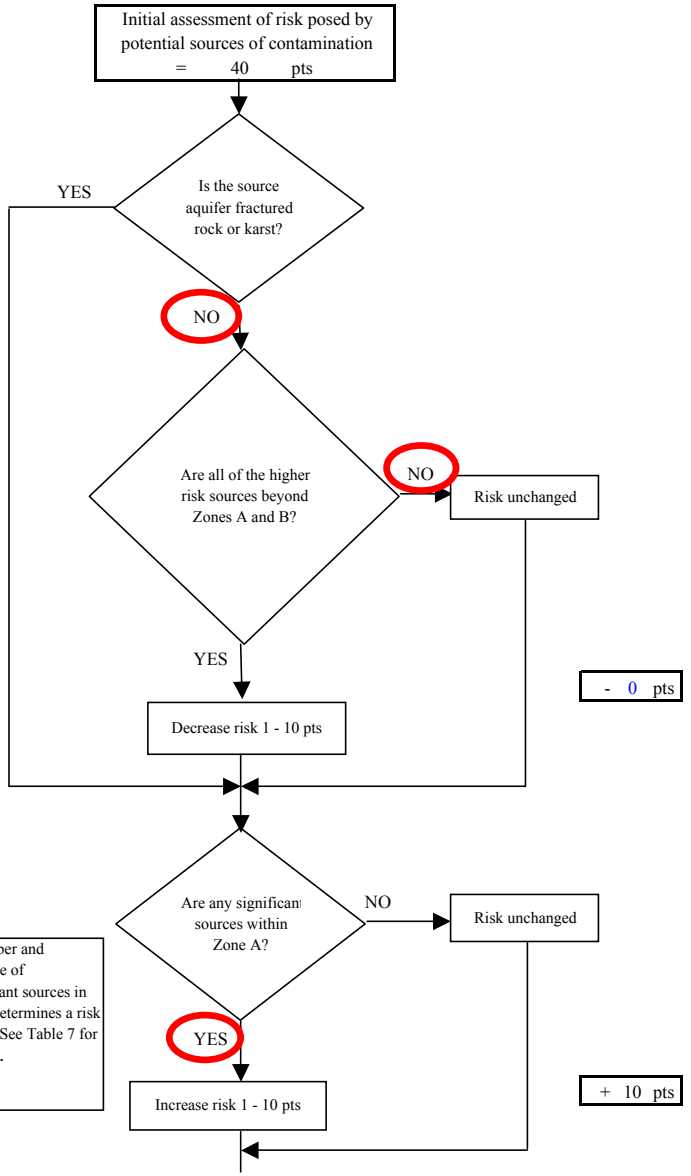


Chart 13. Contaminant risks for Circle Washeteria (PWS No. 300769.001) - Other Organic Chemicals

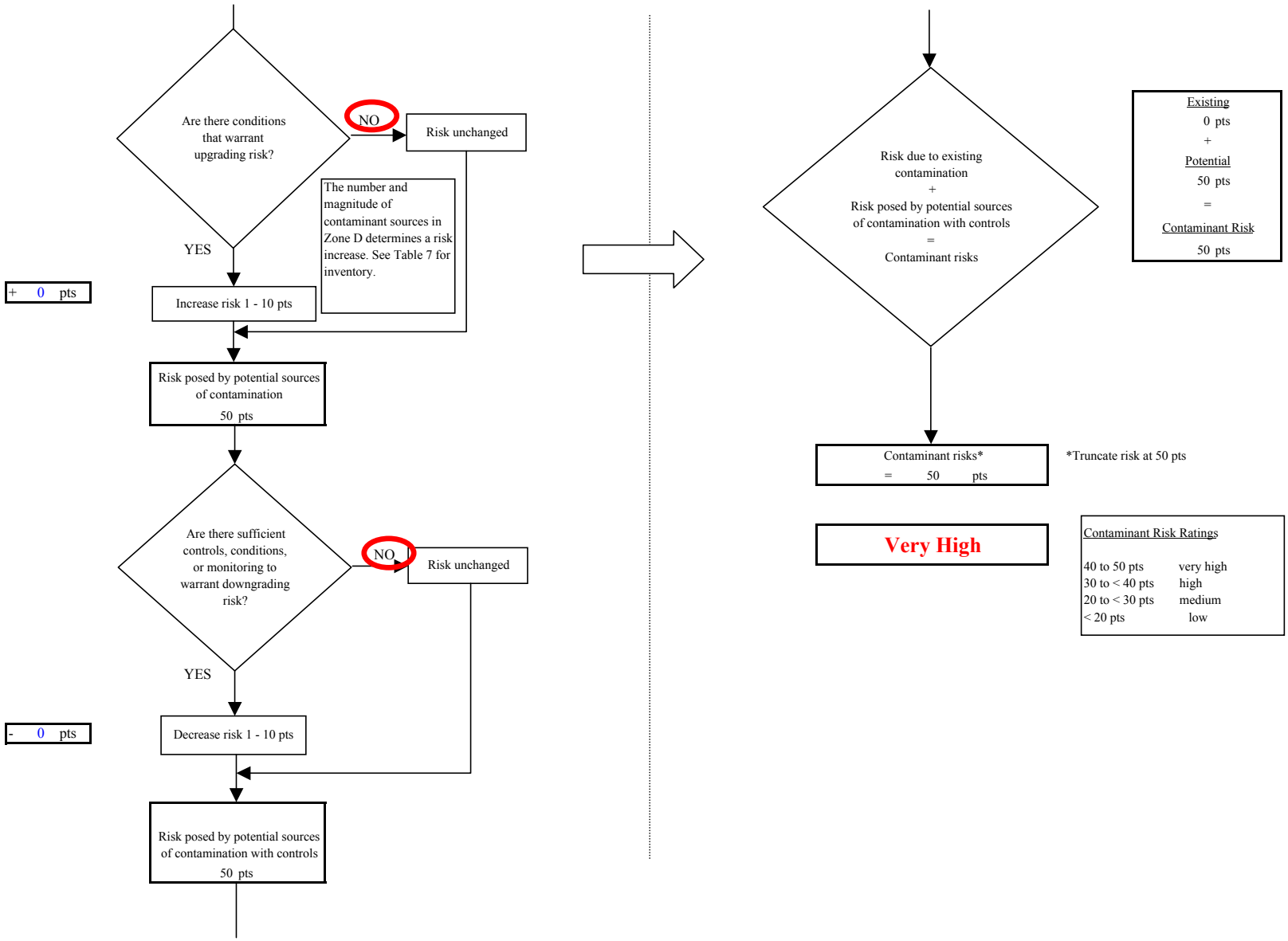


Chart 14. Vulnerability analysis for Circle Washeteria (PWS No. 300769.001) - Other Organic Chemicals