Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for Pumphouse Restaurant Drinking Water System,
Fairbanks area, Alaska
PWSID 310984

September 2003

DRINKING WATER PROTECTION PROGRAM REPORT Report 1231
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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Source Water Assessment for Pumphouse Restaurant Source of Public Drinking Water, Fairbanks Area, Alaska

Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

This source water assessment provides an evaluation of the vulnerability of the public water system serving the Pumphouse Restaurant to potential contamination. This Class B (non-community) water system consists of one well on China Pump Road near its intersection with the Parks Highway near Fairbanks, Alaska. The well received a natural susceptibility rating of **Very High** This rating is a combination of a susceptibility rating of **Very High** for the actual wellhead and a **Very High** rating for the aquifer in which the well is drawing water from. Identified potential and current sources of contamination for the Pumphouse Restaurant public water system include: residential heating oil storage tanks, residential septic systems, residential area, and a large capacity septic system. These are considered as sources of bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals. Combining the natural susceptibility of the well with the contaminant risk, the public water system for Pumphouse Restaurant received an overall vulnerability rating of **Very High** for bacteria and viruses, and nitrates and/or nitrites; and a **High** for volatile organic chemicals.

PUMPHOUSE RESTAURANT PUBLIC DRINKING WATER SYSTEM

Pumphouse Restaurant public water system is a Class B (non-community) water system. The system consists of one well on Chena Pump Road near its intersection with the Parks Highway near Fairbanks, Alaska (T1S, R2W, Section 14) (See Map 1 of Appendix A). North Pole is located southeast of Fairbanks in the Fairbanks North Star Borough which is near the center of Alaska (Please see the inset of Map 1 in Appendix A for location). The Borough's current population is 82,840 making it the second-largest population center in the state (ADCED, 2002). Communities located within the Borough include : College, Eielson Air Force Base, Ester, Fairbanks, Fox, Harding Lake, Moose Creek, North Pole, Pleasant Valley, Salcha, and Two Rivers.

The majority of residents located in the area surrounding the city of Fairbanks use individual water wells or hauled water, and septic systems (ADCED, 2002). Heating oil (typically stored in both above and below ground 275 to 500-gallon tanks) is used for heating homes and buildings. Refuse is transported to the Fairbanks North Star Borough landfill.

The Fairbanks area includes two distinct topographic areas: the alluvial plain between the Tanana River and the Chena River, and the uplands north of this alluvial plain. The Pumphouse Restaurant water system is located in the uplands at an elevation of approximately 475 feet above sea level.

According to the well log for this well, the depth of the well is 232 feet below the ground surface and is screened in hard schist. Bedrock in this area is predominantly a metamorphosed marine mud deposit, called a pelitic schist. The schist is locally intruded by granitic rocks – granite and quartz diorite. Groundwater in the bedrock is principally contained in fractures. The water wells in this area with the greatest well recharge appear to be in quartz veins, quartzite, and siliceous schist (Nelson, 1978).

Groundwater in the uplands is recharged by local precipitation. Outflow of ground water in the uplands primarily occurs two ways. In areas under artesian pressure (pressure caused by overlying permafrost), water can flow to the surface through thawed conduits within the permafrost. Otherwise groundwater will flow under the permafrost (if present) and out to the groundwater beneath the adjacent flood plain or creek valley (Nelson, 1978). Areas with discontinuous permafrost may locally affect the ground water flow directions.

PUMPHOUSE RESTAURANT DRINKING WATER PROTECTION AREA

The pathways most likely for surface contamination to reach the groundwater are identified as the first step in determining a drinking water system's risk. 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 capture zone. The groundwater capture zone is located in the area circling the well (the area influenced by pumping) and also the area of the water table upgradient of the well, usually forming a parabola shape.

An outline of the immediate watershed was used to determine the size and shape of the protection area for the Pumphouse Restaurant. Available geology was also

considered to take into account any uncertainties in groundwater flow and aquifer characteristics to arrive at a meaningful protection area.

Because of uncertainties and changing site conditions, a factor of safety is added to the groundwater capture zone to form the drinking water protection area for the well.

The protection areas established for wells are usually separated into four zones, limited by the watershed. These zones correspond to times-of-travel (TOT) of the water moving through the aquifer to the well (plus the factor of safety). Because the rate at which water travels through fractured bedrock is unknown but usually relatively fast, the protection area for the Pumphouse Restaurant consists only of Zone A.

The following is a summary of the four 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 2 years time-of-travel
C	Less than 5 years time-of-travel
D	Less than 10 years time-of-travel

The time of travel for contaminants within the water varies with their unique physical and chemical characteristics.

The drinking water protection area outlined for the Pumphouse Restaurant on Map 1 of Appendix A will serve as the focus for voluntary protection efforts.

INVENTORY OF POTENTIAL AND EXISTING CONTAMINANT SOURCES

The Drinking Water Protection Program (DWPP) has completed an inventory of potential and existing sources of contamination within the Pumphouse Restaurant protection area. This inventory was completed through a search of agency records and other publicly available information. 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 B public water system assessments, three categories of drinking water contaminants were inventoried. They include:

- Bacteria and viruses;
- Nitrates and/or nitrites;
- Volatile organic chemicals

The sources are displayed on Map 2 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 each 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 combination of toxicity and volume associated with that source. Rankings include:

- Low;
- Medium;
- High; and
- Very High.

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 inventoried potential and existing sources of contamination with respect to bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals.

VULNERABILITY OF PUMPHOUSE RESTAURANT 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 eight 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 properties of the aquifer and the presence of other wells or boreholes in the area. 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 the water system's contaminant sample results. Lastly, Chart 4 combines the results of the first three charts to produce the 'Vulnerability Analysis for Bacteria and Viruses'. Charts 5 through 8 contain the Contaminant Risks and Vulnerability Analyses for nitrates and nitrites and volatile 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 wellhead for the Pumphouse Restaurant received a Very High Susceptibility rating. The 8/14/00 Sanitary Survey indicated the well is not capped with a sanitary seal, the well is located directly under the deck of the restaurant, and the well is not grouted. Also, the well is located in a floodplain. A sanitary seal prevents potential contaminant from entering the well while grouting helps to prevent potential contaminants from traveling down the outside of the well casing.

The aquifer in the area the Pumphouse Restaurant well is completed in received a Very High Susceptibility rating. The fractured bedrock can allow contaminants to travel at a fast rate downward from the surface with the precipitation and surface water runoff. The private wells in the area can also provide a quick path to the aquifer if they are not grouted properly. Table 2 summarizes the Susceptibility scores and ratings for Pumphouse Restaurant.

Table 2. Susceptibility

	Score	Rating
Susceptibility of the Wellhead	25	Very High
Susceptibility of the Aquifer	20	Very High
Natural Susceptibility	45	Very High

The Contaminant Risk has been derived from an evaluation of the routine sampling results of the water system and the presence of potential sources of contamination. Contaminant risks to a drinking water source depend on the type and distribution of contaminant sources. 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	42	Very High
Nitrates and/or Nitrites	43	Very High
Volatile Organic Chemicals	30	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 three categories of drinking water contaminants. Note: scores are rounded off to the nearest five.

Table 4. Overall Vulnerability

Category	Score	Rating
Bacteria and Viruses	85	Very High
Nitrates and Nitrites	90	Very High
Volatile Organic Chemicals	75	High

Bacteria and Viruses

The residential septic systems in the protection area represent the greatest risk to the drinking water well.

Only a small amount of bacteria and viruses are required to endanger public health. Coli forms are found naturally in the environment and although they aren't necessarily a health threat, it is an indicator of other potentially harmful bacteria in the water, more specifically, fecal coli forms and E. coli which only come from human and animal fecal waste (EPA, 2002). Harmful bacteria can cause diarrhea, cramps, nausea, headaches, or other symptoms (EPA, 2002). Routine sampling has not detected coli forms in the water.

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 residential septic systems in the protection area also represent the greatest risk to to nitrates and nitrites for this source of public drinking water.

Nitrates are very mobile, moving at approximately the same rate as water. Nitrates have not been detected in significant levels in recent sampling history for the Pumphouse Restaurant well.

After combining the contaminant risk for nitrates and nitrites with the natural susceptibility of the well, the overall vulnerability of the well to contamination is very high.

Volatile Organic Chemicals

The residential heating oil tanks represent the greatest risk for volatile organic chemical contamination to the well.

Both underground and above ground heating oil storage tanks are the standard way of heating homes and businesses in the area surrounding Fairbanks. The most common causes of fuel leaks of these heating oil systems are overfilling the tank, ruptured fuel lines, leaking storage tanks, damaged or faulty valves and vandalism. Regular system maintenance can help prevent many of these harmful fuel leaks.

Volatile Organic Chemicals have not been sampled for in the Pumphouse Restaurant public water system. 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 high.

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APPENDIX A

Pumphouse Restaurant
Drinking Water Protection Area Location Map
(Map 1)

PARKS HIGHWAY
MIDWAY PLACER ROAD
VANWOOD TRAIL
RELIANCE DRIVE
ANISHA DRIVE
CHENA ESTER DITCH ROAD
LINGONBERRY LANE
MONTANA ROAD
RIDGECREST DRIVE
DEVON ROAD
BEWTAGTON DRIVE
KNIGHTSBRIDGE ROAD
FINSBURY COURT
DERBYSHIRE DRIVE
CHESTMONT DRIVE
FOREST HILLS COURT
KENTSHIRE DRIVE
TUXFORD COURT
FRIARS WAY
PROSPECT DRIVE
KING ARTHUR WAY
DOREEN COURT
CHENA RIDGE ROAD
OLD CHENA RIDGE ROAD
ALLEN ADALE ROAD
CHENA PUMP ROAD
Zone A
DESPAIN LANE
DECATHLON AVENUE
LINDA LANE
HAMAN STREET
MUSSBAUMER STREET
GEIST ROAD
PARKS HIGHWAY
NEBULA WAY
DARTMOUTH DRIVE
WOOD DRIVE
GLASGOW DRIVE
AMHERST DRIVE
TRINIDAD DRIVE
PEPPERDINE DRIVE
PALO VERDE AVENUE
PRINCETON DRIVE
STEELHEAD ROAD
CHENA SMALL TRACTS ROAD
COSGRAVE DRIVE
PERCH DRIVE
FOUTS AVENUE
HARDLAND AVENUE
FAIRCHILD AVENUE
RAVENWOOD AVENUE
WESTERN AVENUE
BROADMOOR AVENUE
DISCOVERY DRIVE
KING ROAD
AIRPORT WAY
MCCABE AVENUE

Map 1: Drinking Water Protection Area

PWSID: 310984

Alaska Department of Environmental Conservation

Alaska Drinking Water Protection Program

0 750 1,500 3,000 4,500 Feet

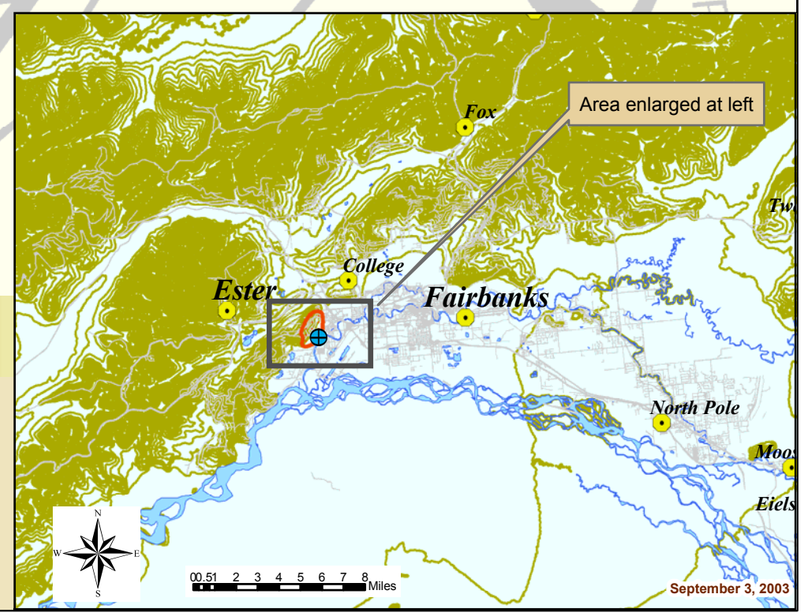
1 inch equals 1,500 feet

Data Sources:

Parcel, roads - Fairbanks North Star Borough
Water bodies, railroad - Geographic Data Technology
Elevation contours - USGS digital elevation models (DEMs)

Legend

- Pumphouse Restaurant well
- Zone A
- Surface water
- Roads



APPENDIX B

Contaminant Source Inventory and Risk Ranking for Pumphouse Restaurant (Tables 1-4)

Table 1

Contaminant Source Inventory for ***Pump House Restaurant***

PWSID 310984.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	2	for Pumphouse Restaurant
Residential Areas	R01		A	2	Estimated 200 acres of residential area
Septic systems (serves one single-family home)	R02		A	2	Assumed 126 septics based on number of parcels designated as residential
Tanks, heating oil, residential (above ground)	R08		A	2	Assumed 126 tanks based on number of parcels designated as residential

Table 2

Contaminant Source Inventory and Risk Ranking for Pump House Restaurant Sources of Bacteria and Viruses

PWSID 310984.001

Contaminant Source Type	***Contaminant Source ID***	***CS ID tag***	***Zone***	***Risk Ranking for Analysis***	***Map Number***	***Comments***
Residential Areas	R01		A	Low	2	Estimated 200 acres of residential area
Septic systems (serves one single-family home)	R02		A	Low	2	Assumed 126 septics based on number of parcels designated as residential
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	High	2	for Pumphouse Restaurant

Table 3

Contaminant Source Inventory and Risk Ranking for Pump House Restaurant Sources of Nitrates/Nitrites

PWSID 310984.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Septic systems (serves one single-family home)	R02		A	Low	2	Assumed 126 septics based on number of parcels designated as residential
Residential Areas	R01		A	Low	2	Estimated 200 acres of residential area
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	High	2	for Pumphouse Restaurant

Table 4

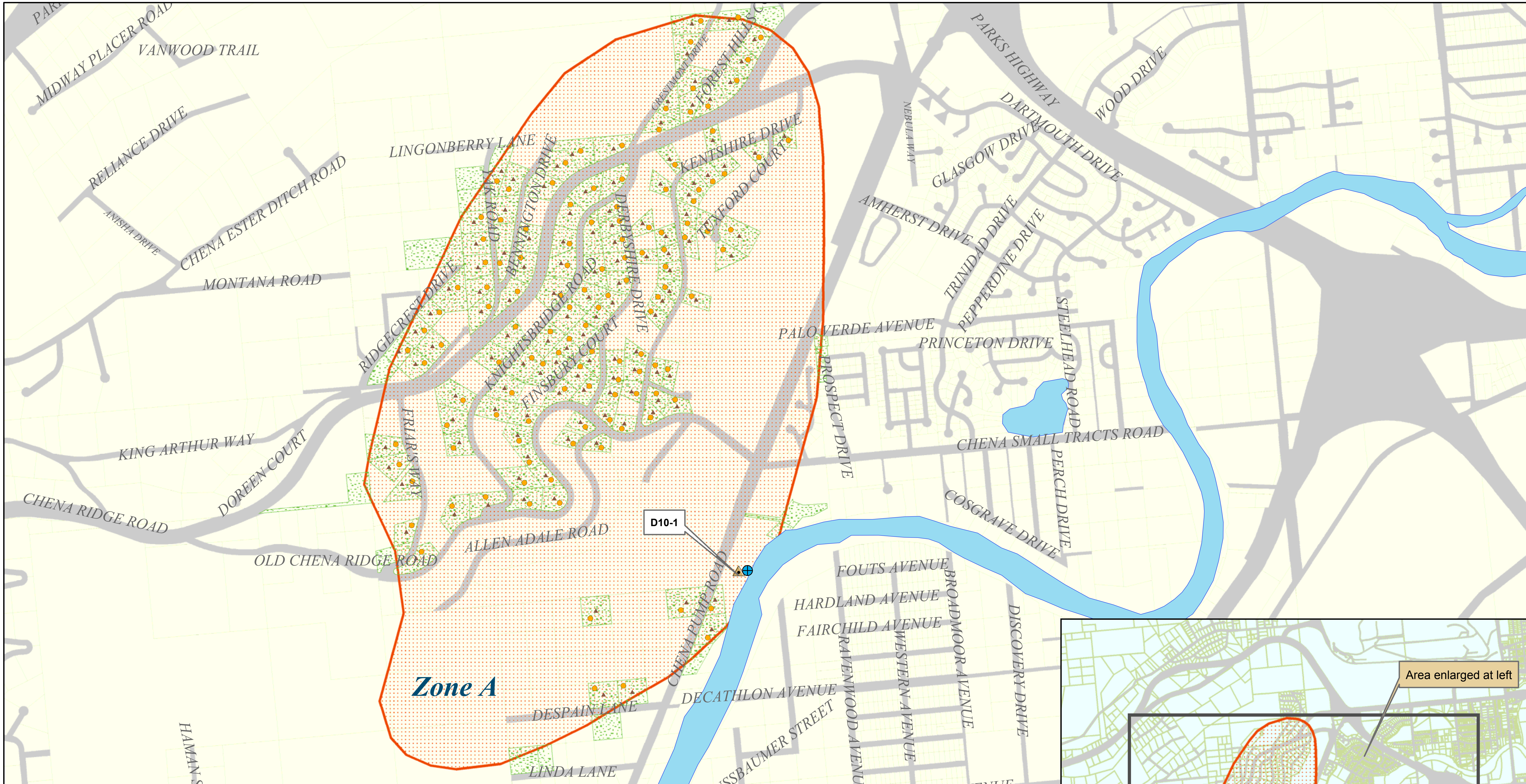
Contaminant Source Inventory and Risk Ranking for Pump House Restaurant Sources of Volatile Organic Chemicals

PWSID 310984.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Residential Areas	R01		A	Low	2	Estimated 200 acres of residential area
Septic systems (serves one single-family home)	R02		A	Low	2	Assumed 126 septics based on number of parcels designated as residential
Tanks, heating oil, residential (above ground)	R08		A	Medium	2	Assumed 126 tanks based on number of parcels designated as residential
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-1	A	Low	2	for Pumphouse Restaurant

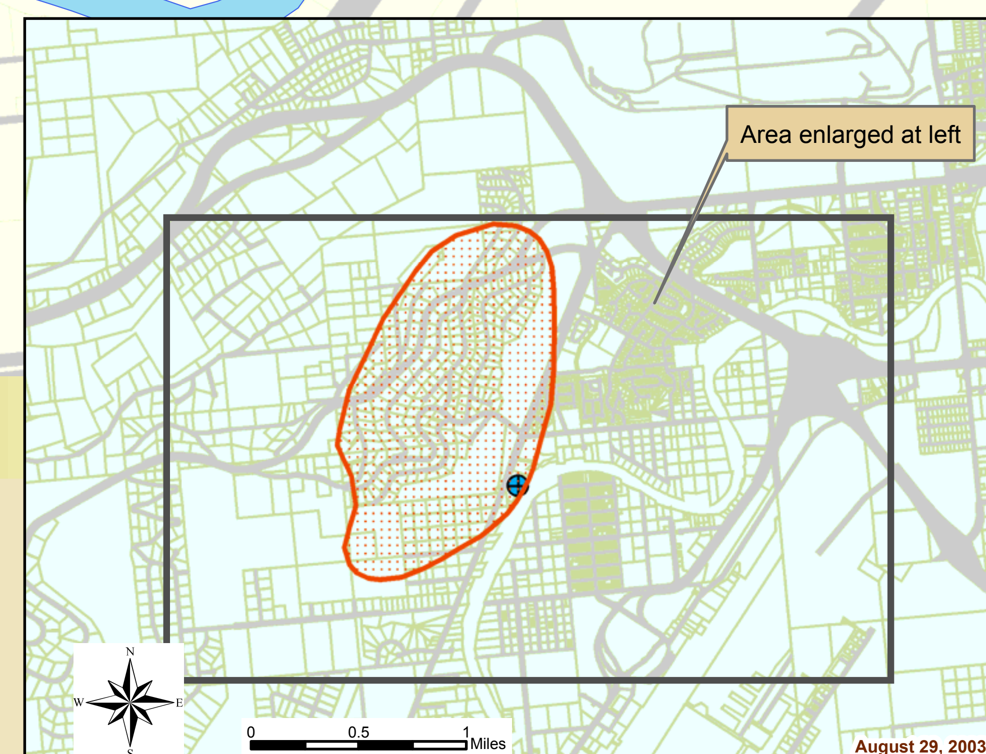
APPENDIX C

Pumphouse Restaurant
Drinking Water Protection Area
and Potential and Existing Contaminant Sources
(Map 2)


VANWOOD TRAIL
MIDWAY PLACER ROAD
RELIANCE DRIVE
ANISHA DRIVE
CHENA ESTER DITCH ROAD
MONTANA ROAD
LINGONBERRY LANE
RIDGECREST DRIVE
KING ARTHUR WAY
DOREEN COURT
CHENA RIDGE ROAD
OLD CHENA RIDGE ROAD
FRIARS WAY
ALLEN ADALE ROAD
BENNINGTON DRIVE
KNIGHTSBRIDGE ROAD
FINSBURY COURT
DERBYSHIRE DRIVE
KENTSHIRE DRIVE
TEXFORD COURT
FOREST HILLS
CHENA PUMP ROAD
D10-1
Zone A
DESPAIN LANE
LINDA LANE
PARKS HIGHWAY
WOOD DRIVE
DARTMOUTH DRIVE
GLASGOW DRIVE
NEBULA WAY
AMHERST DRIVE
TRINIDAD DRIVE
PEPPERDINE DRIVE
STEELHEAD ROAD
PALO VERDE AVENUE
PRINCETON DRIVE
PROSPECT DRIVE
CHENA SMALL TRACTS ROAD
PERCH DRIVE
COSGRAVE DRIVE
FOUTS AVENUE
HARDLAND AVENUE
FAIRCHILD AVENUE
BROADMOOR AVENUE
DISCOVERY DRIVE
RAVENWOOD AVENUE
WESTERN AVENUE
DECATHLON AVENUE

Map 2: Potential Contaminant Sources

PWSID: 310984



Alaska Department of Environmental Conservation

Alaska Drinking Water Protection Program

0 775 1,550 Feet

1 inch equals 1,069 feet

Data Sources:

Parcel, roads - Fairbanks North Star Borough
Water bodies, railroad - Geographic Data Technology
Elevation contours - USGS digital elevation models (DEMs)

Legend

- Pumphouse Restaurant well
- D10, Large capacity septic systems
- R08, Residential heating oil tanks
- R02, Residential septic systems
- Surface water
- Residential area (R01)
- Parcels
- Roads

APPENDIX D

Vulnerability Analysis for Pumphouse Restaurant Public Drinking Water Source

(Charts 1-8)

Chart 1. Susceptibility of the wellhead - Pumphouse Restaurant

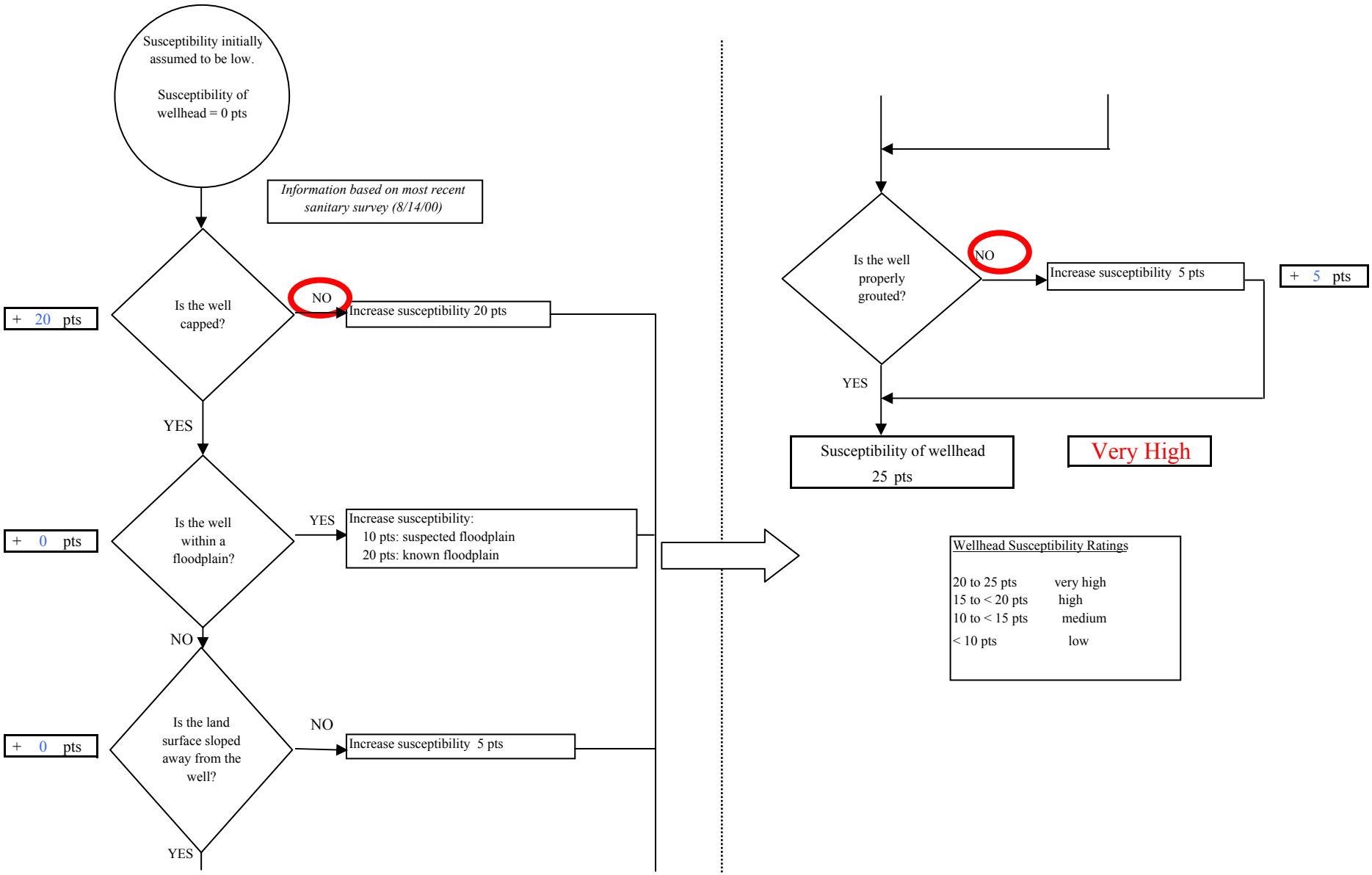


Chart 2. Susceptibility of the aquifer - Pumphouse Restaurant

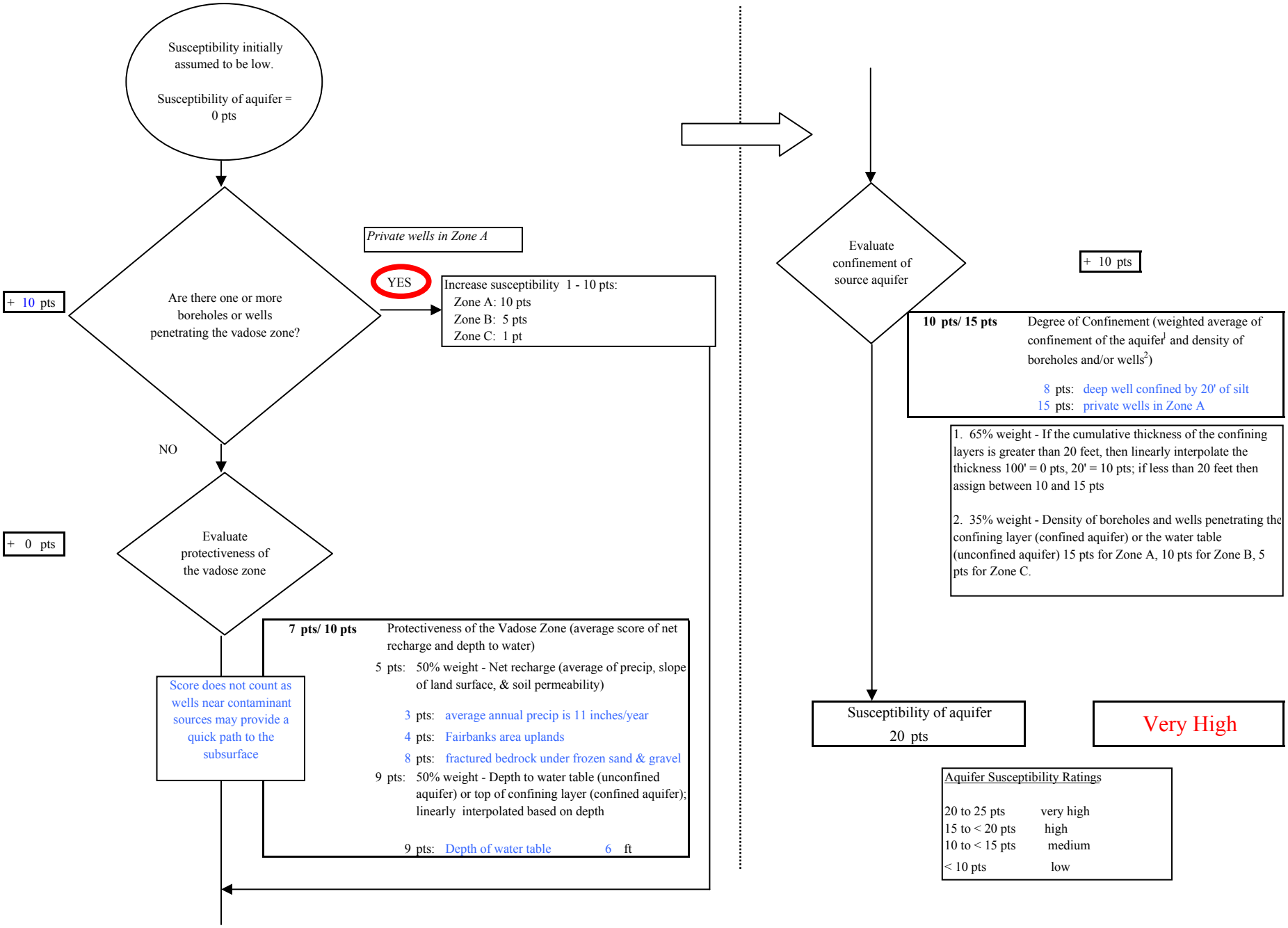
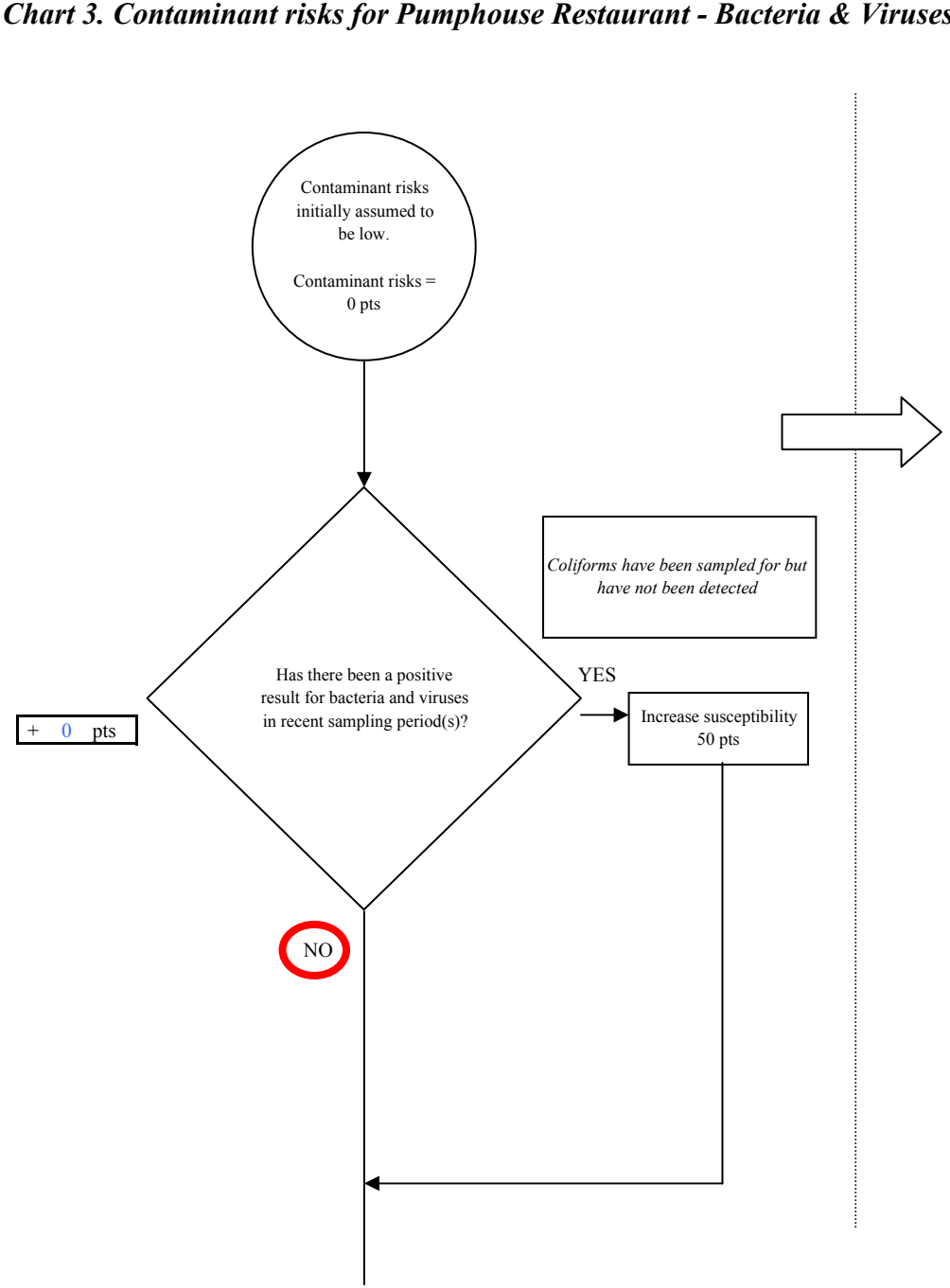
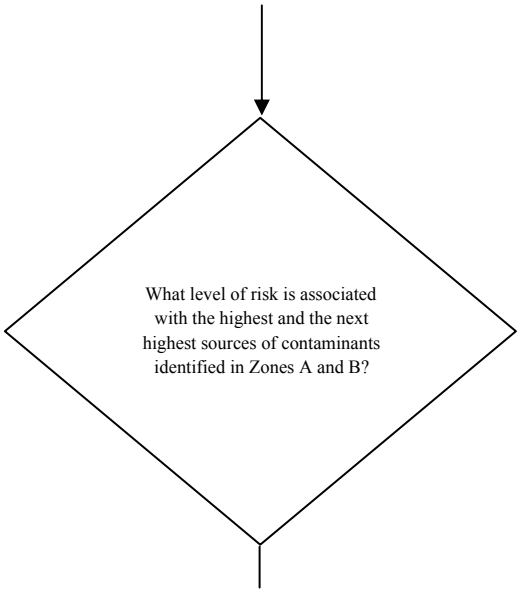


Chart 3. Contaminant risks for Pumphouse Restaurant - Bacteria & Viruses





+ 35 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	0	1
Medium(s)	0	0	0
Low(s)	130	0	130

	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 35

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 Pumphouse Restaurant - Bacteria & Viruses

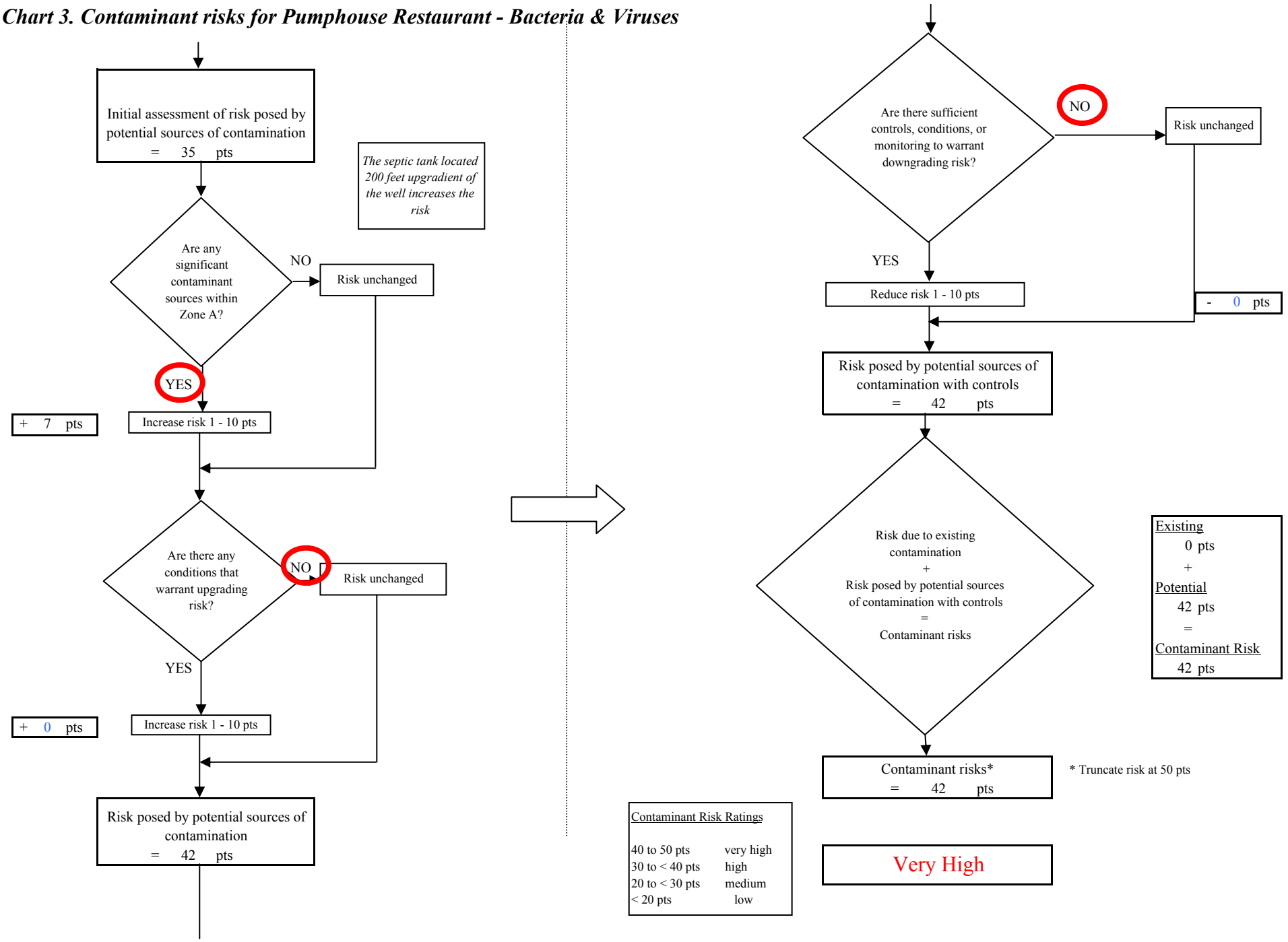


Chart 4. Vulnerability analysis for Pumphouse Restaurant - Bacteria & Viruses

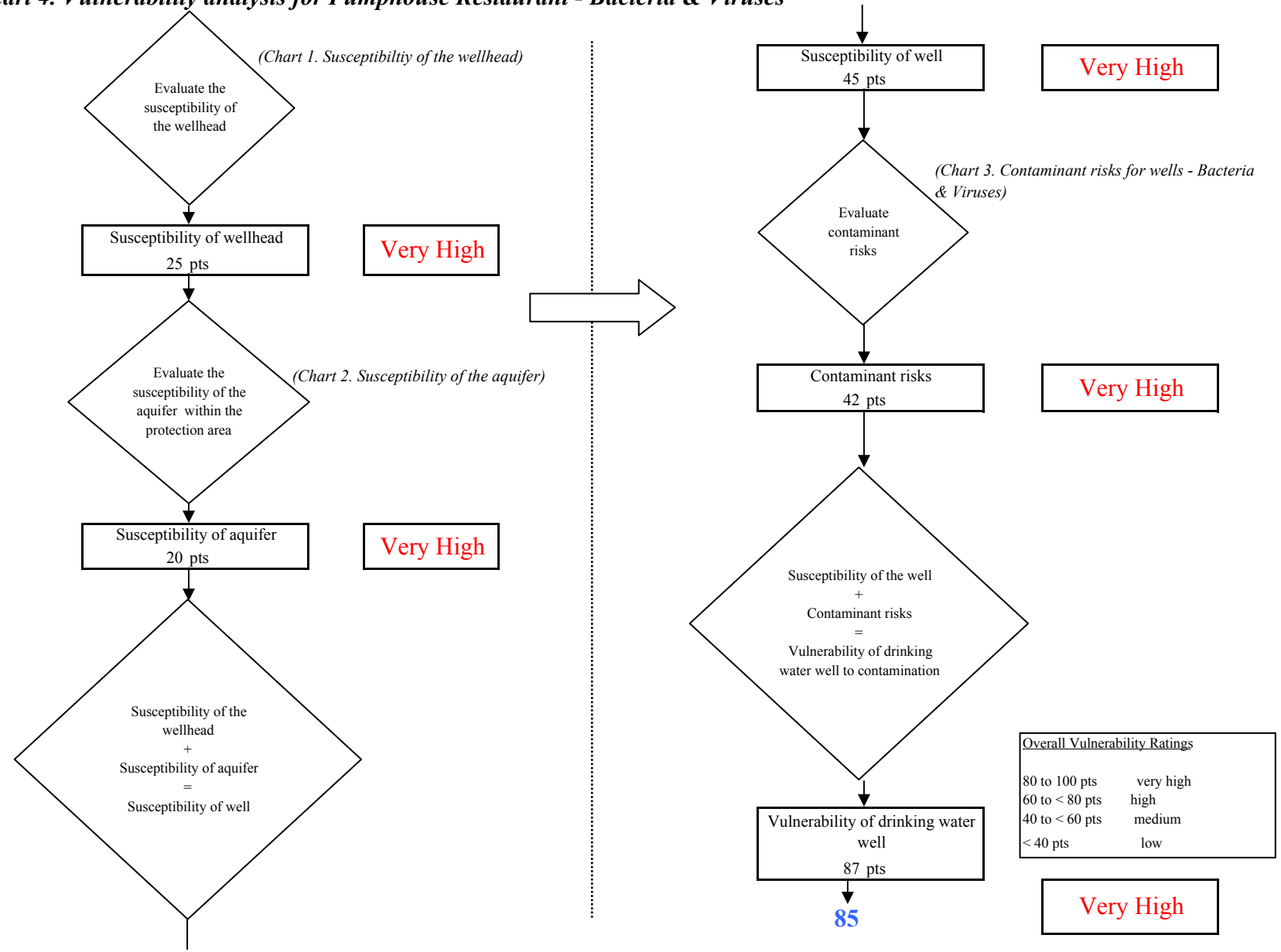


Chart 5. Contaminant risks for Pumphouse Restaurant - Nitrates and Nitrites

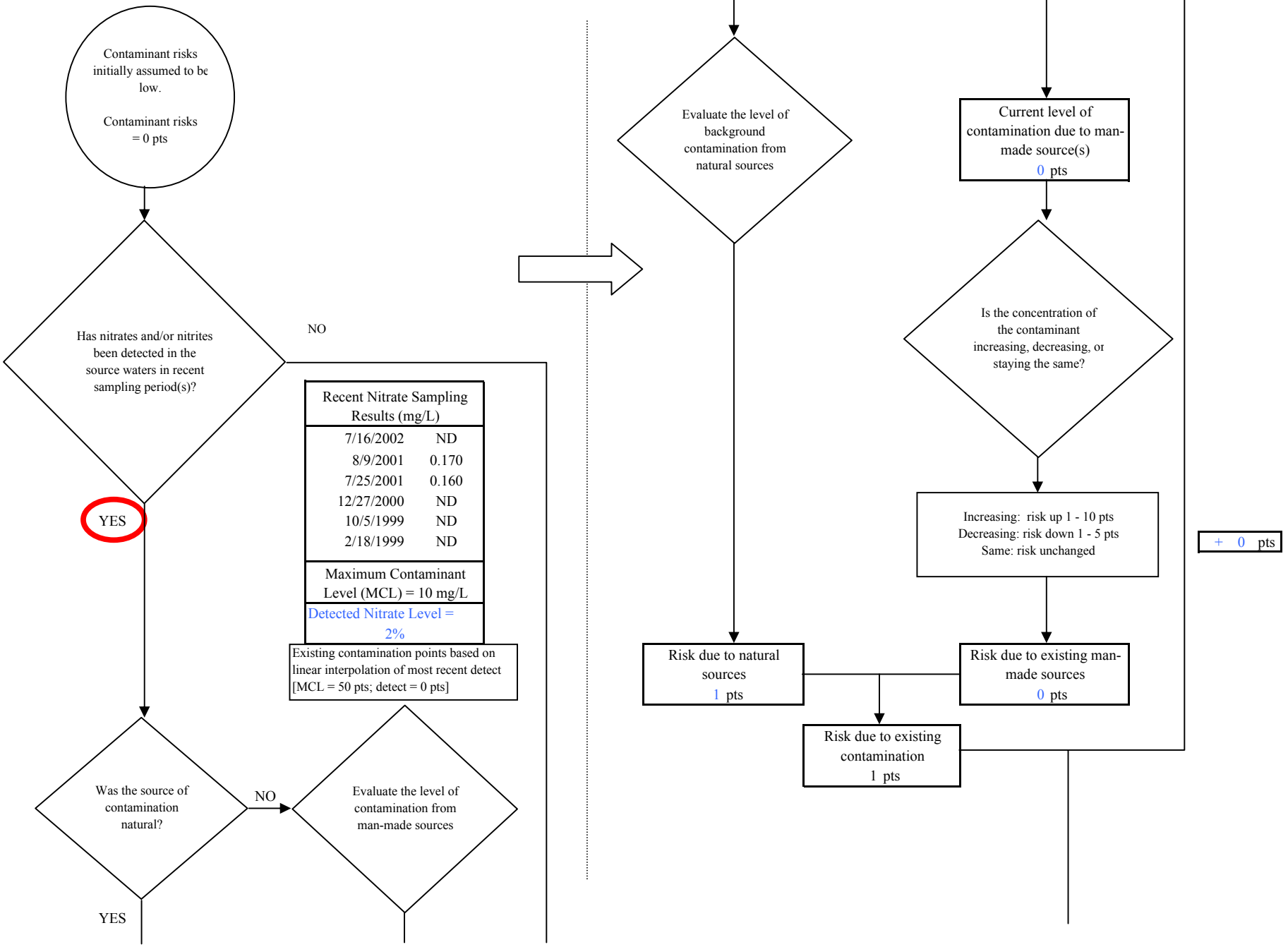


Chart 5. Contaminant risks for Pumphouse Restaurant - Nitrates and Nitrites

+ 35 pts

What level of risk is associated with the highest and the next highest risk sources(s) of contaminants identified in Zones A, B and C?

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	0	1
Medium(s)	0	0	0
Low(s)	130	0	130

	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 35

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.

Initial assessment of risk posed by potential sources of contamination = 35 pts

Is the source aquifer fractured rock or karst?

YES

NO

Are all of the higher risk sources beyond Zones A and B?

NO → Risk unchanged

YES → Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO → Risk unchanged

YES → Increase risk 1 - 10 pts

+ 7 pts

The septic tank located 200 feet upgradient of the well increases the risk

Chart 5. Contaminant risks for Pumphouse Restaurant - Nitrates and Nitrites

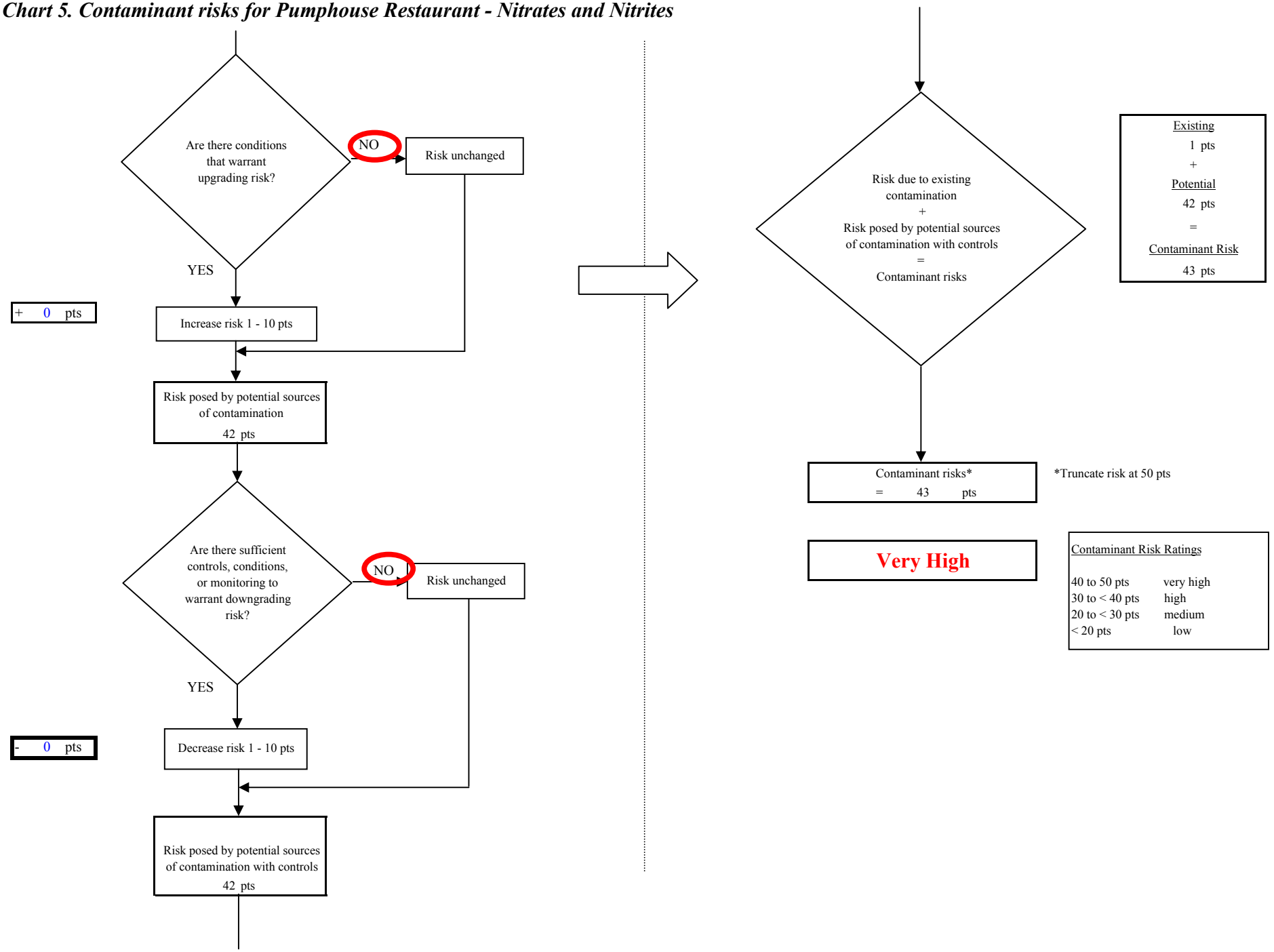


Chart 6. Vulnerability analysis for Pumphouse Restaurant - Nitrates and Nitrites

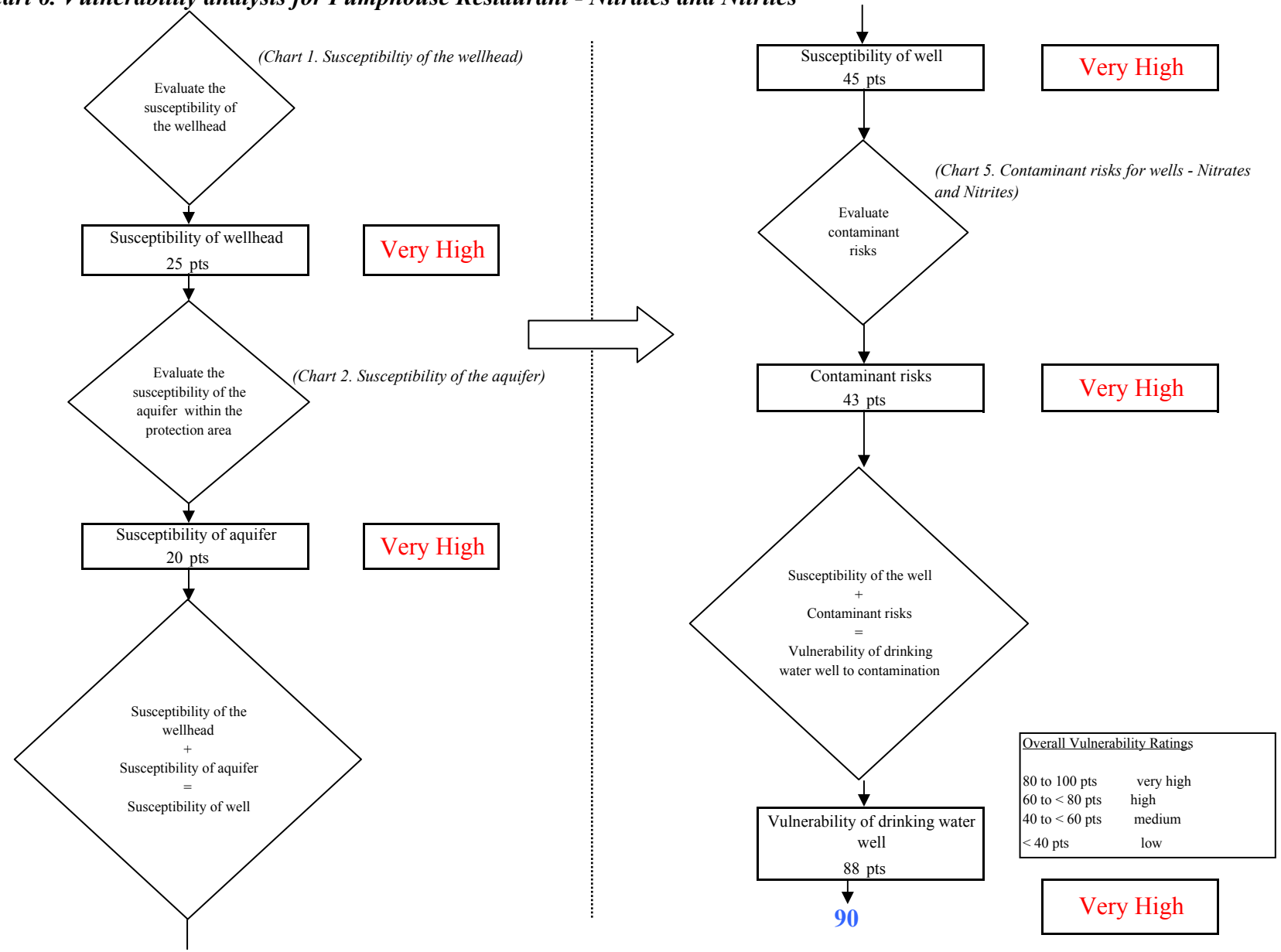


Chart 7. Contaminant risks for Pumphouse Restaurant - Volatile Organic Chemicals

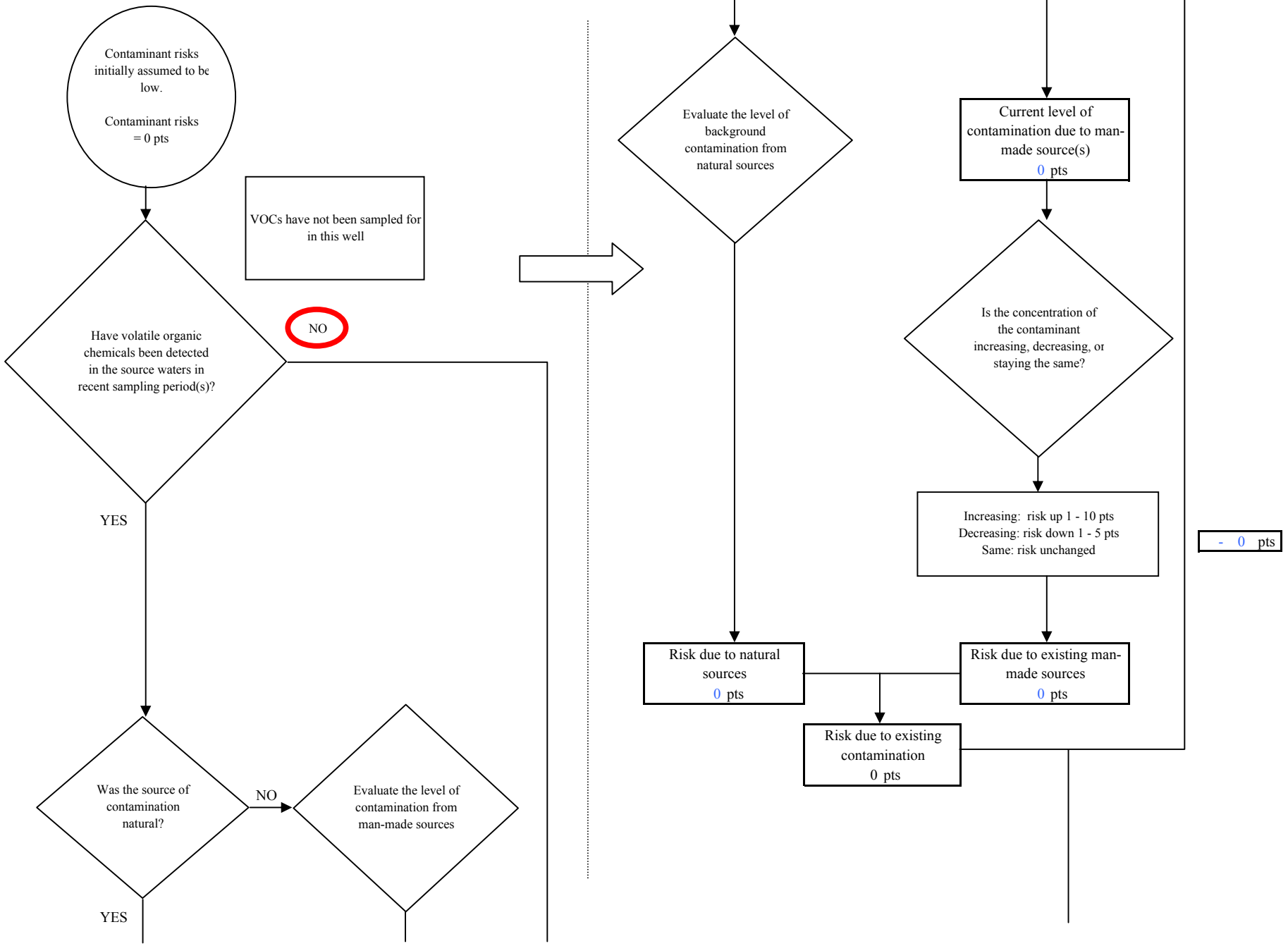
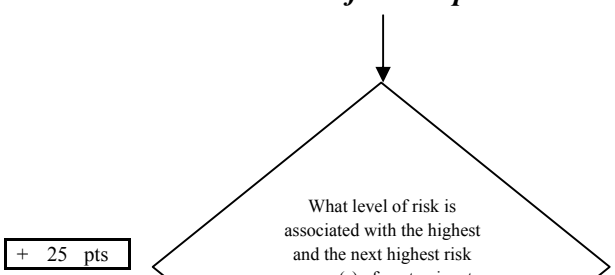


Chart 7. Contaminant risks for Pumphouse Restaurant - Volatile Organic Chemicals



+ 25 pts

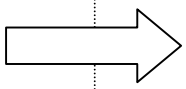
Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	127	30	157
Low(s)	12	0	12

	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 25

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.



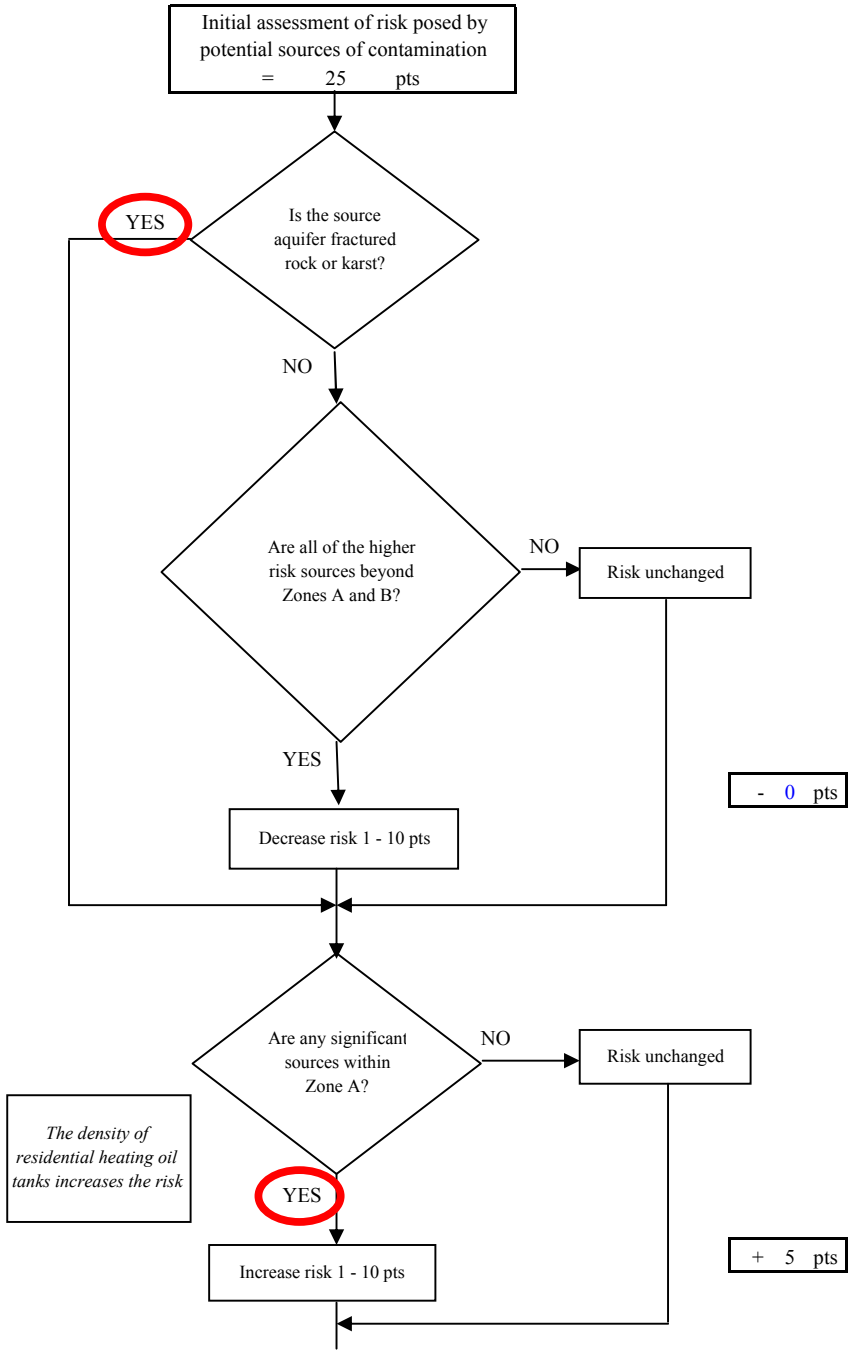


Chart 7. Contaminant risks for Pumphouse Restaurant - Volatile Organic Chemicals

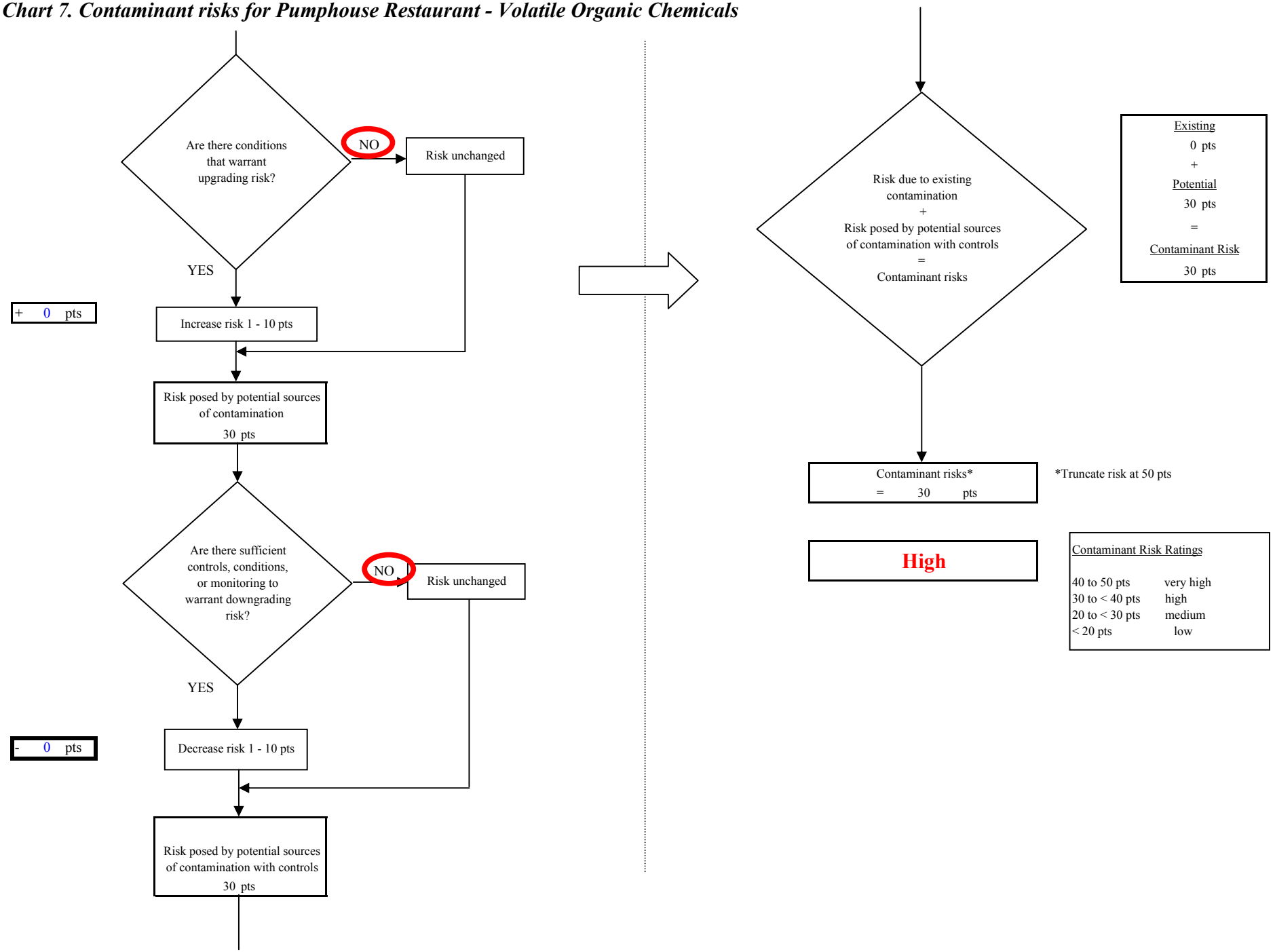


Chart 8. Vulnerability analysis for Pumphouse Restaurant - Volatile Organic Chemicals