Source Water Assessment

A Hydrogeologic Susceptibility and Vulnerability Assessment for Kathy O Estates, Anchorage, Alaska PWSID # 211897.001 and 211897.002

DRINKING WATER PROTECTION PROGRAM REPORT 816

Alaska Department of Environmental Conservation

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Kathy O Estates
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The Drinking Water Protection Program 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. 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 public water system for Kathy O Estates is a Class A (community) water system consisting of two wells in the Anchorage area. Identified potential and existing sources of contaminants for Kathy O Estates include: sewer lines, gasoline stations, residential areas, roads, recreational trails, roads, heavy equipment storage, motor vehicle repair shops, underground fuel tanks, Leaking Underground Storage Tank (LUST) sites, recognized contaminated sites and various commercial and industrial activities. 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, Kathy O Estates **Well No. 1**and **Well No. 2** received a vulnerability rating of **Medium** for bacteria and viruses, **High** for nitrate/nitrites, volatile organic chemicals, inorganic chemicals, synthetic organic chemicals and other organic chemicals.

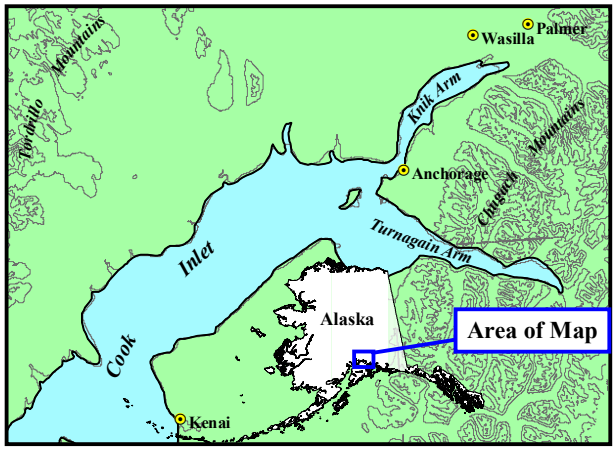

Figure 1. Index map showing the location of Anchorage, Alaska

INTRODUCTION

The Alaska Department of Environmental Conservation (ADEC) is completing source water assessments for all public drinking water sources in the State of Alaska. The purpose of this 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. The results of this source water assessment can be used to decide where voluntary protection efforts are needed and feasible, and what efforts will be most effective in reducing contaminant risks to your water system.

This source water assessment combines a review of the natural conditions at the site and the potential and existing contaminant risks. These are combined to determine the overall vulnerability of the drinking water source to contamination.

DESCRIPTION OF THE ANCHORAGE AREA, ALASKA

Location

Anchorage, located in south-central 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 Arm 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.

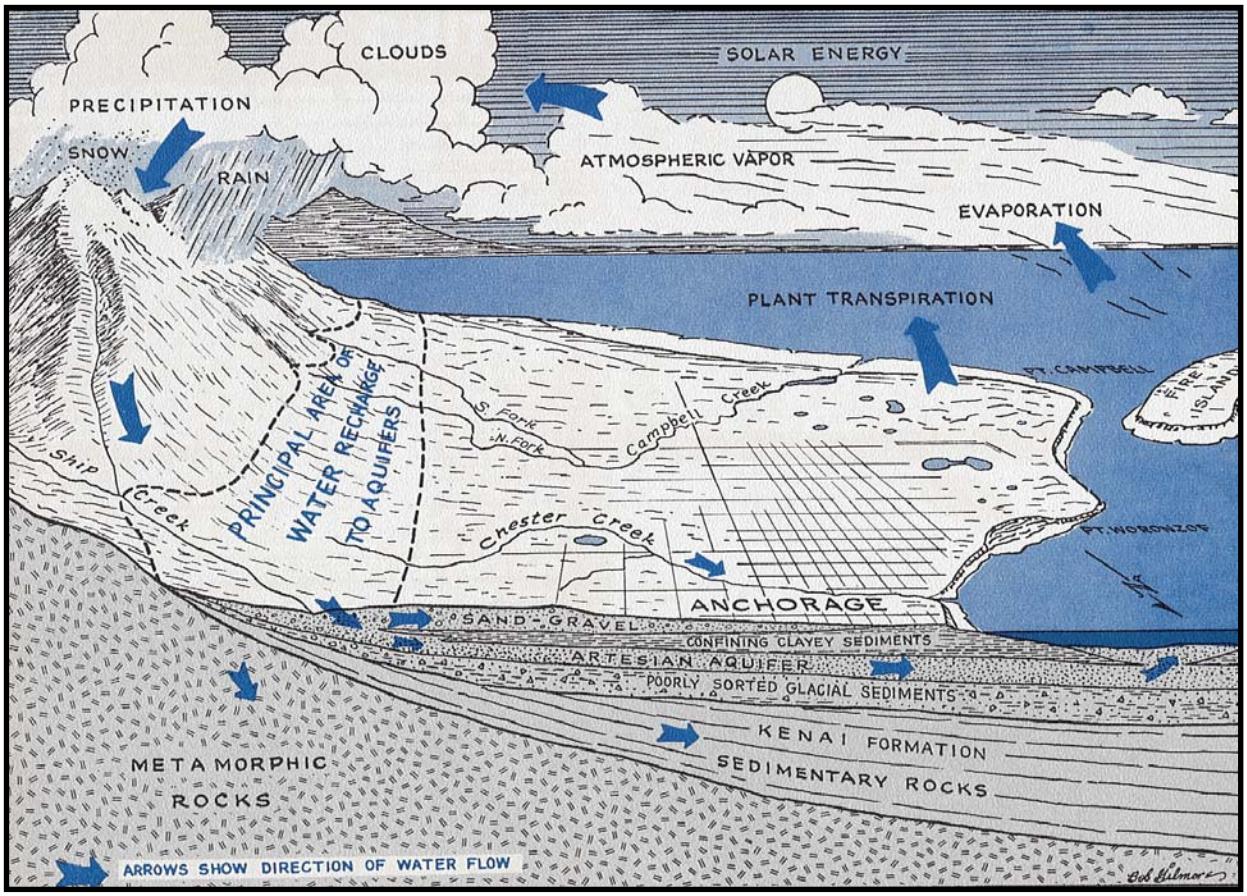

Figure 2. Generalized hydrologic cycle in the Anchorage area [*Barnwell, George, Dearborn,Weeks, and Zenone*, 1972].

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^{o} F during July to 8^{o} F in January [*Western Regional Climate Center*, 2000].

Physiography and Groundwater Conditions

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

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

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

Water enters or recharges these two aquifer systems in several different ways. Along the front of the Chugach Mountains, groundwater seeps from fractures in

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

KATHY O ESTATES PUBLIC DRINKING WATER SYSTEM

Kathy O Estates is a Class A (community) water system. The system consists of two wells in the Anchorage area. (See Map 1 of Appendix A).

Well No. 1 is located off of Chugach Way and Well No. 2 is located off of Arctic Blvd. The wells are approximately 450 feet apart and at an elevation of approximately 75 feet above sea level.

The 1997 Sanitary Survey indicates that the Well No. 1 and No. 2 are installed with caps providing a sanitary seal. A properly installed sanitary seal may provide protection against contaminants from entering the source waters at the well casing. Records indicate that the wells were installed prior to grouting regulations. Thus, it is assumed that the wells are not grouted according to current ADEC regulations. Proper grouting provides added protection against contaminants traveling along the well casing and into source waters.

Records indicate that the depth of Well No.1 is 160 feet. The well log is unavailable. However, logs of nearby wells indicate that there is a confining layer from 30 feet to 114 feet below the surface.
The depth of Well No.2 is 260 feet and the well log indicates that the well penetrates multiple confining layers from 30 -100 feet and 174 – 210 feet. At the time of drilling, Well No.2 was artesian flowing. Artesian wells flow to the surface freely, without the need for pumping. It is unknown whether, the aquifer remains artesian.

This confining layers may provide protection from contaminates entering the aquifer. However, the protectiveness of the clay layers tend to thin out towards the mountains allowing contaminants that enter the subsurface near the base of the mountains to enter the confined aquifer uninhibited by the absence of any protective layer.. Records indicate that abandoned well and active private wells are located near Well No.1 and No. 2. This abandoned well may provide a direct route for contaminants to enter the aquifer. Wells penetrating the confining layer can further reduce the protectiveness

This system operates 365 days per year and serves 240 residents and 2 nonresidents through 75 service connections.

KATHY O ESTATES 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. Some areas are more likely to allow contamination to reach the well than others. 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 DWPA are most likely to impact the drinking water well, this area will serve as the focus for voluntary protection efforts.

An outline of the immediate watershed was used to determine the size and shape of the DWPA for Kathy O Estates. Available geology was also considered to take into account any uncertainties in groundwater flow and aquifer characteristics to arrive at a meaningful DWPA (Please refer to the Guidance Manual for Class A Public Water Systems for additional information).

The DWPAs 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. An analytical calculation was used to determine the size and shape of the DWPA. 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*), and State of Alaska Department of Water Resources (*Jokela et. al., 1991*).

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 DWPA zones and the calculated time-of-travel for each:

Table 1. Definition of Zones

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

INVENTORY OF POTENTIAL AND EXISTING CONTAMINANT SOURCES

The Drinking Water Protection Program has completed an inventory of potential and existing sources of contamination within Kathy O Estates 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 Maps 2 -5 in 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.

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, volatile organic chemicals, heavy metals, synthetic organic chemicals, and other organic chemicals.

VULNERABILITY OF KATHY O ESTATESDRINKING 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 has been analyzed and an overall vulnerability score of 0 to 100 is ultimately assigned:

Natural Susceptibility (0 – 50 points)

+

Contaminant Risks (0 – 50 points)

=

Vulnerability of the

Drinking Water Source to Contamination (0 – 100).
A score for the Natural Susceptibility is achieved by analyzing the properties of the well and the aquifer.

Susceptibility of the Wellhead (0 – 25 Points)

+

Susceptibility of the Aquifer (0 – 25 Points)

=

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

Table 2 shows the Susceptibility scores and ratings for the well serving Kathy O Estates.

Table 2. Susceptibility of the well

Well No. 1:

	Score	Rating
Susceptibility of the Wellhead	5	Low
Susceptibility of the Aquifer	15	High
Natural Susceptibility	20	Low

Well No. 2:

	Score	Rating
Susceptibility of the Wellhead	5	Low
Susceptibility of the Aquifer	14	Medium
Natural Susceptibility	19	Low

Contaminant risks to a drinking water source depend on the type, number or density, and distribution of contaminant sources. This data 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. Table 3 summarizes the Contaminant Risks for each category of drinking water contaminants.

Table 3. Contaminant Risks

Well No. 1

Category	Score	Rating
Bacteria and Viruses	35	High
Nitrates and/or Nitrites	40	Very High
Volatile Organic Chemicals	50	Very High
Heavy Metals, Cyanide, and Other Inorganic Chemicals	50	Very High
Synthetic Organic Chemicals	42	Very High
Other Organic Chemicals	50	Very High

Well No. 2

Category	Score	Rating
Bacteria and Viruses	35	High
Nitrates and/or Nitrites	45	Very High
Volatile Organic Chemicals	50	Very High
Heavy Metals, Cyanide, and Other Inorganic Chemicals	50	Very High
Synthetic Organic Chemicals	50	Very High
Other Organic Chemicals	50	Very High

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. Lastly, 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, synthetic organic chemicals, and other organic chemicals, respectively.

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

Well No. 1

Category	Score	Rating
Bacteria and Viruses	55	Medium
Nitrates and Nitrites	60	High
Volatile Organic Chemicals	70	High
Heavy Metals, Cyanide and Other Inorganic Chemicals	70	High
Synthetic Organic Chemicals	60	High
Other Organic Chemicals	70	High

Well No. 2

Category	Score	Rating
Bacteria and Viruses	55	Medium
Nitrates and Nitrites	60	High
Volatile Organic Chemicals	70	High
Heavy Metals, Cyanide and Other Inorganic Chemicals	70	High
Synthetic Organic Chemicals	60	High
Other Organic Chemicals	70	High

Bacteria and Viruses
The contaminant risk for bacteria and viruses is medium for Well No. 1 and No.2 with sewer lines, residential areas, parks, recreational trails and medical facilities presenting the most significant risk to the drinking water sources. (See Chart 3 – Contaminant Risks for Bacteria and Viruses in Appendix D).

Recent sampling of Well No.1 and No. 2 indicates that no bacteria and viruses have been detected. .

After combining the contaminant risk for bacteria and viruses with the natural susceptibility of the well, the overall vulnerability for Well No. 1 and No. 2 is Medium.

Nitrates and Nitrites
The contaminant risk for nitrates and nitrites is high for Well No. 1 and No. 2 with sewer lines, residential areas, parks, recreational trails and agricultural storage presenting the most significant risk to the drinking water sources.

Recent sampling of Well No. 1 and No. 2 indicates that nitrates have not been detected in the source waters. After combining the contaminant risk for nitrates and nitrites with the natural susceptibility of the well, the overall vulnerability of Well No. 1 and No. 2 to contamination is high.

Volatile Organic Chemicals
The contaminant risk for volatile organic chemicals is very high for Well No. 1 and No. 2 with residential areas, sewer lines, roads gasoline stations, print shops, underground fuel tanks, Leaking Underground Storage Tank (LUST) sites and recognized contaminated sites presenting the most significant risk to the drinking water sources. (See Chart 7 – Contaminant Risks for Volatile Organic Chemicals in Appendix D).

Recent sampling of Well No. 1 and No. 2 indicates that no volatile organic chemicals have been detected in the source waters.

After combining the contaminant risks for volatile organic chemicals with the natural susceptibility of the wells, the overall vulnerability of Well No.1 and No.2 to contamination is high.

Heavy Metals, Cyanide, and Other Inorganic Chemicals
The contaminant risk for heavy metals, cyanide and other inorganic chemicals for Well No.1 and No.2 is very high with sewer lines, residential areas, roads, underground fuel tanks, sign manufacturing shops, motor vehicle repair shops, print shops and existing contamination presenting the most significant risk to the drinking water sources. (See Chart 9 – Contaminant Risks for Heavy Metals, Cyanide, and Other Inorganic Chemicals in Appendix D).

Sampling of Well No.1 on 11/19/1999, 10/10/1996, 7/20/93, indicates that arsenic was detected in the source waters above the current MCL of 0.01 mg/l. (See Chart 9 – Contaminant Risks for Heavy Metals and Other Inorganic Chemicals in Appendix D). The MCL for arsenic has recently been lowered from 0.050 mg/l to 0.01 mg/l.

Sampling of Well No. 2 on 7/21/1993 indicates that arsenic was detected at 40% of the MCL.

According to the EPA, "Arsenic occurs naturally in rocks and soil, water, air, and plants and animals. It can be further released into the environment through natural activities such as volcanic action, erosion of rocks, and forest fires, or through human actions. Approximately 90 percent of industrial arsenic in the U.S. is currently used as a wood preservative, but arsenic is also used in paints, dyes, metals, drugs, soaps, and semi-conductors. Agricultural applications, mining, and smelting also contribute to arsenic releases in the environment." (USEPA, 2001). It is likely that the arsenic detected is from natural sources.

Studies have linked long-term exposure to arsenic in drinking water to cancer of the bladder, lungs, skin, kidney, nasal passages, liver, and prostate. Non-cancer effects of ingesting arsenic include cardiovascular, Pulmonary, immunological, neurological, and endocrine (e.g., diabetes) effects. Short-term exposure to high doses of arsenic can cause other adverse health effects, but such effects are unlikely to occur from U.S. public water supplies that are in compliance with the previous arsenic standard of 0.050 mg/l. (USEPA, 2001).

In addition, very low levels of barium, cadmium and fluoride have been detecting in the source waters of Well No. 1 and No.2. The levels detected are likely to be from natural sources.

After combining the contaminant risks for other inorganic chemicals with the natural susceptibility of the wells, the overall vulnerability of Well No. 1 and No. 2 is high.

Synthetic Organic Chemicals
The contaminant risk for synthetic organic chemicals for Well No. 1 and No. 2 is very high with sewer lines, residential areas and furniture repair/finishing shops presenting the most significant risk. (See Chart 11 – Contaminant Risks for Synthetic Organic Chemicals in Appendix D, respectively).

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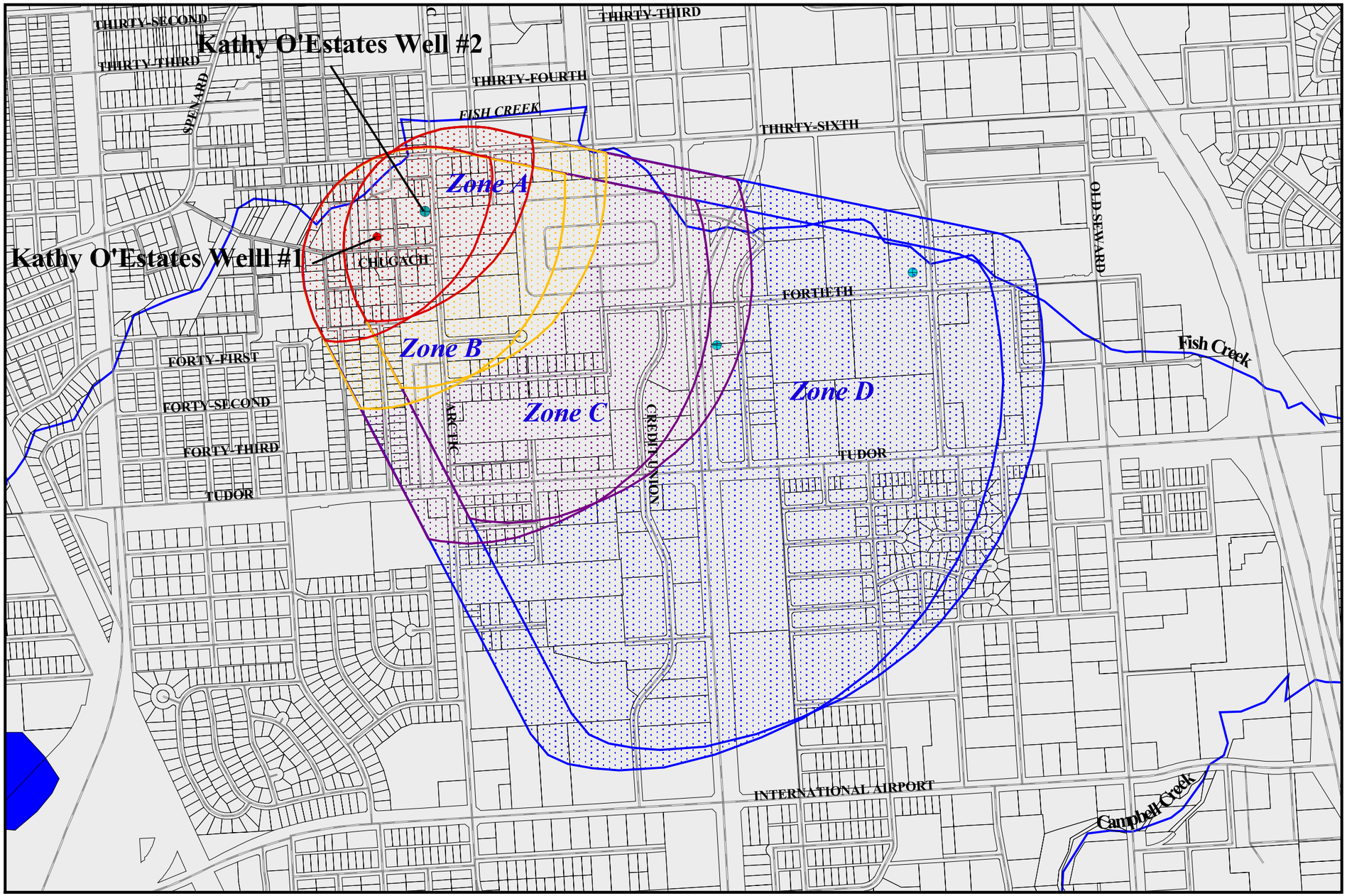
U.S. Environmental Protection Agency, 2001, Office of Water, National Primary Drinking Water Regulations, Consumer Factsheet on Arsenic. Retrieved August 2002. [WWW document]. URL http://www.epa.gov/safewater/ars/ars_rule_factsheet.html

APPENDIX A

Kathy O Estates
Drinking Water Protection Area Location
(Map 1)

Drinking Water Protection Area for Kathy -O Estates (Well No. 1 and Well No. 2)



Legend

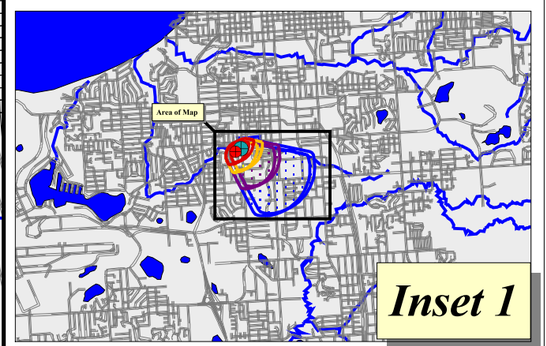
Well Locations for Kathy O'Estates
- Wel No. 1 (Old Well)
- Well No. 2 (New Well)

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
- Land Parcels
- Roads
- Streams
- Lakes
- Cook Inlet
- Private and Public Wells



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W E
S

1100 0 1100 Feet

1:13,200

PWSID 211897.001 (Old Well-No. 1) and 211897.002 (New Well-No. 2)

Map 1

APPENDIX B

Contaminant Source Inventory and Risk Ranking for Kathy O Estates (Tables 1-7)

Table 1

Contaminant Source Inventory for ***Kathy O'Estates***

PWSID 211897.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Construction trade areas and materials	C09	C9-1	A	3	
Construction trade areas and materials	C09	C9-2	A	3	
Construction trade areas and materials	C09	C9-3	A	3	
Construction trade areas and materials	C09	C9-4	A	3	
Construction trade areas and materials	C09	C9-5	A	3	
Construction trade areas and materials	C09	C9-6	A	3	
Construction trade areas and materials	C09	C9-7	A	3	
Gasoline stations (without repair shop)	C15	C15-1	A	3	
Hardware stores	C17	C17-1	A	3	
Heavy equipment rental/storage	C18	C18-1	A	3	
Heavy equipment rental/storage	C18	C18-2	A	3	
Jewelers	C19	C19-1	A	3	
Laundromats without dry cleaning	C22	C22-1	A	3	
Leather processing	C24	C24-1	A	3	
Motor vehicle rental facilities - cars, trucks, ATV's, snow machines (with service department)	C30	C30-1	A	3	
Motor /motor vehicle repair shops	C31	C31-1	A	3	
Motor /motor vehicle repair shops	C31	C31-2	A	3	
Motor /motor vehicle repair shops	C31	C31-3	A	3	
Paint sales /service	C32	C32-1	A	3	
Photography supplies/photo processing laboratories	C36	C36-1	A	3	
Photography supplies/photo processing laboratories	C36	C36-2	A	3	
Printers, publishers, copiers	C37	C37-1	A	3	
Printers, publishers, copiers	C37	C37-2	A	3	
Welding shops	C43	C43-1	A	3	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1-17	A	2	17 sewer lines in Zone A
Sign manufacturing	I39	I39-1	A	3	
Residential Areas	R01	R1-1	A	2	13 acres
Tanks, diesel (underground)	T08	T8-1	A	3	
Closed tanks, diesel (underground)	T09	T9-1	A	3	
Tanks, gasoline (underground)	T12	T12-1	A	3	
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U7-1	A	3	File No. L55.4:3719 Arctic Blvd. Gasoline contaminated soil/groundwater found during the removal of underground fuel tank. Soil removed. Extent of contamination and health impact unknown. Priority: Medium
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U8-1	A	3	File No. L55.103: 3707 Arctic Blvd. Petroleum contamination found during the removal of underground fuel tanks. Soil contamination found. Monitoring wells established and no detection of contamination in ground water. Priority: Low
Municipal or city parks (with green areas)	X04	X4-1	A	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	2	
Highways and roads, paved (cement or asphalt)	X20	X20-1-13	A	2	Zone A has 13 roads
Motor vehicle/general storage yards/facilities	X27	X27-1	A	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-1	A	3	
Dog walking areas/foot trails	X46	X46-1	A	2	
Dog walking areas/foot trails	X46	X46-2	A	2	
Dog walking areas/foot trails	X46	X46-3	A	2	
Orchards or nurseries	A10	A10-1	B	3	
Agricultural chemical sales/storage	C02	C2-1	B	3	
Construction trade areas and materials	C09	C9-8	B	3	
Construction trade areas and materials	C09	C9-9	B	3	
Florists	C12	C12-1	B	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-1	B	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-2	B	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-3	B	3	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Hardware stores	C17	C17-2	B	3	
Hardware stores	C17	C17-3	B	3	
Heavy equipment rental/storage	C18	C18-3	B	3	
Motor/motor vehicle supplies stores	C28	C28-1	B	3	
Photography supplies/photo processing laboratories	C36	C36-3	B	3	
Printers, publishers, copiers	C37	C37-3	B	3	
Printers, publishers, copiers	C37	C37-4	B	3	
Printers, publishers, copiers	C37	C37-5	B	3	
Printers, publishers, copiers	C37	C37-6	B	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-18-23	B	2	6 sewer lines in Zone B
Asphalt and tar processing/storage	I03	I3-1	B	3	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-1	B	3	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-2	B	3	
Textile manufacturing	I45	I45-1	B	3	
Meat processing	N05	N5-1	B	3	
Residential Areas	R01	R1-2	B	2	14 acres
Tanks, other	T24	T24-1	B	3	Anchorage Fire Department storage tanks
Highways and roads, paved (cement or asphalt)	X20	X20-14-28	B	2	Zone B has 15 roads
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-2	B	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-3	B	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-4	B	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-5	B	3	
Construction trade areas and materials	C09	C9-10	C	5	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Construction trade areas and materials	C09	C9-11	C	4	
Hardware stores	C17	C17-4	C	5	
Laboratories (chemical, soils, and research)	C20	C20-1	C	4	
Laboratories (chemical, soils, and research)	C20	C20-2	C	4	
Motor/motor vehicle supplies stores	C28	C28-2	C	4	
Motor /motor vehicle repair shops	C31	C31-4	C	4	
Motor /motor vehicle repair shops	C31	C31-5	C	4	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-24-32	C	2	9 sewer lines in Zone C
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-1	C	4	
Residential Areas	R01	R1-3	C	4	27 acres
Closed tanks, gasoline (underground)	T13	T13-1	C	4	
Closed tanks, gasoline (underground)	T13	T13-2	C	4	
Closed tanks, lubricants or other petroleum products (underground)	T21	T21-1	C	4	
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U4-1	C	4	File No. CS100.158: 401 West Tudor Road. Minor groundwater contamination discovered in 1994 during property transfer.Monitoring well established. Priority: Medium
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U7-2	C	4	File No. L69.43: 4333 Bering Street. Waste oil contamination of soil discovered in 1993. Cleanup initiated. Priority: Medium
Highways and roads, paved (cement or asphalt)	X20	X20-29-41	C	2	Zone C has 13 roads
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-10	C	4	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-6	C	4	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-7	C	4	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-8	C	4	
Dog walking areas/foot trails	X46	X46-4-8	C	4	
Gasoline stations (without repair shop)	C15	C15-2	D	5	
Printers, publishers, copiers	C37	C37-7	D	5	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Printers, publishers, copiers	C37	C37-8	D	5	
Lumber processing and preservation	N04	N4-1	D	5	
Tanks, diesel (underground)	T08	T8-2	D	5	
Tanks, gasoline (underground)	T12	T12-2	D	5	
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U7-3	D	5	File No. L30.12: 150 W. Tudor Road. Gasoline/diesel cotnamiantion encountered in 1987. Underground Storage Tanks and contaminated soils removed in 1989. Extent of remaining contamination is unknown. Priority: High
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U8-2	D	5	File No. L55.96 4300 B. Street. Petroleum contamination of soil encountered in 1990. Soil removed. Site cleanup completed. Priority: Low

Table 2

Contaminant Source Inventory and Risk Ranking for Kathy O'Estates Sources of Bacteria and Viruses

PWSID 211897.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Laundromats without dry cleaning	C22	C22-1	A	Low	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1-17	A	Medium	2	17 sewer lines in Zone A
Residential Areas	R01	R1-1	A	Low	2	13 acres
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	2	
Highways and roads, paved (cement or asphalt)	X20	X20-1-13	A	Low	2	Zone A has 13 roads
Municipal or city parks (with green areas)	X04	X4-1	A	Medium	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-1	A	Medium	3	
Dog walking areas/foot trails	X46	X46-1	A	Low	2	
Dog walking areas/foot trails	X46	X46-2	A	Low	2	
Dog walking areas/foot trails	X46	X46-3	A	Low	2	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-18-23	B	Medium	2	6 sewer lines in Zone B
Meat processing	N05	N5-1	B	Medium	3	
Residential Areas	R01	R1-2	B	Low	2	14 acres
Highways and roads, paved (cement or asphalt)	X20	X20-14-28	B	Low	2	Zone B has 15 roads
Highways and roads, paved (cement or asphalt)	X20	X20-14-28	B	Low	2	Zone B has 15 roads
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-2	B	Medium	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-3	B	Medium	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-4	B	Medium	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-5	B	Medium	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-24-32	C	Medium	2	9 sewer lines in Zone C

Table 2 (continued)

Contaminant Source Inventory and Risk Ranking for Kathy O'Estates

Sources of Bacteria and Viruses

PWSID 211897.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Residential Areas	R01	R1-3	C	Low	4	27 acres
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-8	C	Medium	4	

Table 3

Contaminant Source Inventory and Risk Ranking for Kathy O'Estates Sources of Nitrates/Nitrites

PWSID 211897.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Hardware stores	C17	C17-1	A	Low	3	
Laundromats without dry cleaning	C22	C22-1	A	Low	3	
Leather processing	C24	C24-1	A	Low	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1-17	A	Medium	2	17 sewer lines in Zone A
Residential Areas	R01	R1-1	A	Low	2	13 acres
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	2	
Highways and roads, paved (cement or asphalt)	X20	X20-1-13	A	Low	2	Zone A has 13 roads
Municipal or city parks (with green areas)	X04	X4-1	A	Medium	3	
Dog walking areas/foot trails	X46	X46-1	A	Low	2	
Dog walking areas/foot trails	X46	X46-2	A	Low	2	
Dog walking areas/foot trails	X46	X46-3	A	Low	2	
Orchards or nurseries	A10	A10-1	B	Medium	3	
Florists	C12	C12-1	B	Low	3	
Hardware stores	C17	C17-2	B	Low	3	
Hardware stores	C17	C17-3	B	Low	3	
Agricultural chemical sales/storage	C02	C2-1	B	High	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-18-23	B	Medium	2	6 sewer lines in Zone B
Meat processing	N05	N5-1	B	Low	3	
Residential Areas	R01	R1-2	B	Low	2	14 acres
Highways and roads, paved (cement or asphalt)	X20	X20-14-28	B	Low	2	Zone B has 15 roads
Highways and roads, paved (cement or asphalt)	X20	X20-14-28	B	Low	2	Zone B has 15 roads
Hardware stores	C17	C17-4	C	Low	5	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-24-32	C	Medium	2	9 sewer lines in Zone C
Residential Areas	R01	R1-3	C	Low	4	27 acres
Highways and roads, paved (cement or asphalt)	X20	X20-29-41	C	Low	2	Zone C has 13 roads
Dog walking areas/foot trails	X46	X46-4-8	C	Low	4	

Table 4

Contaminant Source Inventory and Risk Ranking for Kathy O'Estates
Sources of Volatile Organic Chemicals

PWSID 211897.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Gasoline stations (without repair shop)	C15	C15-1	A	High	3	
Hardware stores	C17	C17-1	A	Low	3	
Heavy equipment rental/storage	C18	C18-1	A	Medium	3	
Heavy equipment rental/storage	C18	C18-2	A	Medium	3	
Jewelers	C19	C19-1	A	Low	3	
Laundromats without dry cleaning	C22	C22-1	A	Low	3	
Leather processing	C24	C24-1	A	Medium	3	
Motor vehicle rental facilities - cars, trucks, ATV's, snow machines (with service department)	C30	C30-1	A	Medium	3	
Motor /motor vehicle repair shops	C31	C31-1	A	Medium	3	
Motor /motor vehicle repair shops	C31	C31-2	A	Medium	3	
Motor /motor vehicle repair shops	C31	C31-3	A	Medium	3	
Paint sales /service	C32	C32-1	A	Medium	3	
Photography supplies/photo processing laboratories	C36	C36-1	A	Medium	3	
Photography supplies/photo processing laboratories	C36	C36-2	A	Medium	3	
Printers, publishers, copiers	C37	C37-1	A	High	3	
Printers, publishers, copiers	C37	C37-2	A	High	3	
Welding shops	C43	C43-1	A	Medium	3	
Construction trade areas and materials	C09	C9-1	A	Low	3	
Construction trade areas and materials	C09	C9-2	A	Low	3	
Construction trade areas and materials	C09	C9-3	A	Low	3	
Construction trade areas and materials	C09	C9-4	A	Low	3	
Construction trade areas and materials	C09	C9-5	A	Low	3	
Construction trade areas and materials	C09	C9-6	A	Low	3	

Table 4 (continued)

Contaminant Source Inventory and Risk Ranking for Kathy O'Estates

Sources of Volatile Organic Chemicals

PWSID 211897.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Construction trade areas and materials	C09	C9-7	A	Low	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1-17	A	Low	2	17 sewer lines in Zone A
Sign manufacturing	I39	I39-1	A	Medium	3	
Residential Areas	R01	R1-1	A	Low	2	13 acres
Tanks, gasoline (underground)	T12	T12-1	A	High	3	
Tanks, diesel (underground)	T08	T8-1	A	High	3	
Closed tanks, diesel (underground)	T09	T9-1	A	Medium	3	
Closed tanks, diesel (underground)	T09	T9-1	A	Medium	3	
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U8-1	A	Medium	3	File No. L55.103: 3707 Arctic Blvd. Petroleum contamination found during the removal of underground fuel tanks. Soil contamination found. Monitoring wells established and no detection of contamination in ground water. Priority: Low
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	2	
Highways and roads, paved (cement or asphalt)	X20	X20-1-13	A	Low	2	Zone A has 13 roads
Motor vehicle/general storage yards/facilities	X27	X27-1	A	Low	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-1	A	Low	3	
Orchards or nurseries	A10	A10-1	B	Low	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-1	B	High	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-2	B	High	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-3	B	High	3	
Hardware stores	C17	C17-2	B	Low	3	
Hardware stores	C17	C17-3	B	Low	3	
Heavy equipment rental/storage	C18	C18-3	B	Medium	3	
Motor/motor vehicle supplies stores	C28	C28-1	B	Low	3	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Photography supplies/photo processing laboratories	C36	C36-3	B	Medium	3	
Printers, publishers, copiers	C37	C37-3	B	High	3	
Printers, publishers, copiers	C37	C37-4	B	High	3	
Printers, publishers, copiers	C37	C37-5	B	High	3	
Printers, publishers, copiers	C37	C37-6	B	High	3	
Construction trade areas and materials	C09	C9-8	B	Low	3	
Construction trade areas and materials	C09	C9-9	B	Low	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-18-23	B	Low	2	6 sewer lines in Zone B
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-1	B	Very High	3	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-2	B	Very High	3	
Asphalt and tar processing/storage	I03	I3-1	B	Medium	3	
Textile manufacturing	I45	I45-1	B	Very High	3	
Meat processing	N05	N5-1	B	Medium	3	
Residential Areas	R01	R1-2	B	Low	2	14 acres
Highways and roads, paved (cement or asphalt)	X20	X20-14-28	B	Low	2	Zone B has 15 roads
Highways and roads, paved (cement or asphalt)	X20	X20-14-28	B	Low	2	Zone B has 15 roads
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-2	B	Low	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-3	B	Low	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-4	B	Low	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-5	B	Low	3	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Hardware stores	C17	C17-4	C	Low	5	
Laboratories (chemical, soils, and research)	C20	C20-1	C	Low	4	
Laboratories (chemical, soils, and research)	C20	C20-2	C	Low	4	
Motor/motor vehicle supplies stores	C28	C28-2	C	Low	4	
Motor /motor vehicle repair shops	C31	C31-4	C	Medium	4	
Motor /motor vehicle repair shops	C31	C31-5	C	Medium	4	
Construction trade areas and materials	C09	C9-10	C	Low	5	
Construction trade areas and materials	C09	C9-11	C	Low	4	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-24-32	C	Low	2	9 sewer lines in Zone C
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-1	C	High	4	
Residential Areas	R01	R1-3	C	Low	4	27 acres
Closed tanks, gasoline (underground)	T13	T13-1	C	Medium	4	
Closed tanks, gasoline (underground)	T13	T13-2	C	Medium	4	
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U4-1	C	Medium	4	File No. CS100.158: 401 West Tudor Road. Minor groundwater contamination discovered in 1994 during property transfer.Monitoring well established. Priority: Medium
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U7-2	C	Medium	4	File No. L69.43: 4333 Bering Street. Waste oil contamination of soil discovered in 1993. Cleanup initiated. Priority: Medium
Highways and roads, paved (cement or asphalt)	X20	X20-29-41	C	Low	2	Zone C has 13 roads
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-10	C	Low	4	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-6	C	Low	4	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-7	C	Low	4	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-8	C	Low	4	
Gasoline stations (without repair shop)	C15	C15-2	D	High	5	
Printers, publishers, copiers	C37	C37-7	D	High	5	
Printers, publishers, copiers	C37	C37-8	D	High	5	
Lumber processing and preservation	N04	N4-1	D	Medium	5	
Tanks, gasoline (underground)	T12	T12-2	D	High	5	
Tanks, diesel (underground)	T08	T8-2	D	High	5	
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U7-3	D	High	5	File No. L30.12: 150 W. Tudor Road. Gasoline/diesel cotnamiantion encountered in 1987. Underground Storage Tanks and contaminated soils removed in 1989. Extent of remaining contamination is unknown. Priority: High
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U8-2	D	Low	5	File No. L55.96 4300 B. Street. Petroleum contamination of soil encountered in 1990. Soil removed. Site cleanup completed. Priority: Low

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Hardware stores	C17	C17-1	A	Low	3	
Heavy equipment rental/storage	C18	C18-1	A	Low	3	
Heavy equipment rental/storage	C18	C18-2	A	Low	3	
Jewelers	C19	C19-1	A	Low	3	
Leather processing	C24	C24-1	A	Medium	3	
Motor vehicle rental facilities - cars, trucks, ATV's, snow machines (with service department)	C30	C30-1	A	Low	3	
Motor /motor vehicle repair shops	C31	C31-1	A	Medium	3	
Motor /motor vehicle repair shops	C31	C31-2	A	Medium	3	
Motor /motor vehicle repair shops	C31	C31-3	A	Medium	3	
Paint sales /service	C32	C32-1	A	Low	3	
Photography supplies/photo processing laboratories	C36	C36-1	A	Medium	3	
Photography supplies/photo processing laboratories	C36	C36-2	A	Medium	3	
Printers, publishers, copiers	C37	C37-1	A	Medium	3	
Welding shops	C43	C43-1	A	Low	3	
Construction trade areas and materials	C09	C9-1	A	Low	3	
Construction trade areas and materials	C09	C9-2	A	Low	3	
Construction trade areas and materials	C09	C9-3	A	Low	3	
Construction trade areas and materials	C09	C9-4	A	Low	3	
Construction trade areas and materials	C09	C9-5	A	Low	3	
Construction trade areas and materials	C09	C9-6	A	Low	3	
Construction trade areas and materials	C09	C9-7	A	Low	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1-17	A	Low	2	17 sewer lines in Zone A
Sign manufacturing	I39	I39-1	A	Medium	3	

Contaminant Source Inventory and Risk Ranking for Kathy O'Estates

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*
Residential Areas	R01	R1-1	A	Low	2	13 acres
Tanks, gasoline (underground)	T12	T12-1	A	Medium	3	
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	2	
Highways and roads, paved (cement or asphalt)	X20	X20-1-13	A	Low	2	Zone A has 13 roads
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-1	A	Low	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-1	B	Low	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-2	B	Low	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-3	B	Low	3	
Hardware stores	C17	C17-2	B	Low	3	
Hardware stores	C17	C17-3	B	Low	3	
Heavy equipment rental/storage	C18	C18-3	B	Low	3	
Agricultural chemical sales/storage	C02	C2-1	B	Low	3	
Photography supplies/photo processing laboratories	C36	C36-3	B	Medium	3	
Printers, publishers, copiers	C37	C37-3	B	Medium	3	
Printers, publishers, copiers	C37	C37-4	B	Medium	3	
Printers, publishers, copiers	C37	C37-5	B	Medium	3	
Printers, publishers, copiers	C37	C37-6	B	Medium	3	
Construction trade areas and materials	C09	C9-8	B	Low	3	
Construction trade areas and materials	C09	C9-9	B	Low	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-18-23	B	Low	2	6 sewer lines in Zone B
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-1	B	High	3	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-2	B	High	3	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Asphalt and tar processing/storage	I03	I3-1	B	Low	3	
Textile manufacturing	I45	I45-1	B	Medium	3	
Residential Areas	R01	R1-2	B	Low	2	14 acres
Highways and roads, paved (cement or asphalt)	X20	X20-14-28	B	Low	2	Zone B has 15 roads
Highways and roads, paved (cement or asphalt)	X20	X20-14-28	B	Low	2	Zone B has 15 roads
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-2	B	Low	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-3	B	Low	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-4	B	Low	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-5	B	Low	3	
Hardware stores	C17	C17-4	C	Low	5	
Laboratories (chemical, soils, and research)	C20	C20-1	C	Low	4	
Laboratories (chemical, soils, and research)	C20	C20-2	C	Low	4	
Motor /motor vehicle repair shops	C31	C31-4	C	Medium	4	
Motor /motor vehicle repair shops	C31	C31-5	C	Medium	4	
Construction trade areas and materials	C09	C9-10	C	Low	5	
Construction trade areas and materials	C09	C9-11	C	Low	4	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-24-32	C	Low	2	9 sewer lines in Zone C
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-1	C	High	4	
Residential Areas	R01	R1-3	C	Low	4	27 acres
Highways and roads, paved (cement or asphalt)	X20	X20-29-41	C	Low	2	Zone C has 13 roads

Contaminant Source Inventory and Risk Ranking for Kathy O'Estates

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*
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-10	C	Low	4	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-6	C	Low	4	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-7	C	Low	4	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-8	C	Low	4	
Printers, publishers, copiers	C37	C37-7	D	Medium	5	
Printers, publishers, copiers	C37	C37-8	D	Medium	5	
Lumber processing and preservation	N04	N4-1	D	Medium	5	
Tanks, gasoline (underground)	T12	T12-2	D	Medium	5	

Table 6

Contaminant Source Inventory and Risk Ranking for Kathy O'Estates
Sources of Synthetic Organic Chemicals

PWSID 211897.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Paint sales /service	C32	C32-1	A	Low	3	
Photography supplies/photo processing laboratories	C36	C36-1	A	Low	3	
Photography supplies/photo processing laboratories	C36	C36-2	A	Low	3	
Printers, publishers, copiers	C37	C37-1	A	Low	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1-17	A	Low	2	17 sewer lines in Zone A
Residential Areas	R01	R1-1	A	Low	2	13 acres
Municipal or city parks (with green areas)	X04	X4-1	A	Low	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-1	A	Low	3	
Orchards or nurseries	A10	A10-1	B	High	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-1	B	Medium	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-2	B	Medium	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-3	B	Medium	3	
Agricultural chemical sales/storage	C02	C2-1	B	High	3	
Photography supplies/photo processing laboratories	C36	C36-3	B	Low	3	
Printers, publishers, copiers	C37	C37-3	B	Low	3	
Printers, publishers, copiers	C37	C37-4	B	Low	3	
Printers, publishers, copiers	C37	C37-5	B	Low	3	
Printers, publishers, copiers	C37	C37-6	B	Low	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-18-23	B	Low	2	6 sewer lines in Zone B
Residential Areas	R01	R1-2	B	Low	2	14 acres
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-2	B	Low	3	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-3	B	Low	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-4	B	Low	3	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-5	B	Low	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-24-32	C	Low	2	9 sewer lines in Zone C
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-1	C	Low	4	
Residential Areas	R01	R1-3	C	Low	4	27 acres
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-10	C	Low	4	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-6	C	Low	4	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-7	C	Low	4	
Medical/veterinary facilities (doctor or dentist offices, hospitals, nursing homes)	X40	X40-8	C	Low	4	
Printers, publishers, copiers	C37	C37-7	D	Low	5	
Printers, publishers, copiers	C37	C37-8	D	Low	5	
Lumber processing and preservation	N04	N4-1	D	High	5	

Table 7

Contaminant Source Inventory and Risk Ranking for Kathy O'Estates
Sources of Other Organic Chemicals

PWSID 211897.001

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Map Number	Comments
Gasoline stations (without repair shop)	C15	C15-1	A	Low	3	
Hardware stores	C17	C17-1	A	Low	3	
Heavy equipment rental/storage	C18	C18-1	A	Medium	3	
Heavy equipment rental/storage	C18	C18-2	A	Medium	3	
Leather processing	C24	C24-1	A	Medium	3	
Motor vehicle rental facilities - cars, trucks, ATV's, snow machines (with service department)	C30	C30-1	A	Medium	3	
Motor /motor vehicle repair shops	C31	C31-1	A	Medium	3	
Motor /motor vehicle repair shops	C31	C31-2	A	Medium	3	
Motor /motor vehicle repair shops	C31	C31-3	A	Medium	3	
Photography supplies/photo processing laboratories	C36	C36-1	A	Low	3	
Photography supplies/photo processing laboratories	C36	C36-2	A	Low	3	
Welding shops	C43	C43-1	A	Low	3	
Construction trade areas and materials	C09	C9-1	A	Low	3	
Construction trade areas and materials	C09	C9-2	A	Low	3	
Construction trade areas and materials	C09	C9-3	A	Low	3	
Construction trade areas and materials	C09	C9-4	A	Low	3	
Construction trade areas and materials	C09	C9-5	A	Low	3	
Construction trade areas and materials	C09	C9-6	A	Low	3	
Construction trade areas and materials	C09	C9-7	A	Low	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-1-17	A	Low	2	17 sewer lines in Zone A
Residential Areas	R01	R1-1	A	Low	2	13 acres
Highways and roads, paved (cement or asphalt)	X20	X20-1	A	Low	2	
Highways and roads, paved (cement or asphalt)	X20	X20-1-13	A	Low	2	Zone A has 13 roads

Contaminant Source Inventory and Risk Ranking for Kathy O'Estates

Sources of Other Organic Chemicals

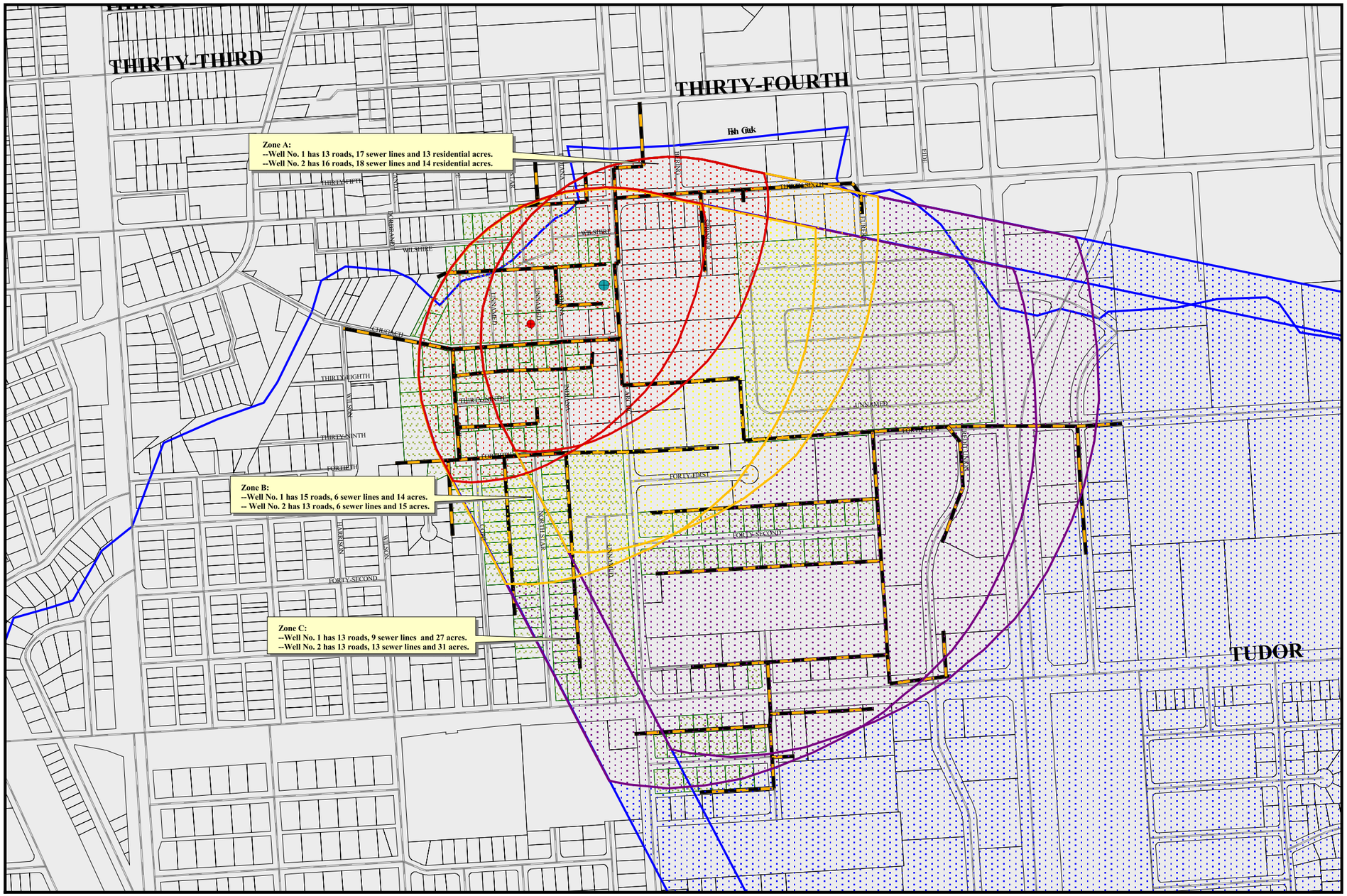
Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Motor vehicle/general storage yards/facilities	X27	X27-1	A	Low	3	
Orchards or nurseries	A10	A10-1	B	Low	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-1	B	Medium	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-2	B	Medium	3	
Furniture manufacturing, repair, and finishing shops	C14	C14-3	B	Medium	3	
Hardware stores	C17	C17-2	B	Low	3	
Hardware stores	C17	C17-3	B	Low	3	
Heavy equipment rental/storage	C18	C18-3	B	Medium	3	
Photography supplies/photo processing laboratories	C36	C36-3	B	Low	3	
Construction trade areas and materials	C09	C9-8	B	Low	3	
Construction trade areas and materials	C09	C9-9	B	Low	3	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-18-23	B	Low	2	6 sewer lines in Zone B
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-1	B	Very High	3	
Electrical, electronic, computer, and communications equipment/component manufacturing	I13	I13-2	B	Very High	3	
Asphalt and tar processing/storage	I03	I3-1	B	High	3	
Textile manufacturing	I45	I45-1	B	Medium	3	
Meat processing	N05	N5-1	B	Low	3	
Residential Areas	R01	R1-2	B	Low	2	14 acres
Highways and roads, paved (cement or asphalt)	X20	X20-14-28	B	Low	2	Zone B has 15 roads
Highways and roads, paved (cement or asphalt)	X20	X20-14-28	B	Low	2	Zone B has 15 roads
Hardware stores	C17	C17-4	C	Low	5	
Motor /motor vehicle repair shops	C31	C31-4	C	Medium	4	

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Motor /motor vehicle repair shops	C31	C31-5	C	Medium	4	
Construction trade areas and materials	C09	C9-10	C	Low	5	
Construction trade areas and materials	C09	C9-11	C	Low	4	
Domestic wastewater collection systems (sewer lines or lift stations)	D01	D01-24-32	C	Low	2	9 sewer lines in Zone C
Injection wells (Class V) Motor Vehicle Waste Disposal Well	D42	D42-1	C	High	4	
Residential Areas	R01	R1-3	C	Low	4	27 acres
Highways and roads, paved (cement or asphalt)	X20	X20-29-41	C	Low	2	Zone C has 13 roads
Gasoline stations (without repair shop)	C15	C15-2	D	Low	5	
Lumber processing and preservation	N04	N4-1	D	High	5	

APPENDIX C

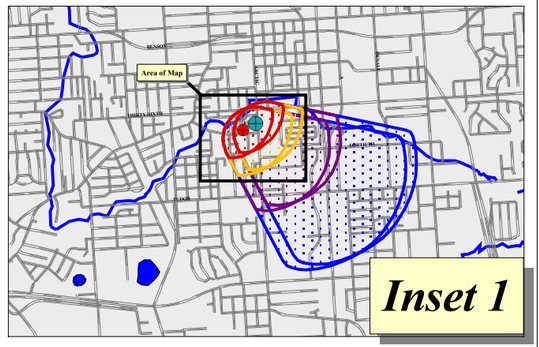
Kathy O Estates
Drinking Water Protection Area
and Potential and Existing Contaminant Sources
(Maps 2-5)

Drinking Water Protection Area for Kathy O Estates with Potential and Existing Sources of Contamination.



Legend

- Well Locations for Kathy O'Estates
  - Wel No. 1 (Old Well)
  - Well No. 2 (New 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
- Sewer Lines (D01)
- Residential (R02)
- Roads
- Streams
- Lakes
- Cook Inlet
- Land Parcels



Inset 1

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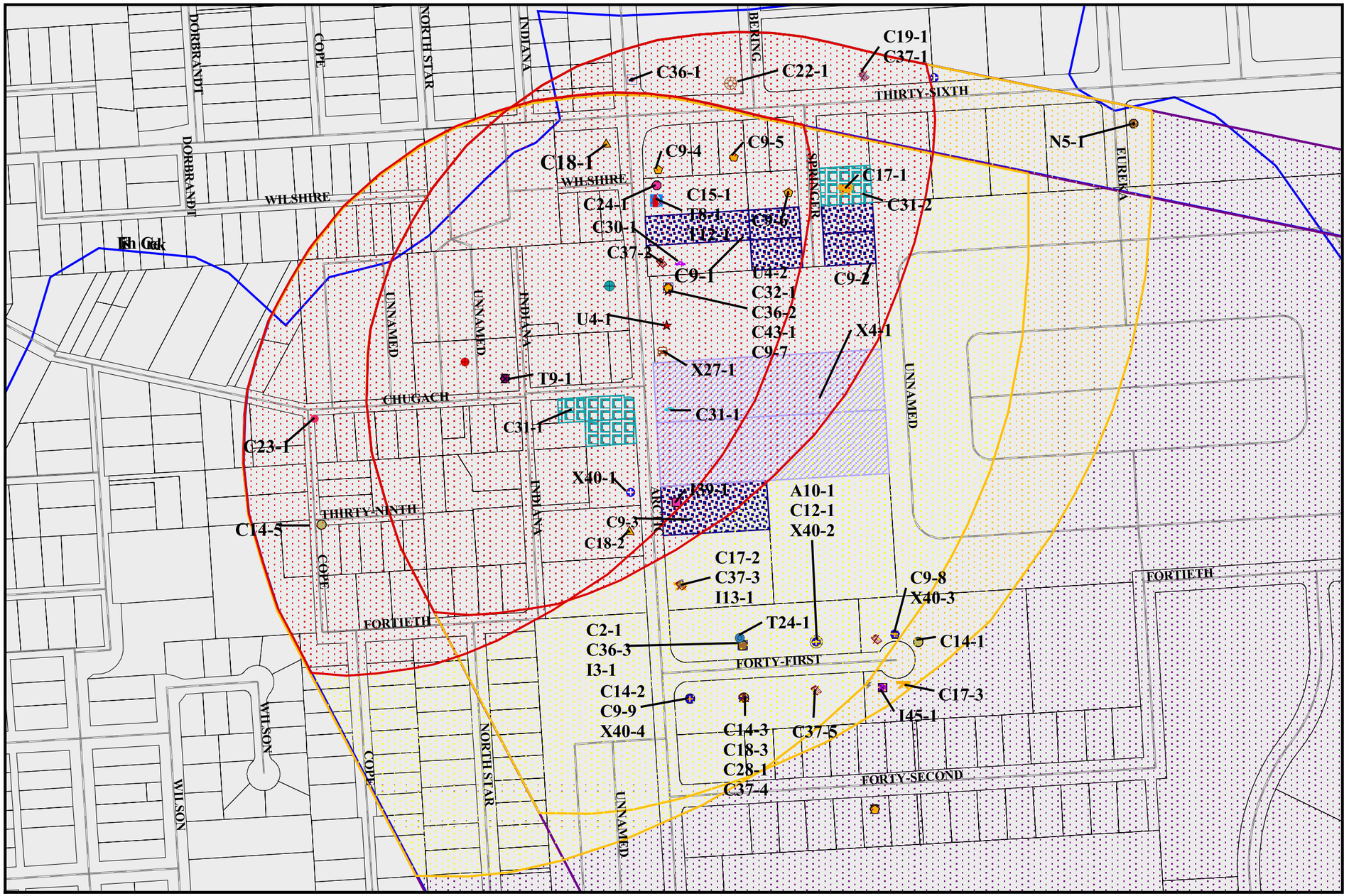
1:7,200

PWSID 211897.001 (Old Well-No. 1) and 211897.002 (New Well-No. 2)

Map 2

Drinking Water Protection Area for Kathy O Estates with Potential and Existing Sources of Contamination.



Legend

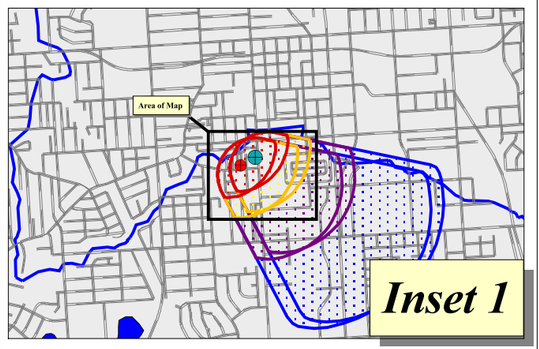
Well Locations for Kathy O'Estates
- Wel No. 1 (Old Well)
- Well No. 2 (New Well)
- Anchorage Fire Department Storage Tanks

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
- Motor/Motor Vehicle Repair Shops (C31)
- Anchorage Parks (X4)
- Construction Trade Areas and Materials (C9)
- Anchorage Land Parcels
- Roads
- Streams
- Lakes
- Cook Inlet
- Land Parcels



N
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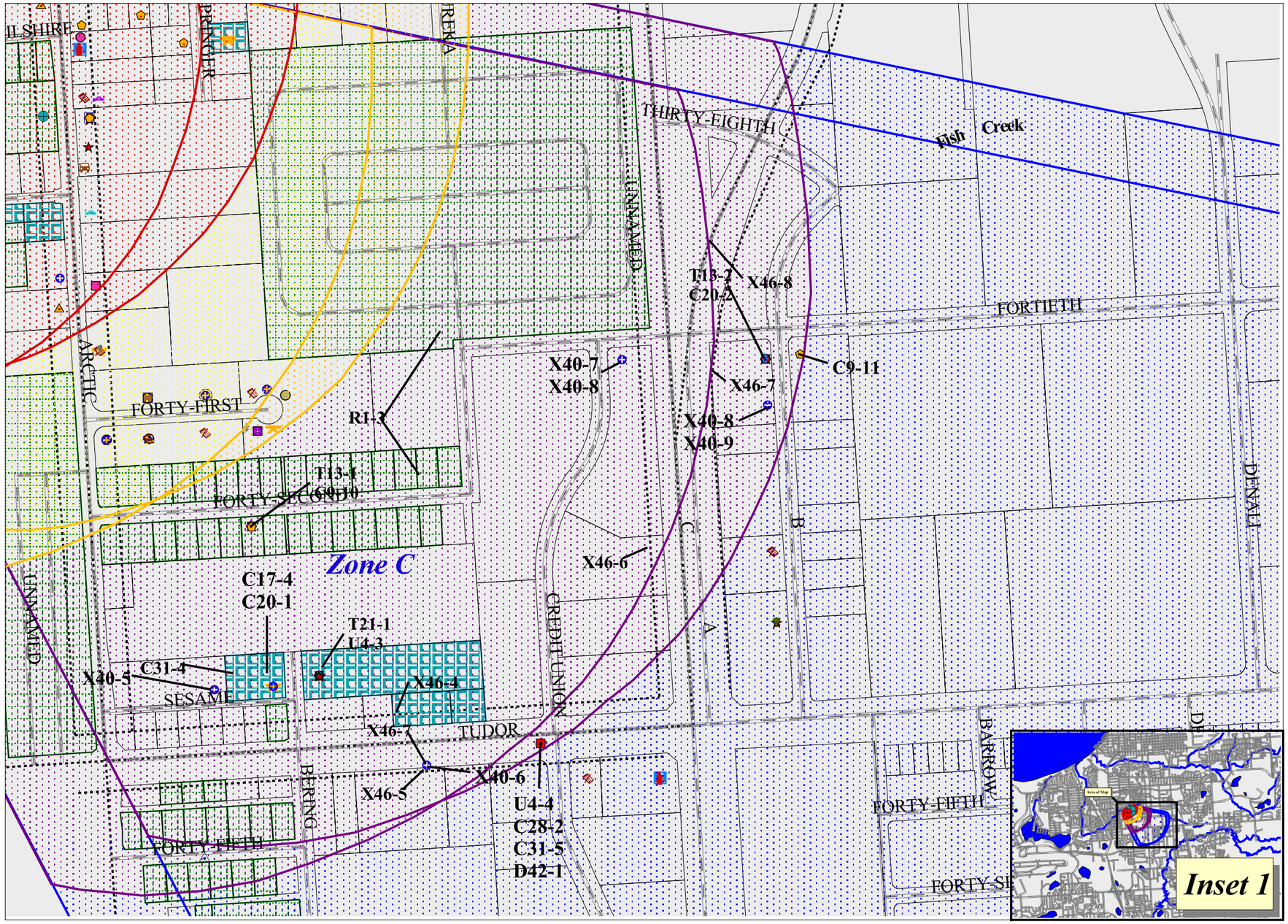
400 0 400 Feet
1:4,800

PWSID 211897.001 (Old Well-No. 1) and 211897.002 (New Well-No. 2)

Map 3

Drinking Water Protection Area for Kathy O Estates with Potential and Existing Sources of Contamination.



Legend

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

Potential Contaminant Sources
- Orchards and Nurseries (A10)
- Florists (C12)
- Furniture Manufacturing, Repair, and Finishing (C14)
- Gasoline Stations With Repair Shops (C15)
- Hardware Stores (C17)
- Heavy Equipment Rental/Storage (C18)
- Jewlers (C19)
- Agriculture Chemical Sales/Storage (C2)
- Laboratories (Medical) (C20)
- Laundromats Without Dry Cleaning (C22)
- Leather Processing (C24)
- Motor/Motor Vehicle Supply Stores (C28)
- Motor Vehicle Rental Facility - With Service (C30)
- Motor/Motor Vehicle Repair Shop (C31)
- Paint Sales/Service (C32)
- Photography Supplies/Photo Processing (C36)
- Printers, Publishers, Copiers (C37)
- Taxidermists (C41)
- Welding Shops (C43)
- Body Shops (Automotive) (C5)
- Construction Trade Areas and Materials (C9)
- Class V Injection Wells - Motor Vehicle Waste (D42)
- Electrical, Electronic, Commputer Manufacturing (I13)
- Asphalt and Tar Processing/Storage (I3)
- Sign Manufacturing (I39)
- Textile Manufacturing (I45)
- Lumber Processing and Preservation (N4)
- Meat Processing (N5)
- Gasoline Tanks - Underground (T12)
- Gasoline Tanks (Closed) - Underground (T13)
- Closed Tanks, Lubricants, Petroleum Products - Underground (T21)
- Diesel Tanks - Underground (T8)
- Diesel Tanks (Closed) - underground (T9)
- Contaminated Sites - DEC Recognized (U4)
- Motor Vehicle/General Storage Yards (X27)
- Medical/Veterinary Facilities (X40)

Roads (X20)

Anchorage Land Parcels

N W E S

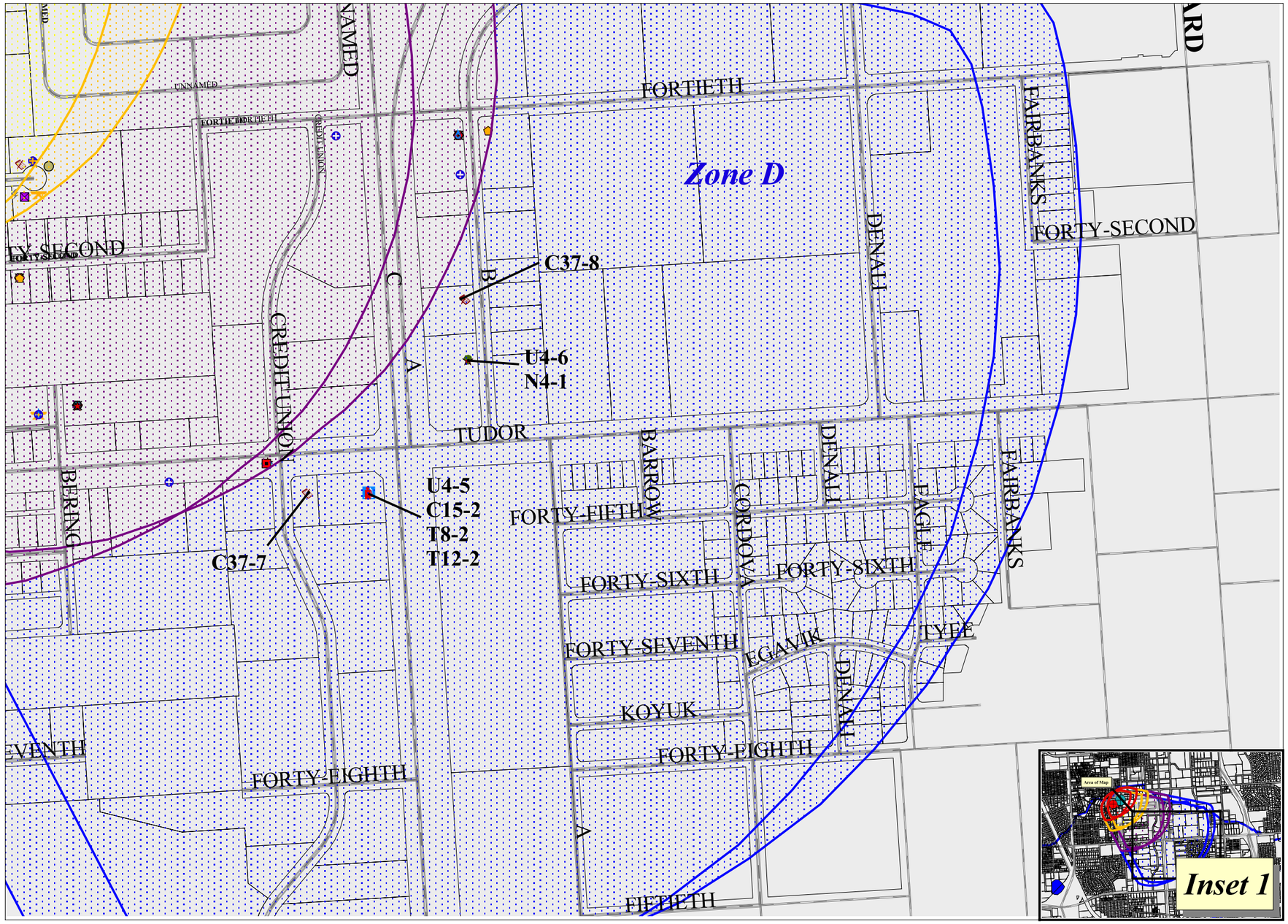
450 0 450 Feet

1:5,400

PWSID 211897.001 (Old Well-No. 1) and 211897.002 (New Well-No. 2)

Map 4

Drinking Water Protection Area for Kathy O Estates with Potential and Existing Sources of Contamination.



Legend

Well Locations for Kathy O'Estates
- Wel No. 1 (Old Well)
- Well No. 2 (New 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

Potential Contaminant Sources
- Orchards and Nurseries (A10)
- Florists (C12)
- Furniture Manufacturing, Repair, and Finishing (C14)
- Gasoline Stations With Repair Shops (C15)
- Hardware Stores (C17)
- Heavy Equipment Rental/Storage (C18)
- Jewlers (C19)
- Agriculture Chemical Sales/Storage (C2)
- Laboratories (Medical) (C20)
- Laundromats Without Dry Cleaning (C22)
- Leather Processing (C24)
- Motor/Motor Vehicle Supply Stores (C28)
- Motor Vehicle Rental Facility - With Service (C30)
- Motor/Motor Vehicle Repair Shop (C31)
- Paint Sales/Service (C32)
- Photography Supplies/Photo Processing (C36)
- Printers, Publishers, Copiers (C37)
- Taxidermists (C41)
- Welding Shops (C43)
- Body Shops (Automotive) (C5)
- Construction Trade Areas and Materials (C9)
- Class V Injection Wells - Motor Vehicle Waste (D42)
- Electrical, Electronic, Commputer Manufacturing (I13)
- Asphalt and Tar Processing/Storage (I3)
- Sign Manufacturing (I39)
- Textile Manufacturing (I45)
- Lumber Processing and Preservation (N4)
- Meat Processing (N5)
- Gasoline Tanks - Underground (T12)
- Gasoline Tanks (Closed) - Underground (T13)
- Closed Tanks, Lubricants, Petroleum Products - Underground (T21)
- Diesel Tanks - Underground (T8)
- Diesel Tanks (Closed) - underground (T9)
- Contaminated Sites - DEC Recognized (U4)
- Motor Vehicle/General Storage Yards (X27)
- Medical/Veterinary Facilities (X40)
- Roads (X20)
- Anchorage Land Parcels

N
W E
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600 0 600 Feet

1:6,600

PWSID 211897.001 (Old Well-No. 1) and 211897.002 (New Well-No. 2)

Map 5

APPENDIX D

Vulnerability Analysis for
Kathy O Estates
(Charts 1-14)

Chart 1. Susceptibility of the wellhead - Kathy O Estates (Well No.1-Old Well)

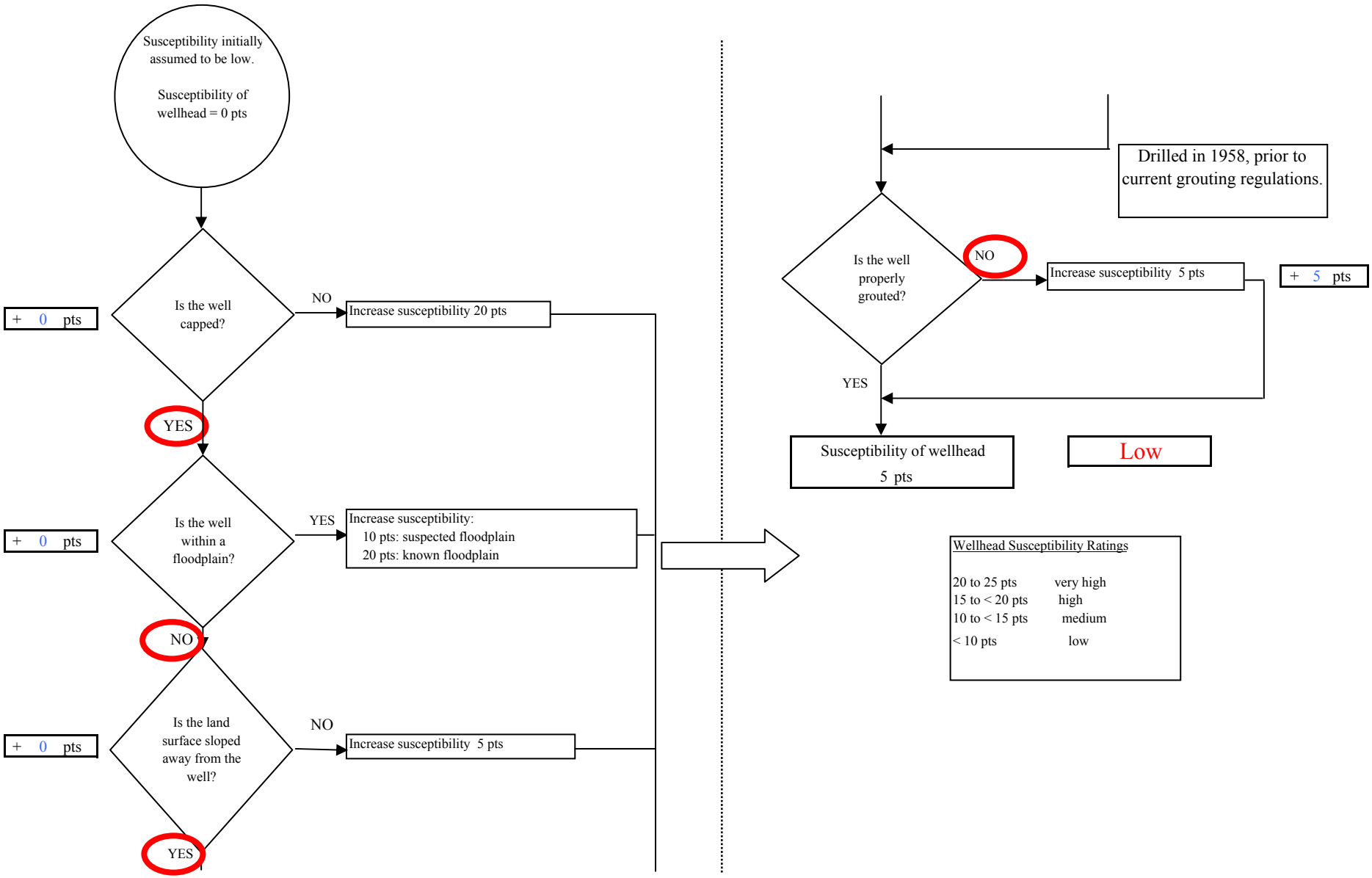


Chart 2. Susceptibility of the aquifer - Kathy O Estates (Well No.1-Old Well)

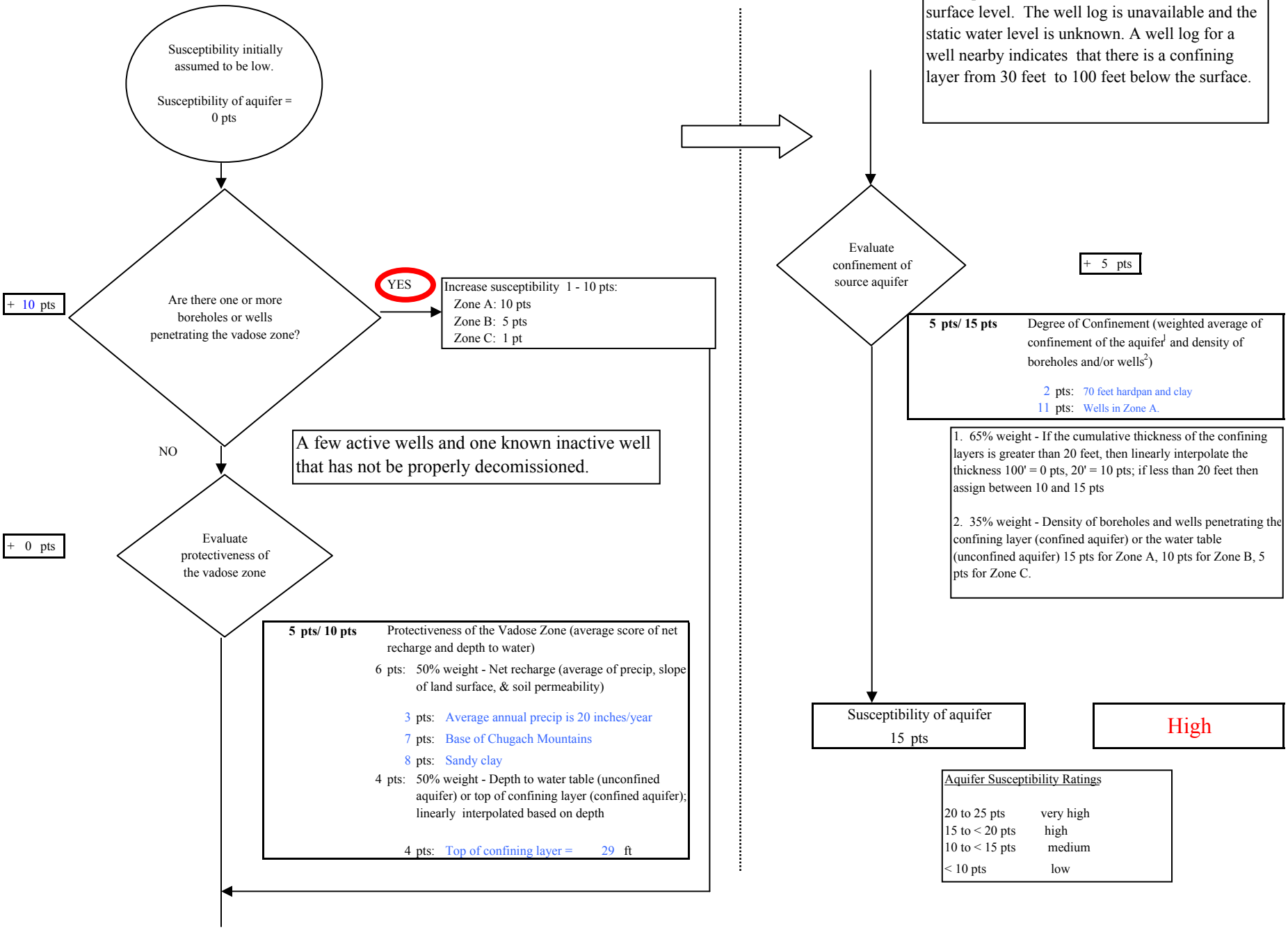
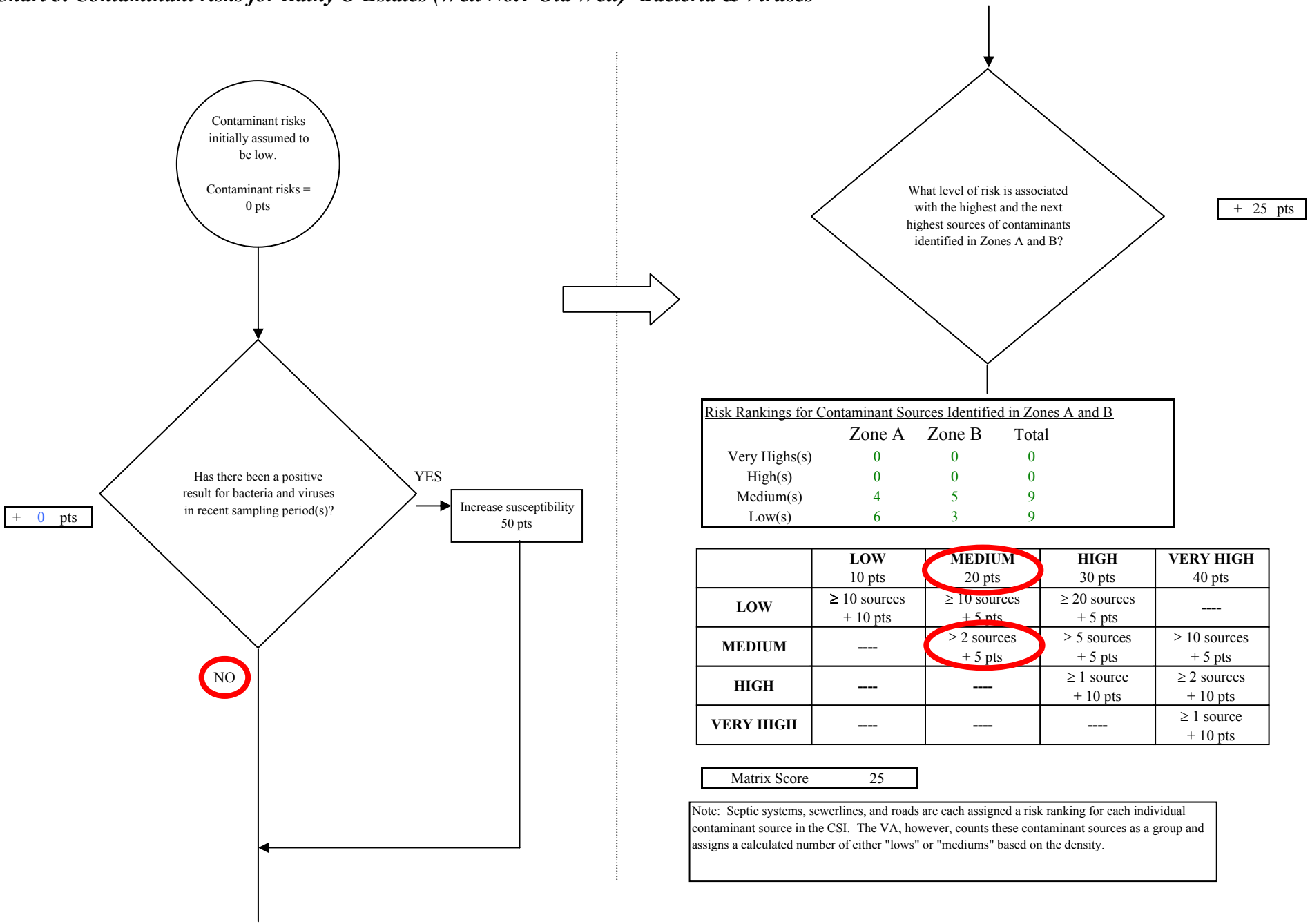


Chart 3. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Bacteria & Viruses



Risk Rankings for Contaminant Sources Identified in Zones A and B

	Zone A	Zone B	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	4	5	9
Low(s)	6	3	9

	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 3. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Bacteria & Viruses

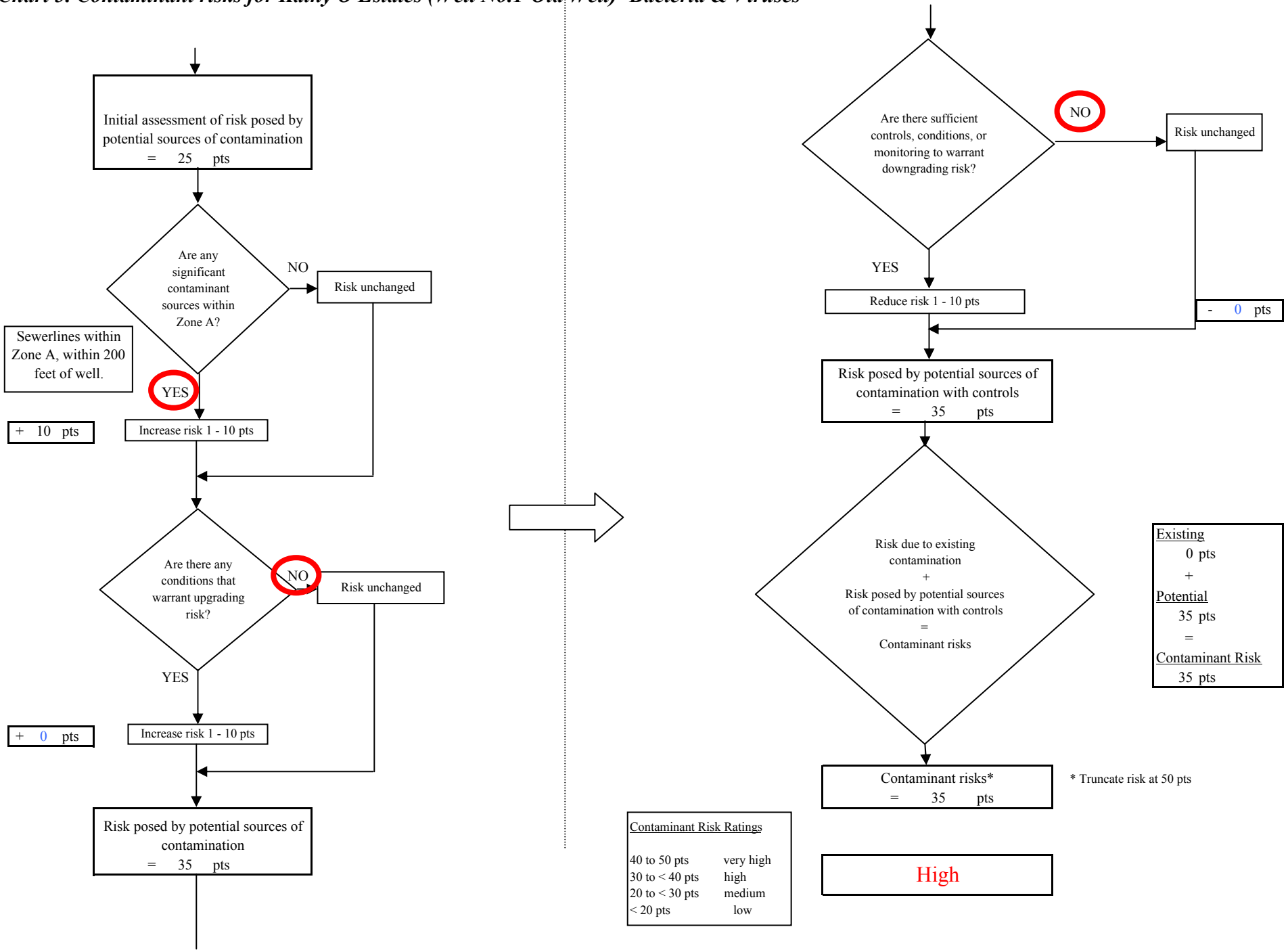


Chart 4. Vulnerability analysis for Kathy O Estates (Well No.1-Old Well)- Bacteria & Viruses

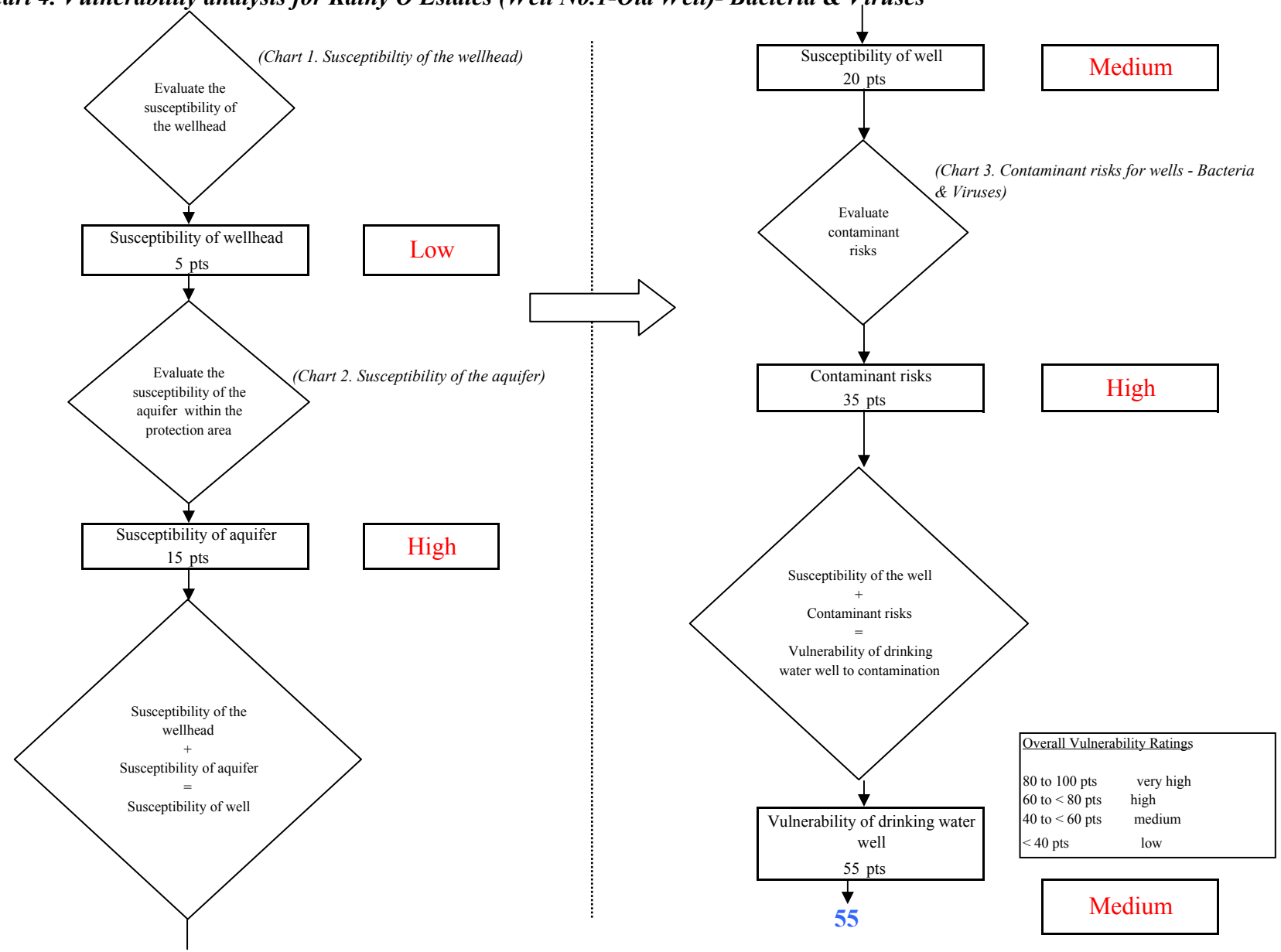


Chart 5. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Nitrates and Nitrites

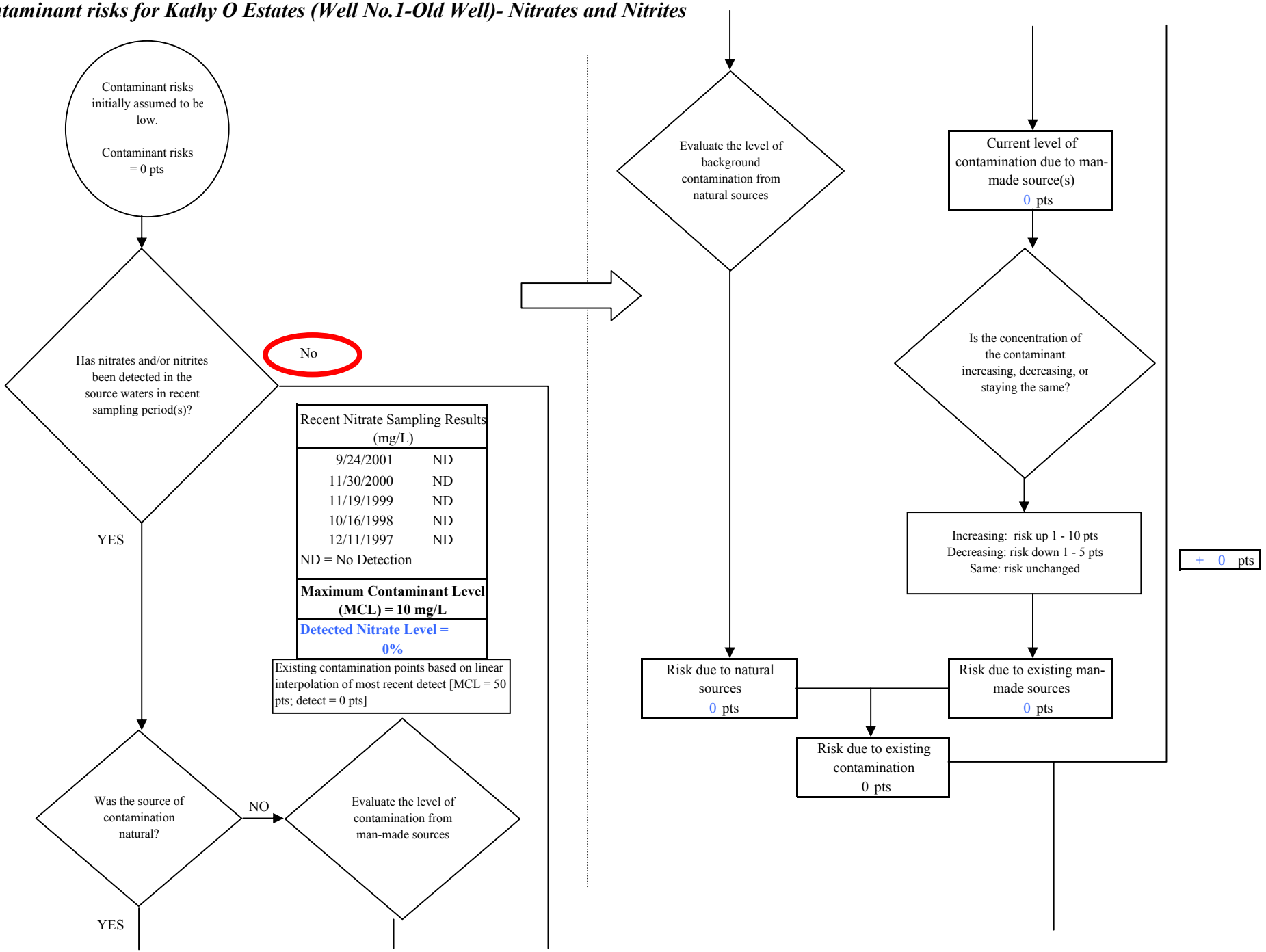


Chart 5. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Nitrates and Nitrites

+ 30 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)	0	1	1
Medium(s)	3	1	4
Low(s)	8	10	18

	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 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.

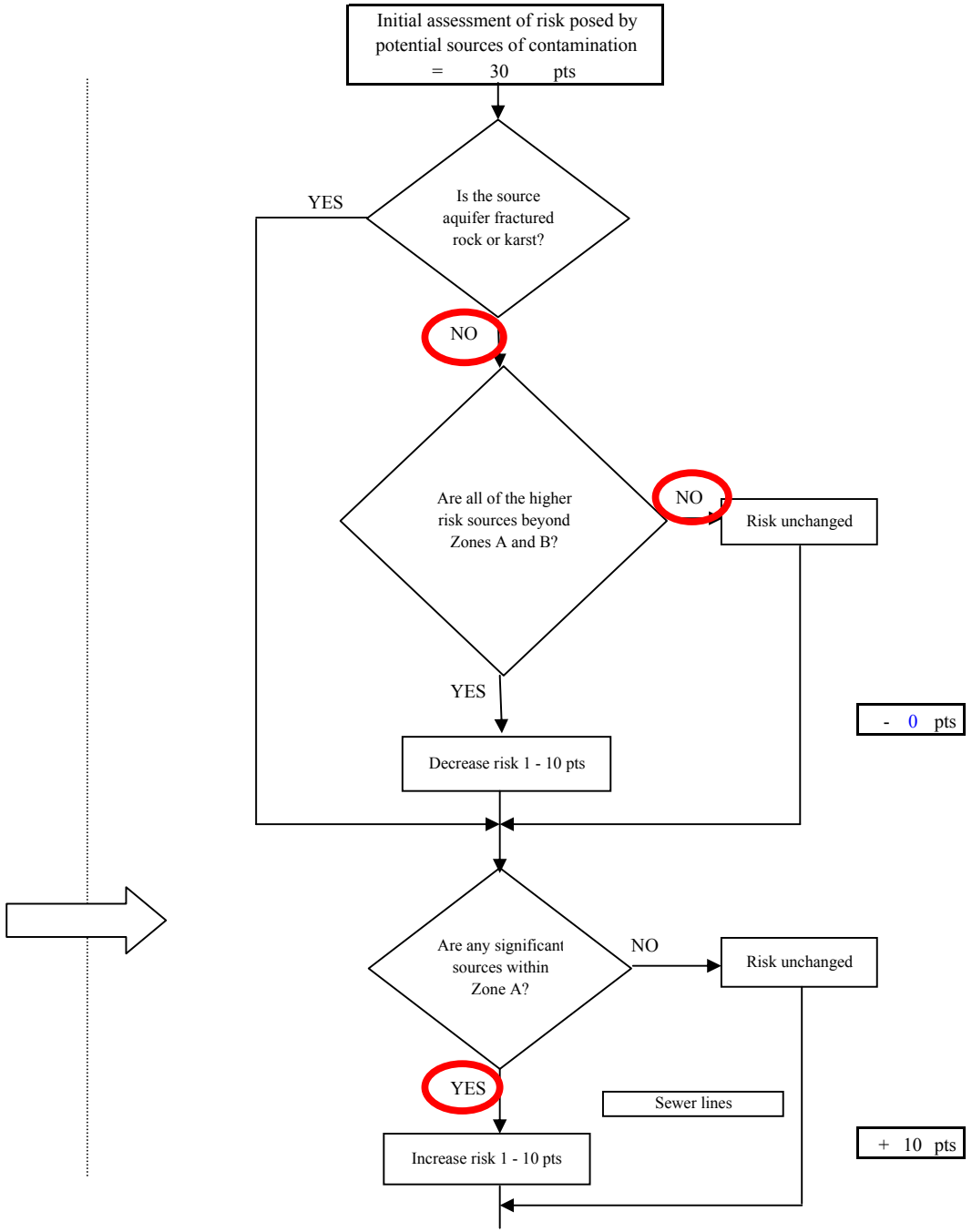


Chart 5. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Nitrates and Nitrites

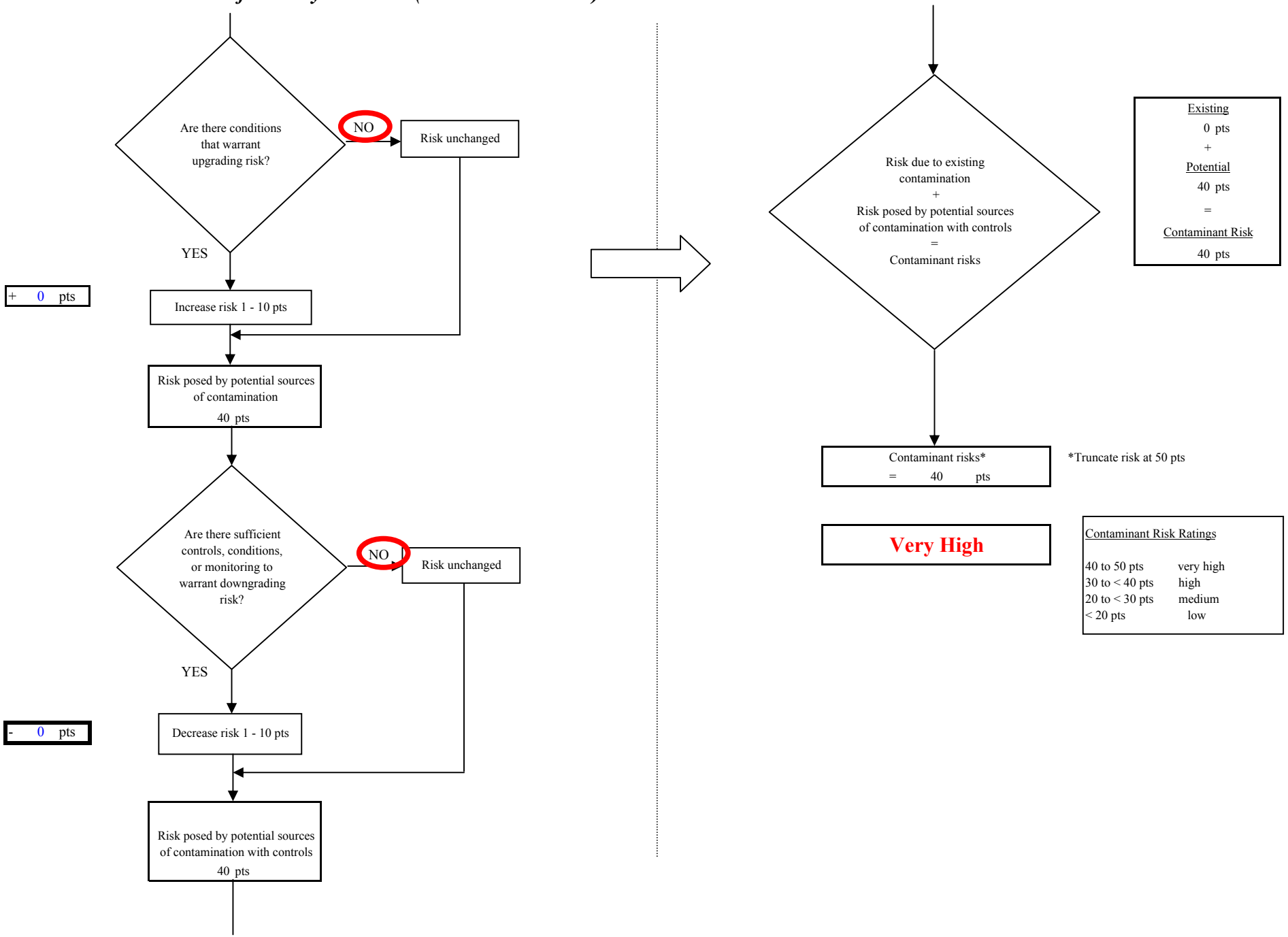


Chart 6. Vulnerability analysis for Kathy O Estates (Well No.1-Old Well)- Nitrates and Nitrites

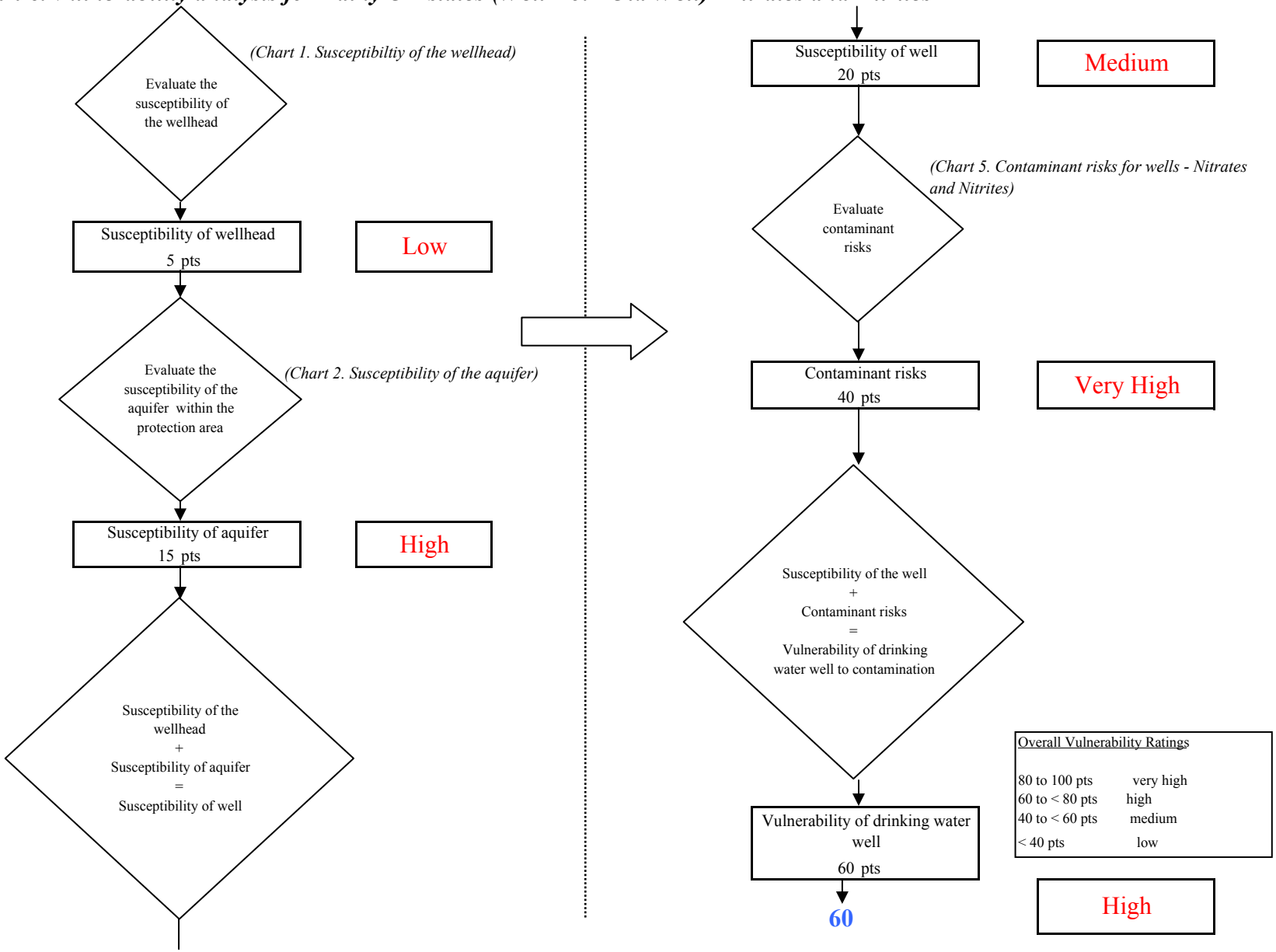


Chart 7. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Volatile Organic Chemicals

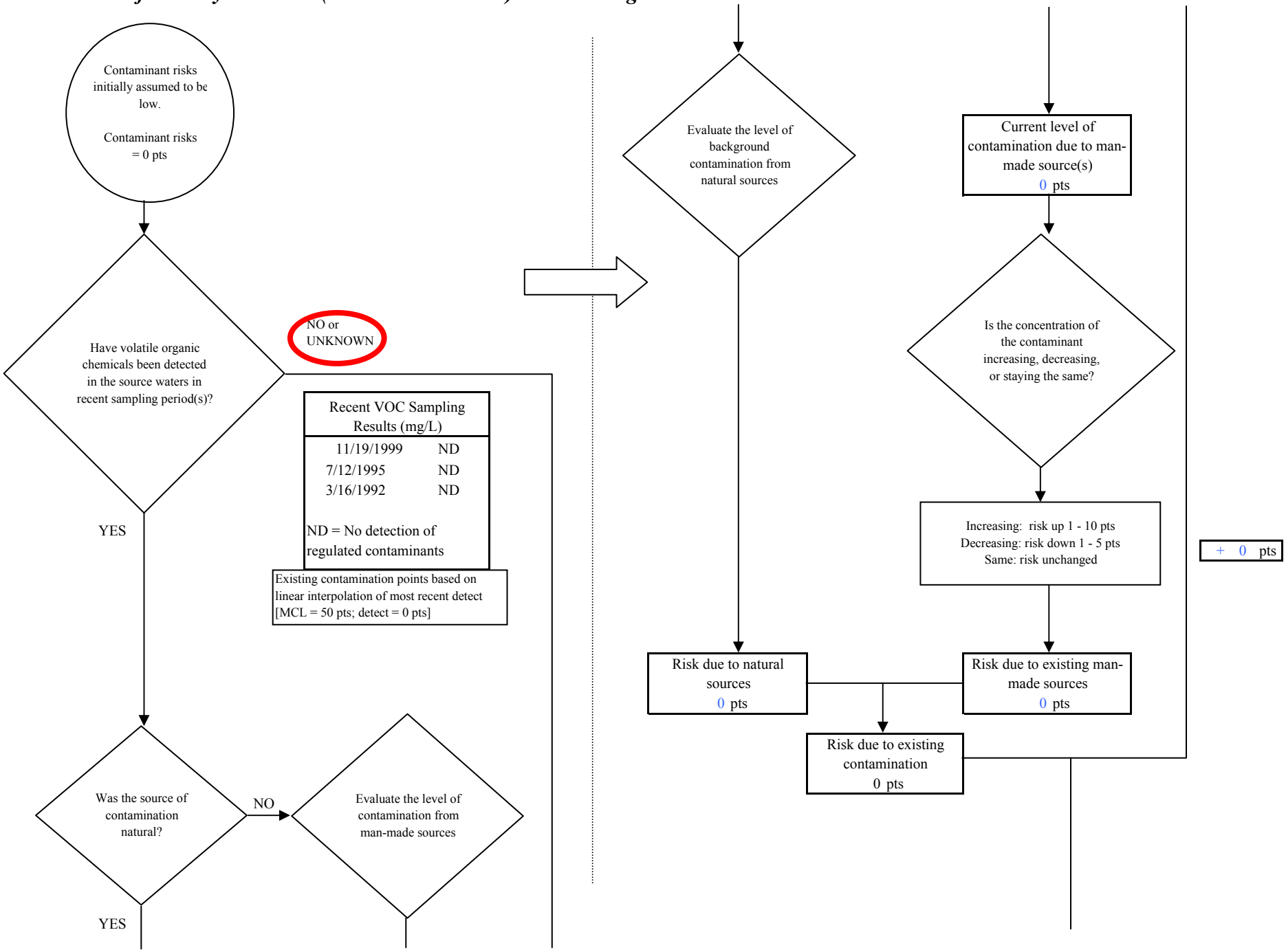


Chart 7. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Volatile Organic Chemicals

+ 50 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	3	3
High(s)	5	8	13
Medium(s)	15	10	25
Low(s)	16	23	39

	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 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 = 50 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

Underground fuel tanks, contaminated site and sign manufacturing.

YES

Increase risk 1 - 10 pts

+ 10 pts

Chart 7. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Volatile Organic Chemicals

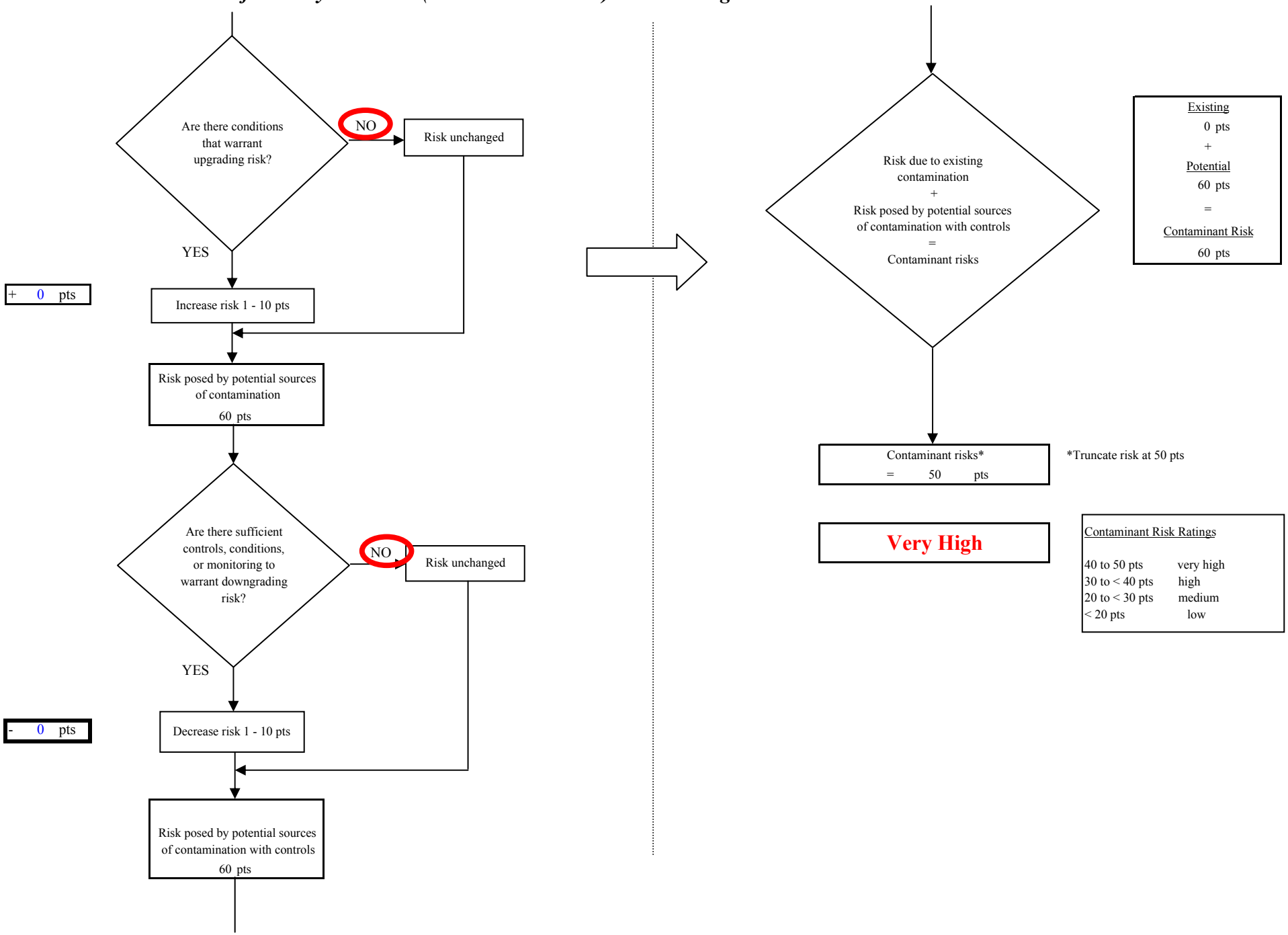


Chart 8. Vulnerability analysis for Kathy O Estates (Well No.1-Old Well)- Volatile Organic Chemicals

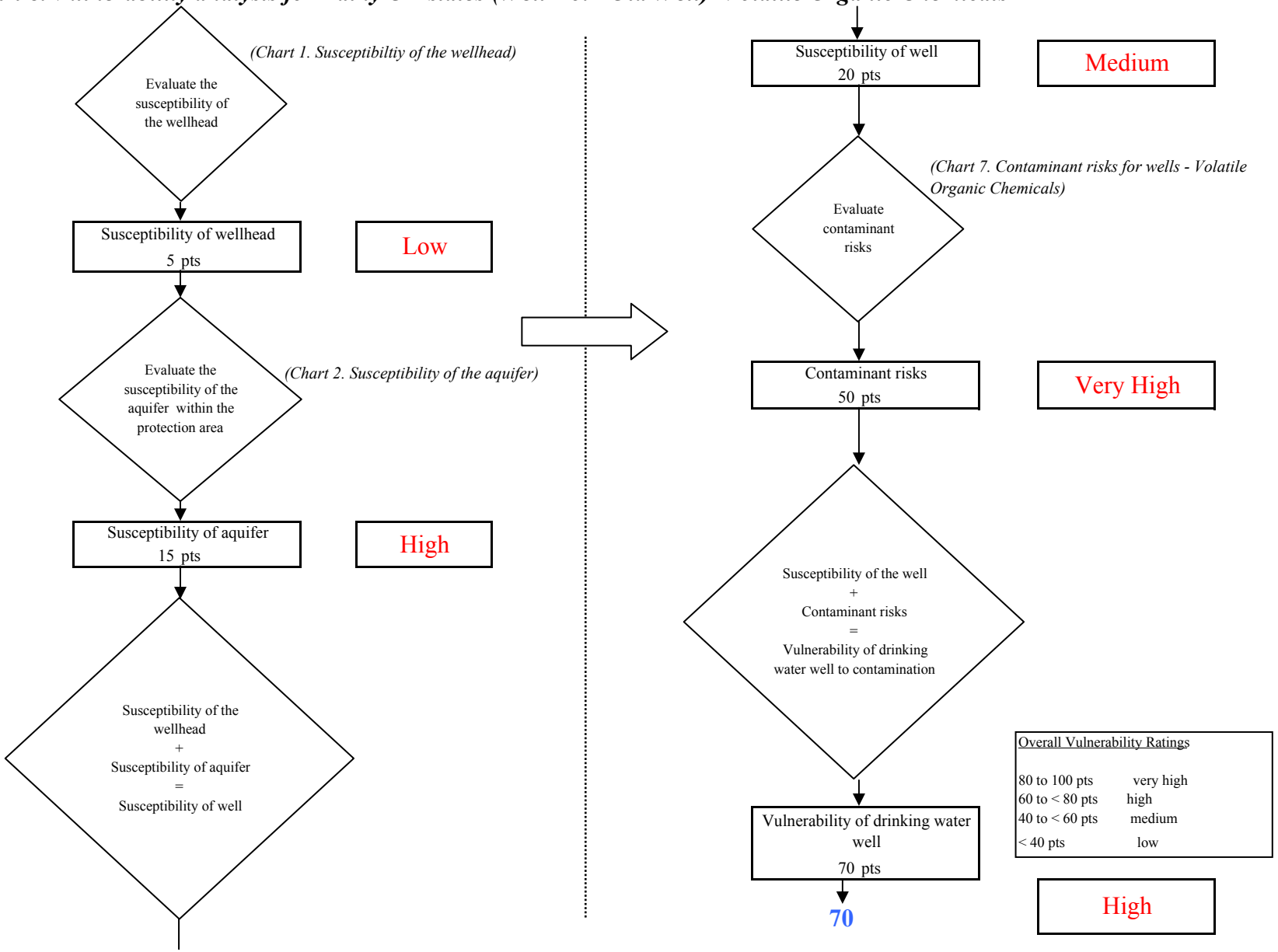


Chart 9. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Heavy Metals, Cyanide and Other Inorganic Chemicals

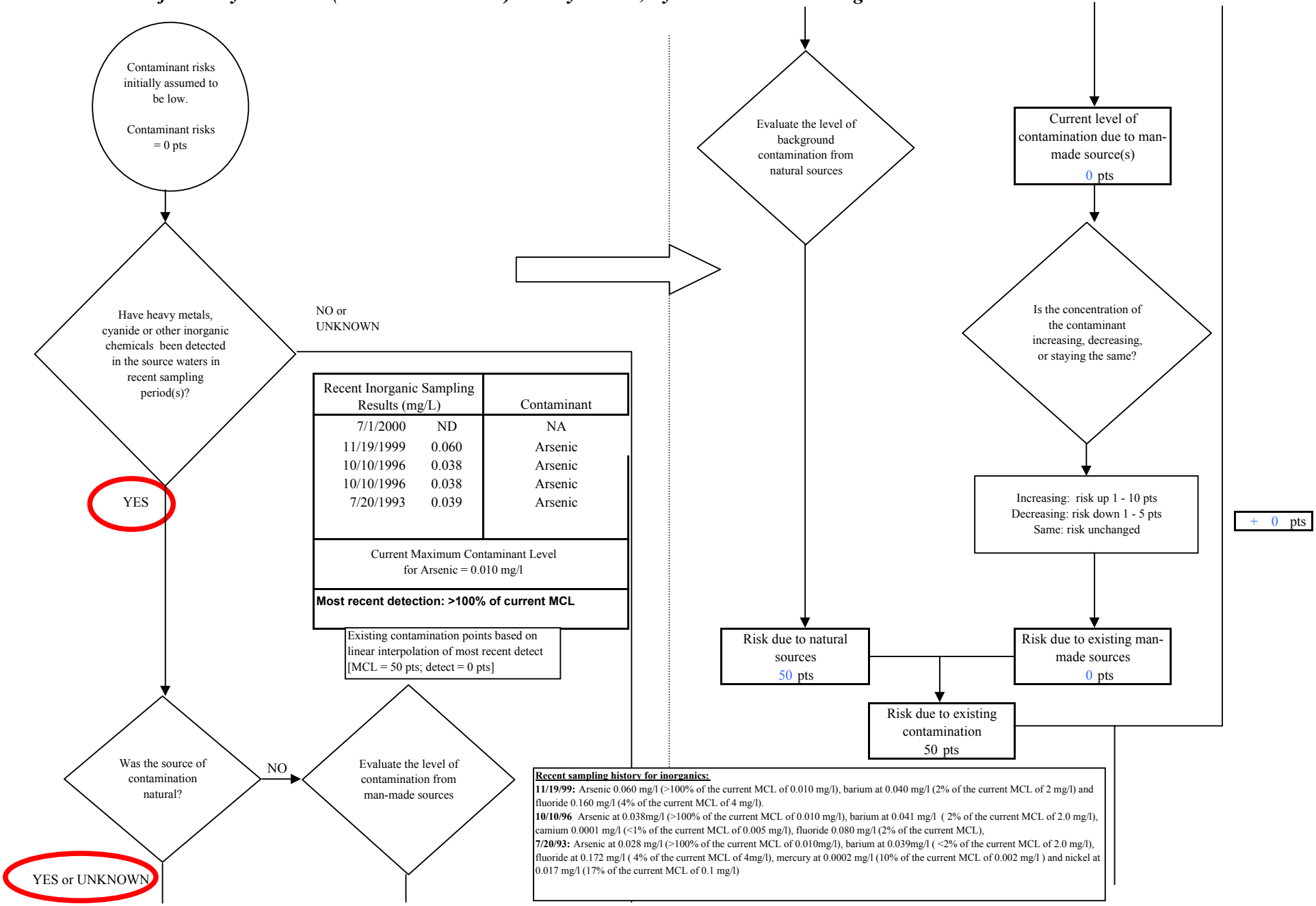


Chart 9. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Heavy Metals, Cyanide and Other Inorganic Chemicals

+ 40 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)	0	3	3
Medium(s)	9	8	17
Low(s)	18	26	44

	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.

Initial assessment of risk posed by potential sources of contamination = 40 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

Underground fuel tanks

YES

Increase risk 1 - 10 pts

+ 10 pts

Chart 9. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Heavy Metals, Cyanide and Other Inorganic Chemicals

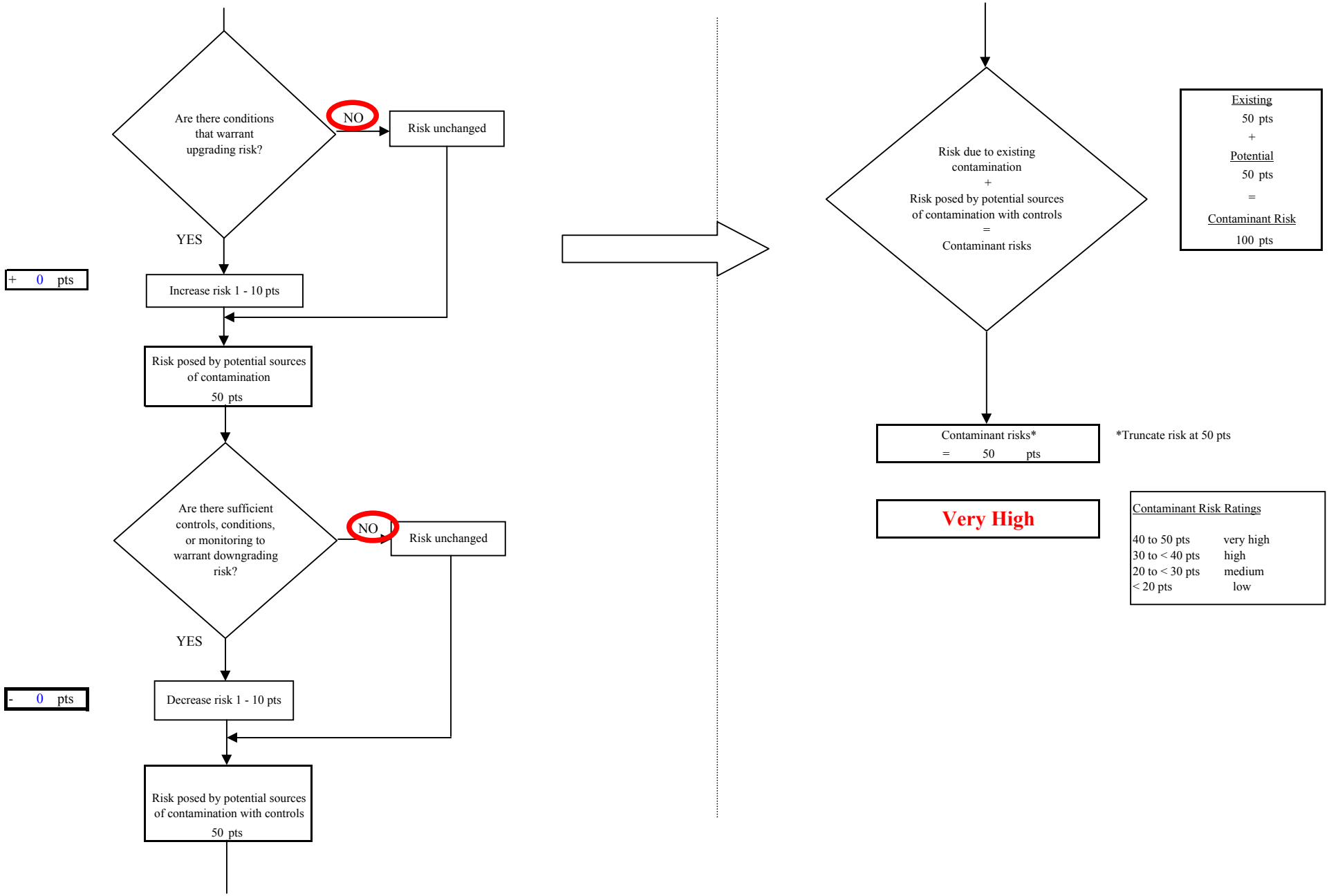


Chart 10. Vulnerability analysis for Kathy O Estates (Well No.1-Old Well)- Heavy Metals, Cyanide and Other Inorganic Chemicals

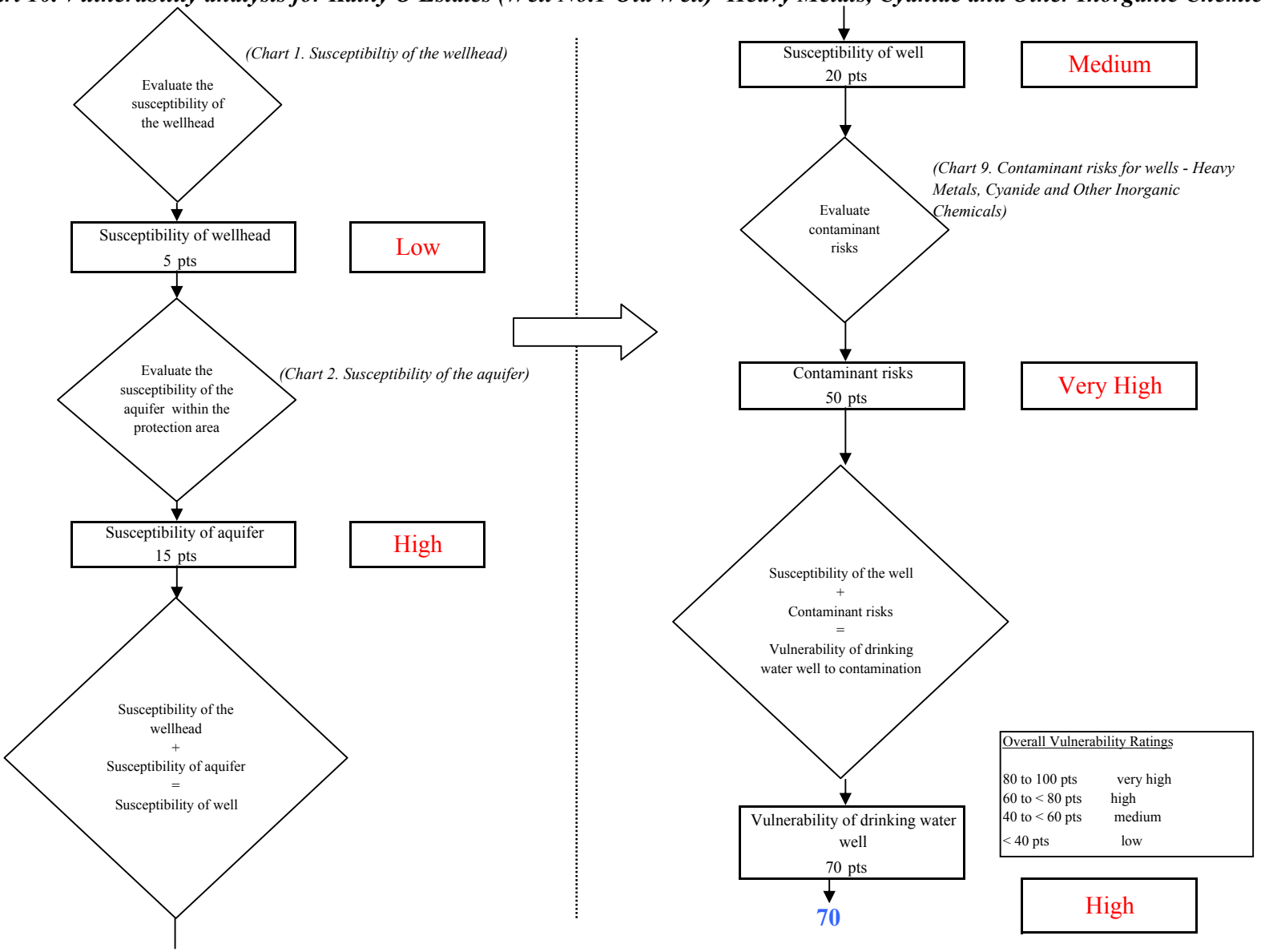


Chart 11. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Synthetic Organic Chemicals

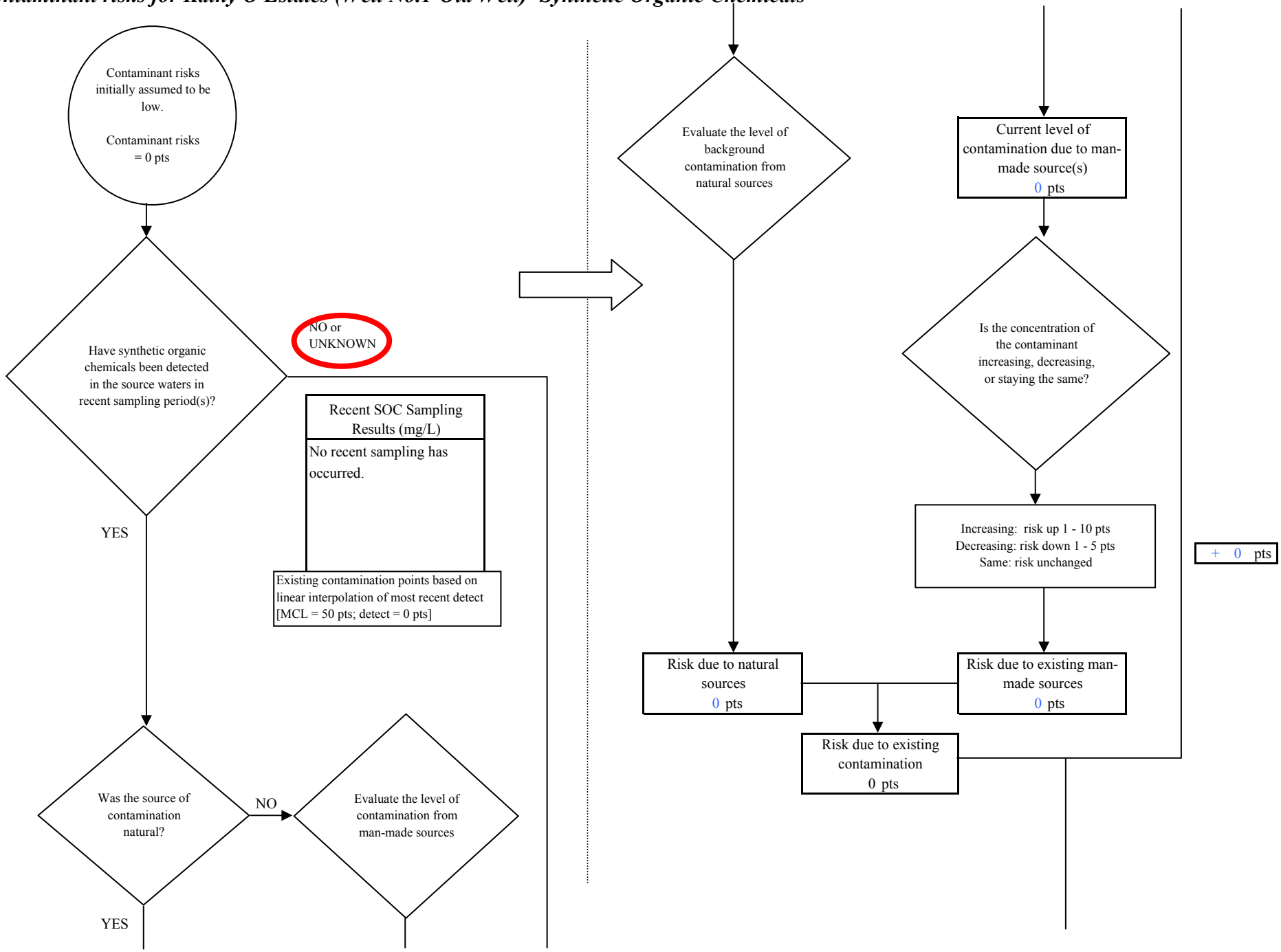
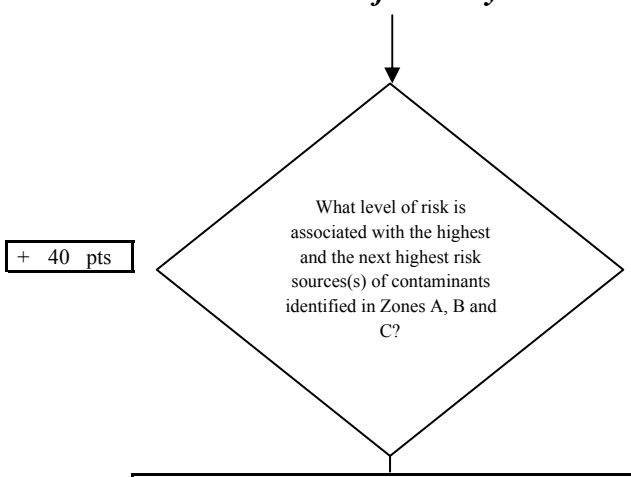


Chart 11. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Synthetic Organic Chemicals



+ 40 pts

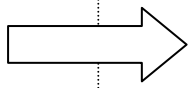
Risk Levels for Contaminant Sources identified in Zones A, B and C

	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	2	2
Medium(s)	0	3	3
Low(s)	8	16	24

	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.



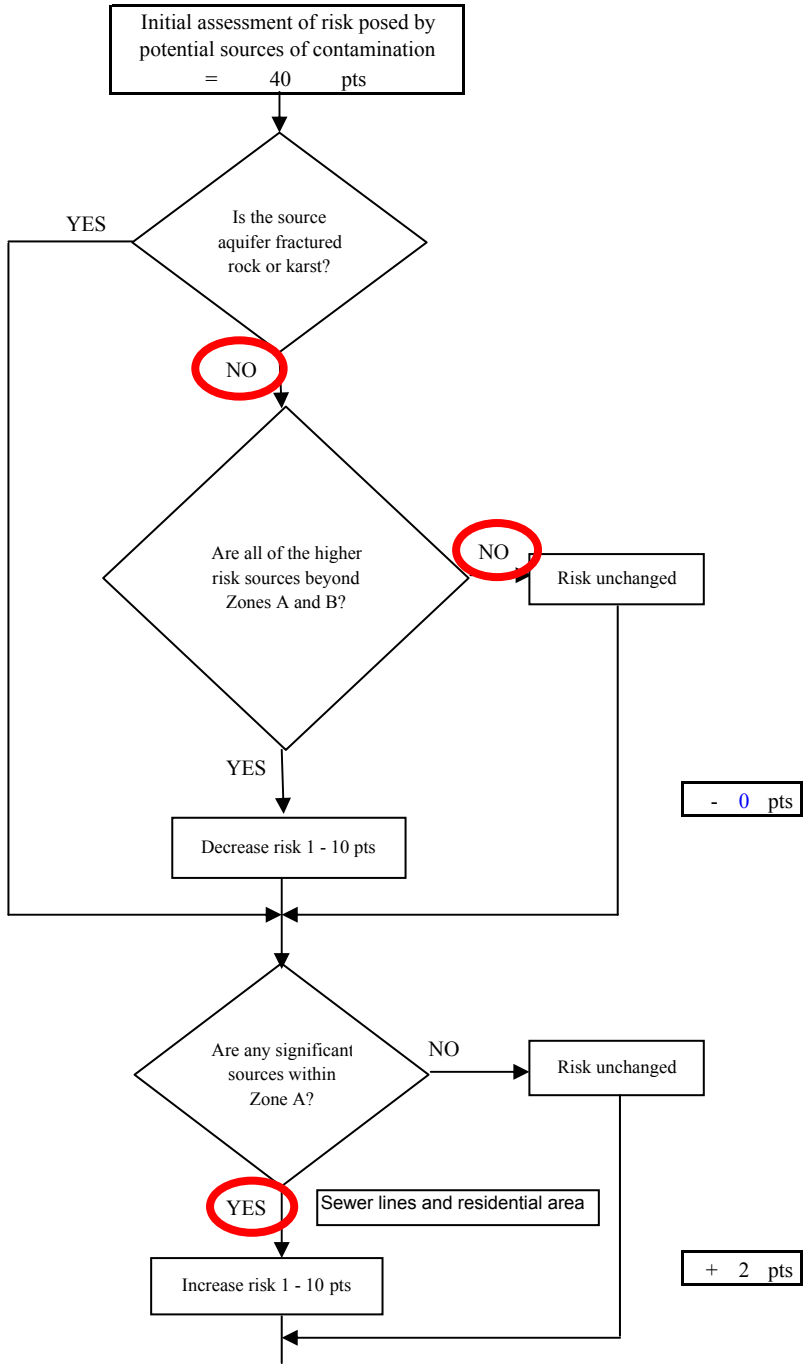


Chart 11. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Synthetic Organic Chemicals

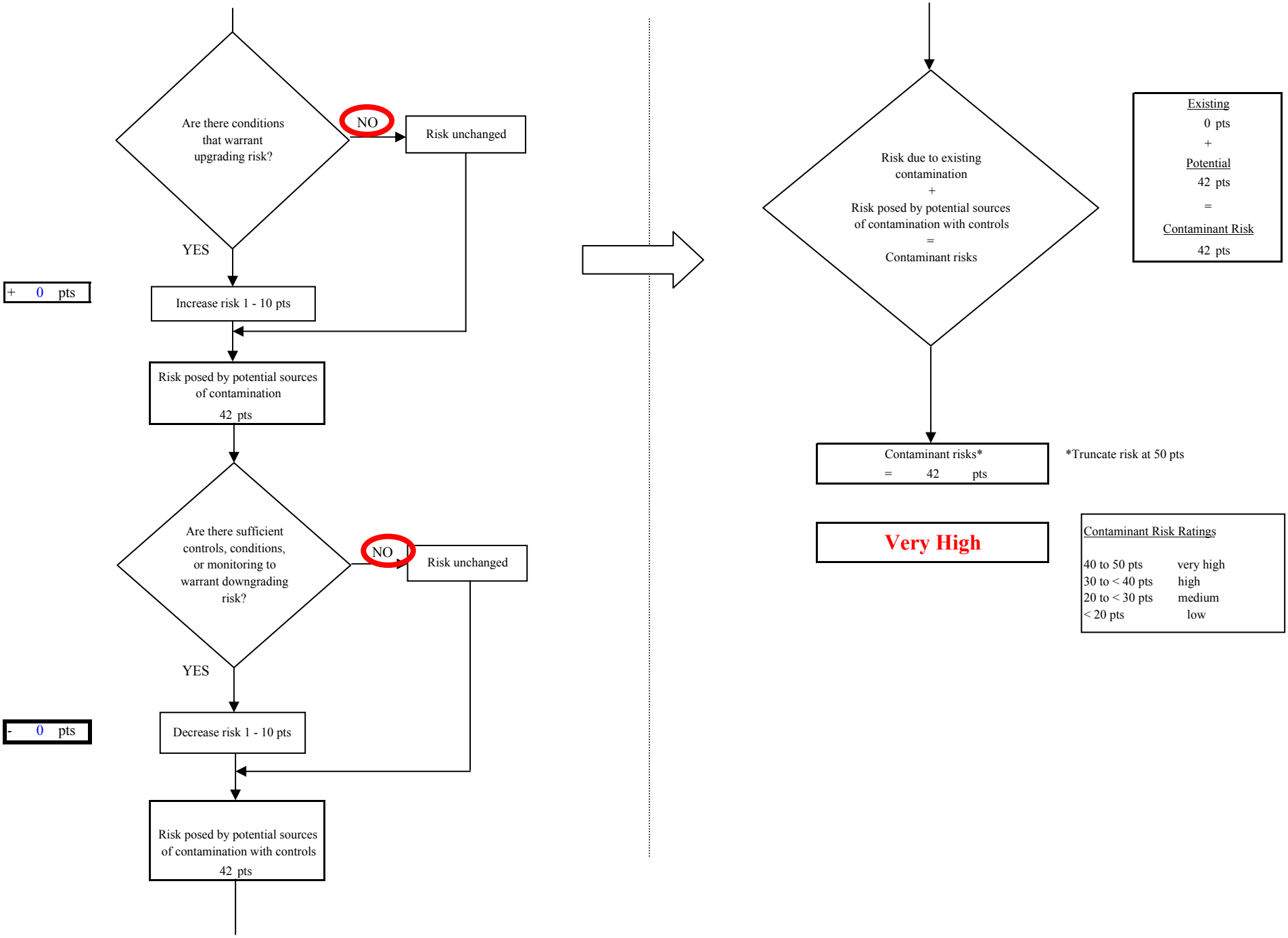


Chart 12. Vulnerability analysis for Kathy O Estates (Well No.1-Old Well)- Synthetic Organic Chemicals

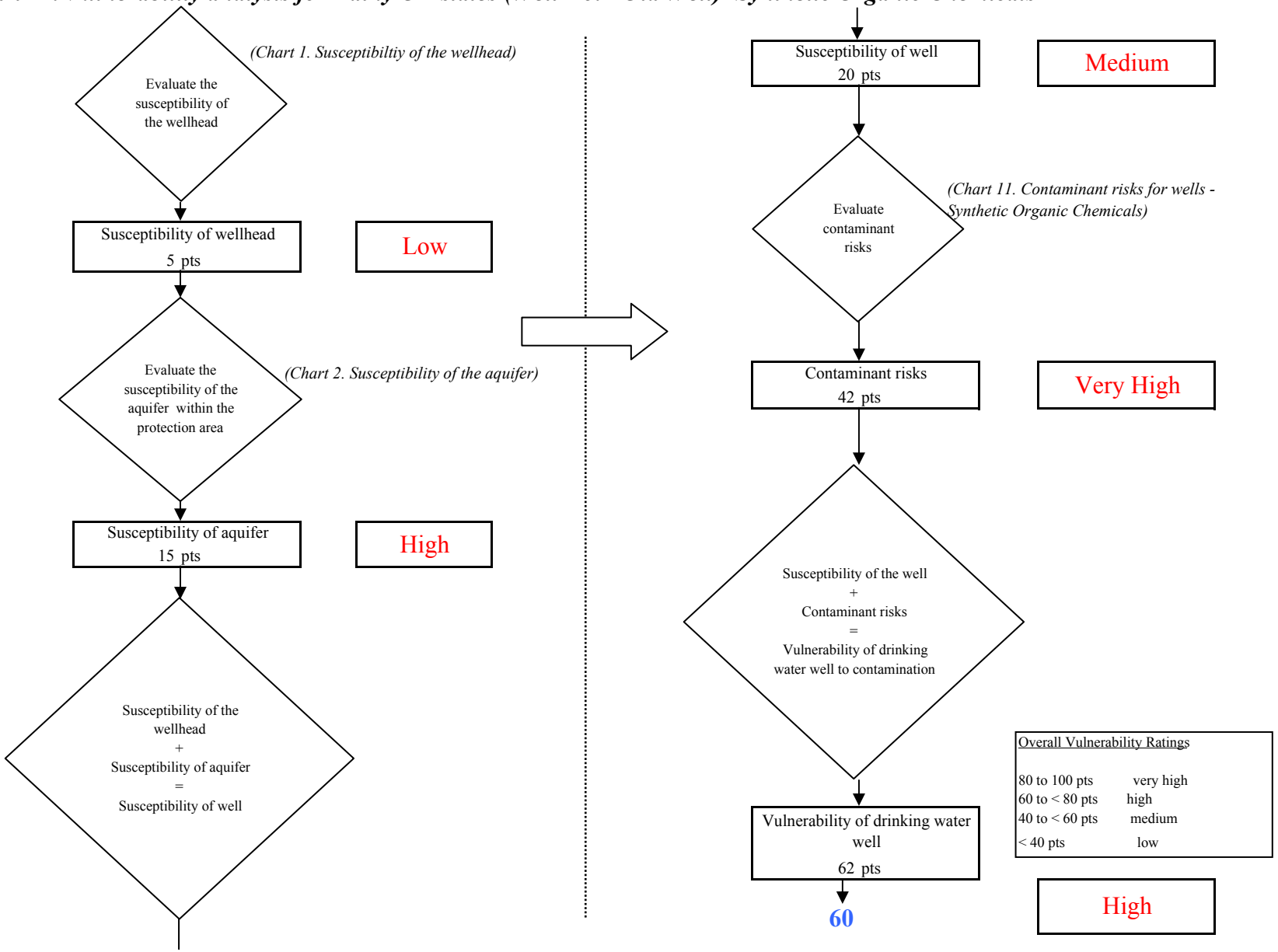


Chart 13. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Other Organic Chemicals

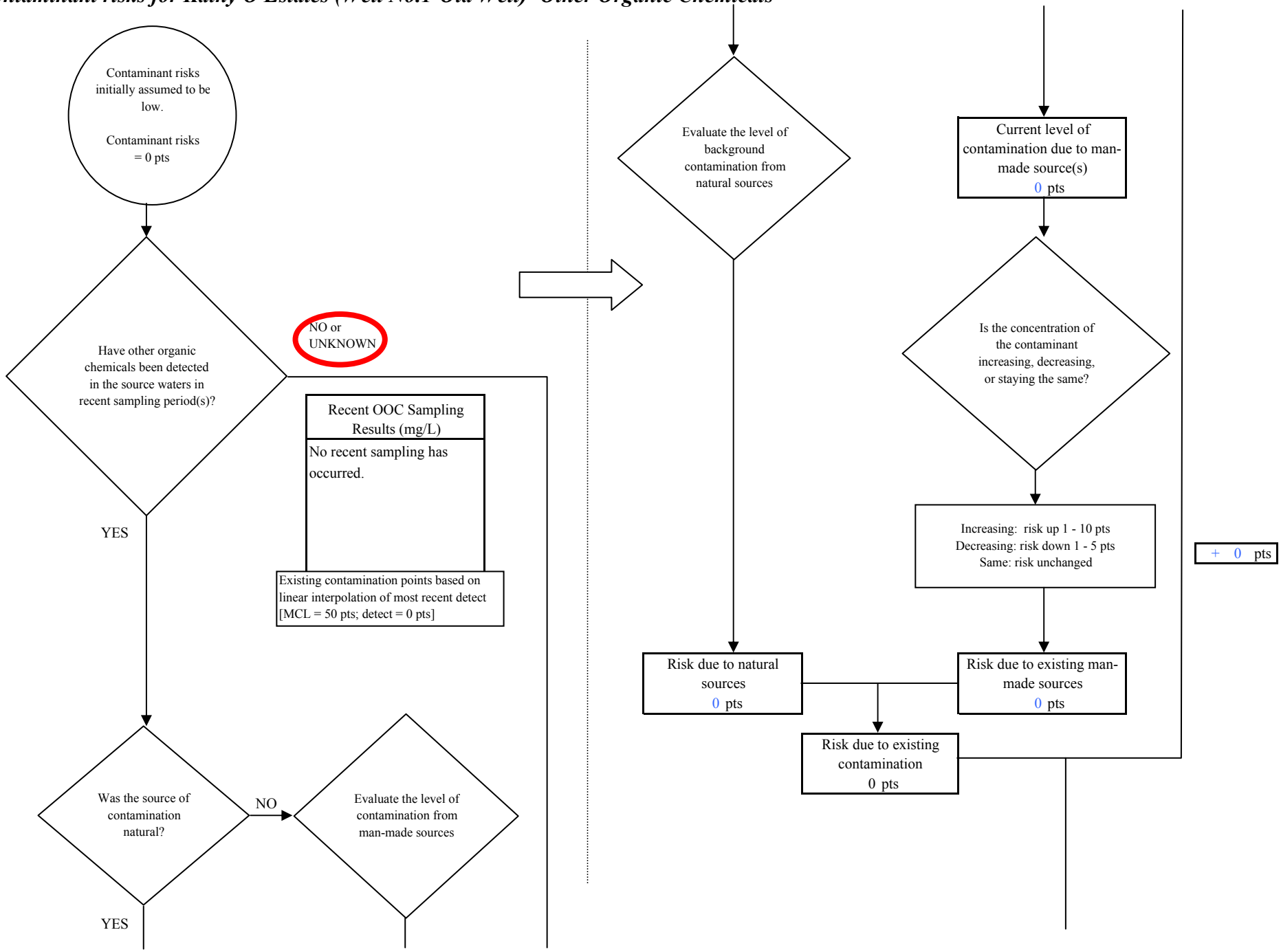


Chart 13. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Other Organic Chemicals

+ 50 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	2	2
High(s)	0	2	2
Medium(s)	7	7	14
Low(s)	16	12	28

	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 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 = 50 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

Sewer lines

YES → Increase risk 1 - 10 pts

+ 10 pts

Chart 13. Contaminant risks for Kathy O Estates (Well No.1-Old Well)- Other Organic Chemicals

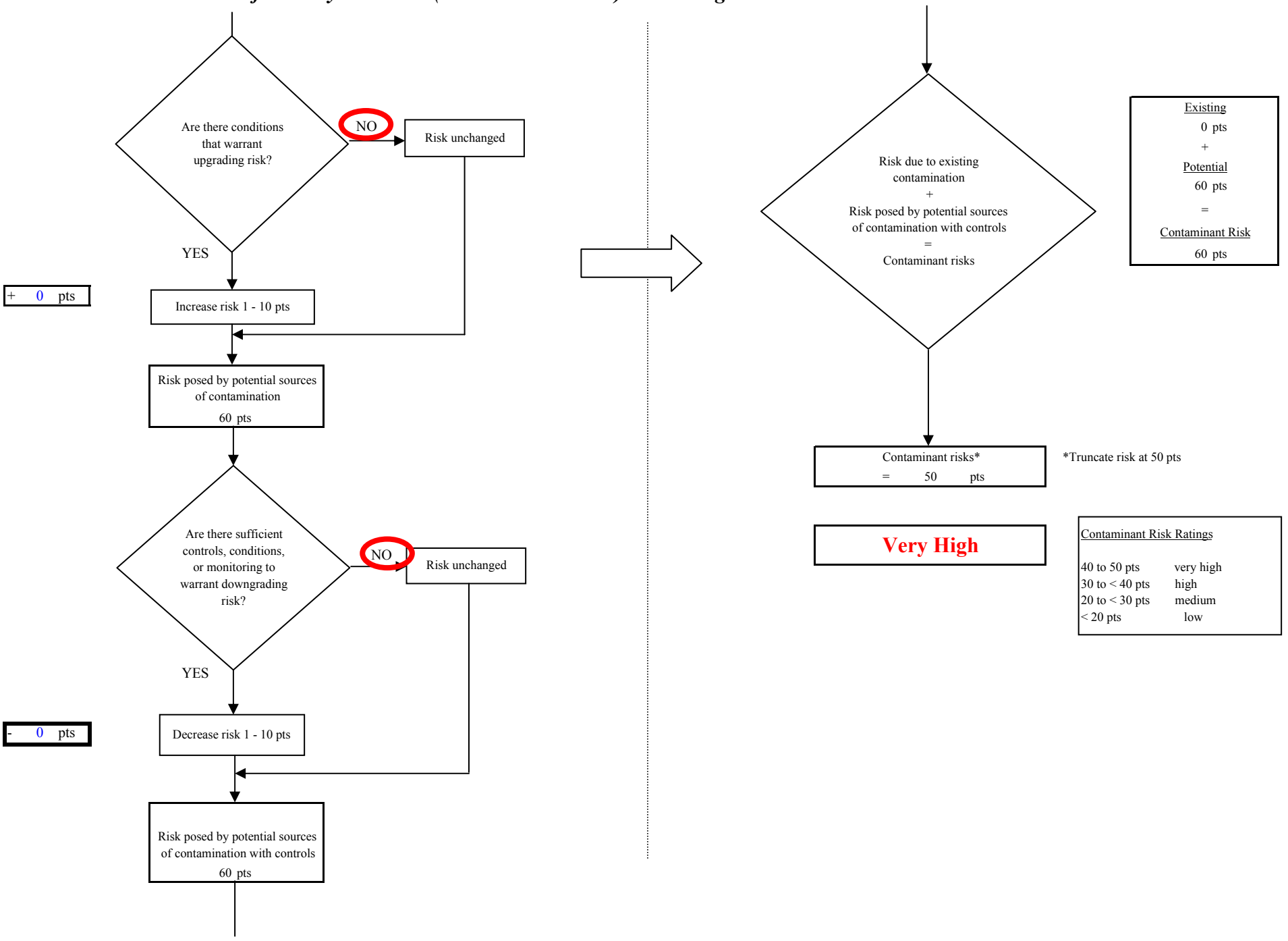


Chart 14. Vulnerability analysis for Kathy O Estates (Well No.1-Old Well)- Other Organic Chemicals

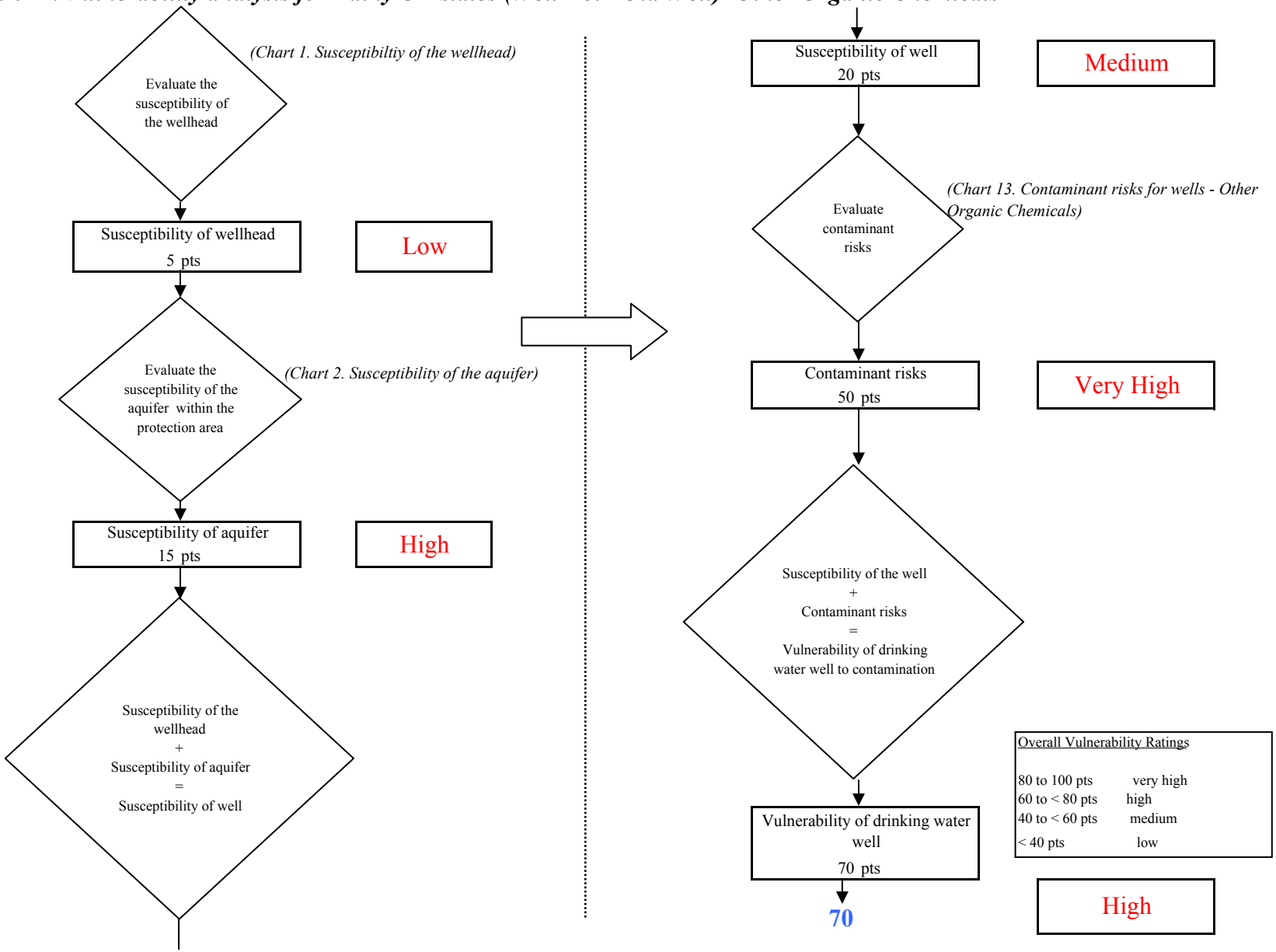


Chart 1. Susceptibility of the wellhead - Kathy O Estates (Well No.2-New Well)

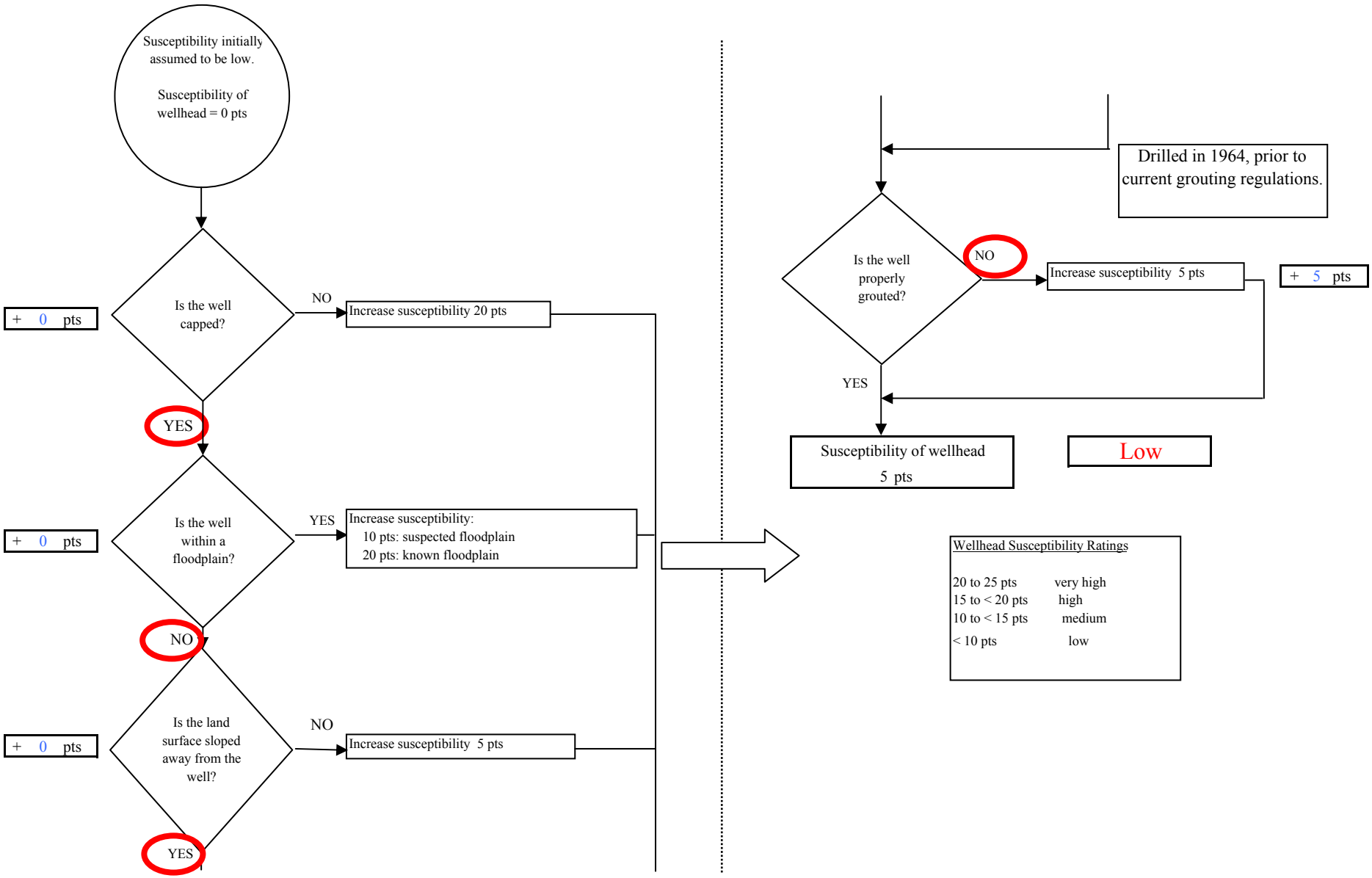


Chart 2. Susceptibility of the aquifer - Kathy O Estates (Well No.2-New Well)

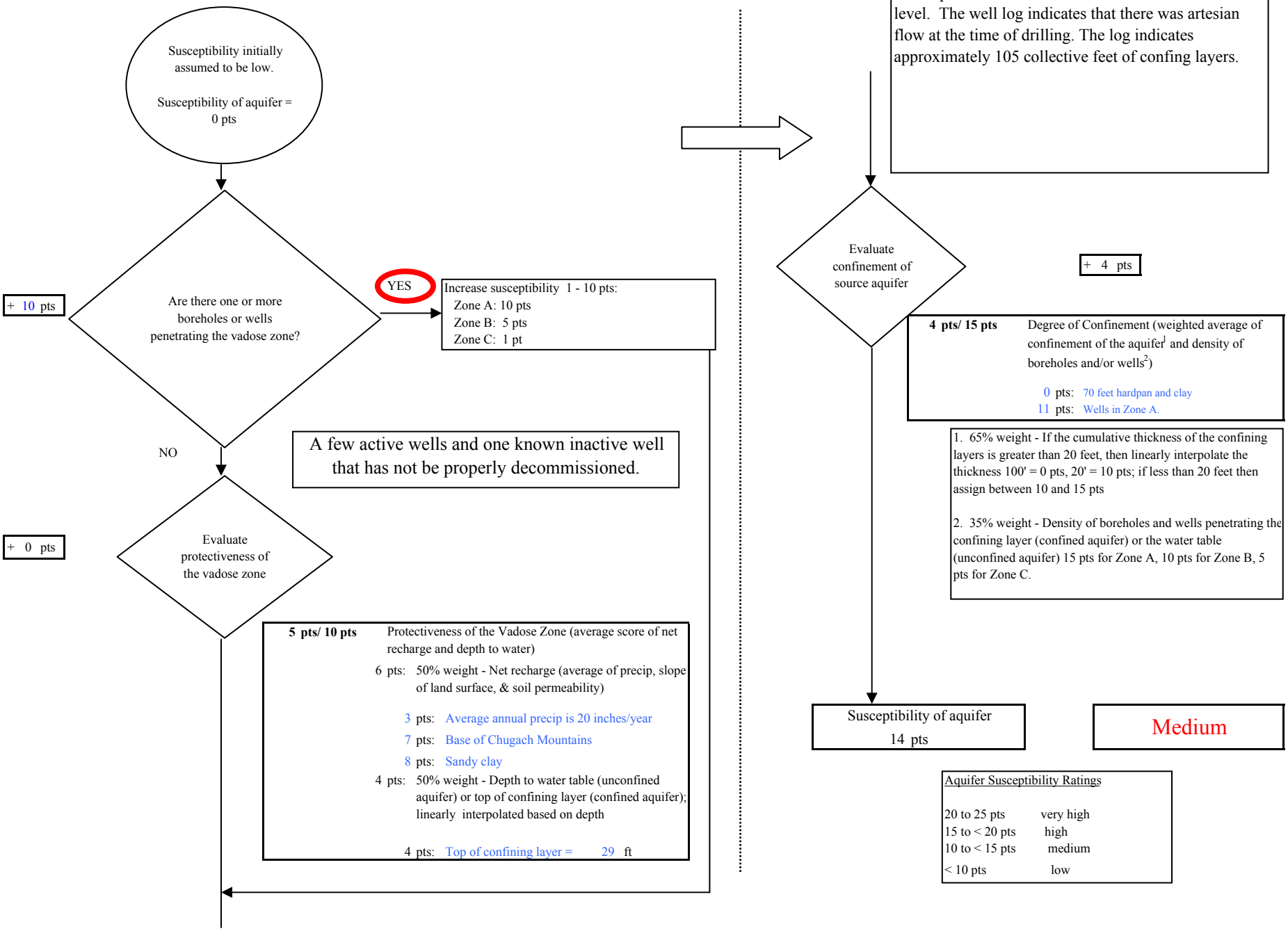
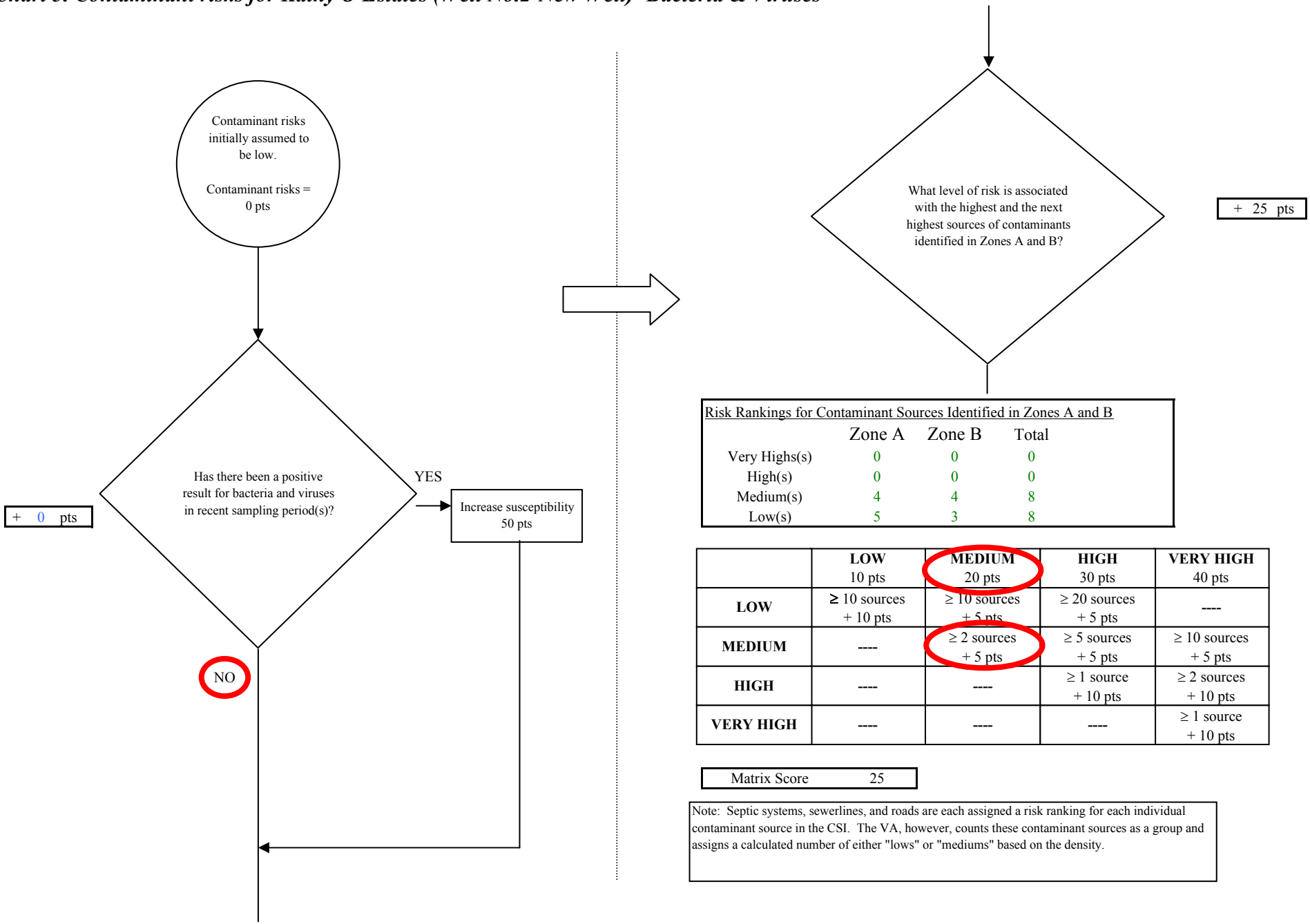


Chart 3. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Bacteria & Viruses



Risk Rankings for Contaminant Sources Identified in Zones A and B

	Zone A	Zone B	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	4	4	8
Low(s)	5	3	8

	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 3. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Bacteria & Viruses

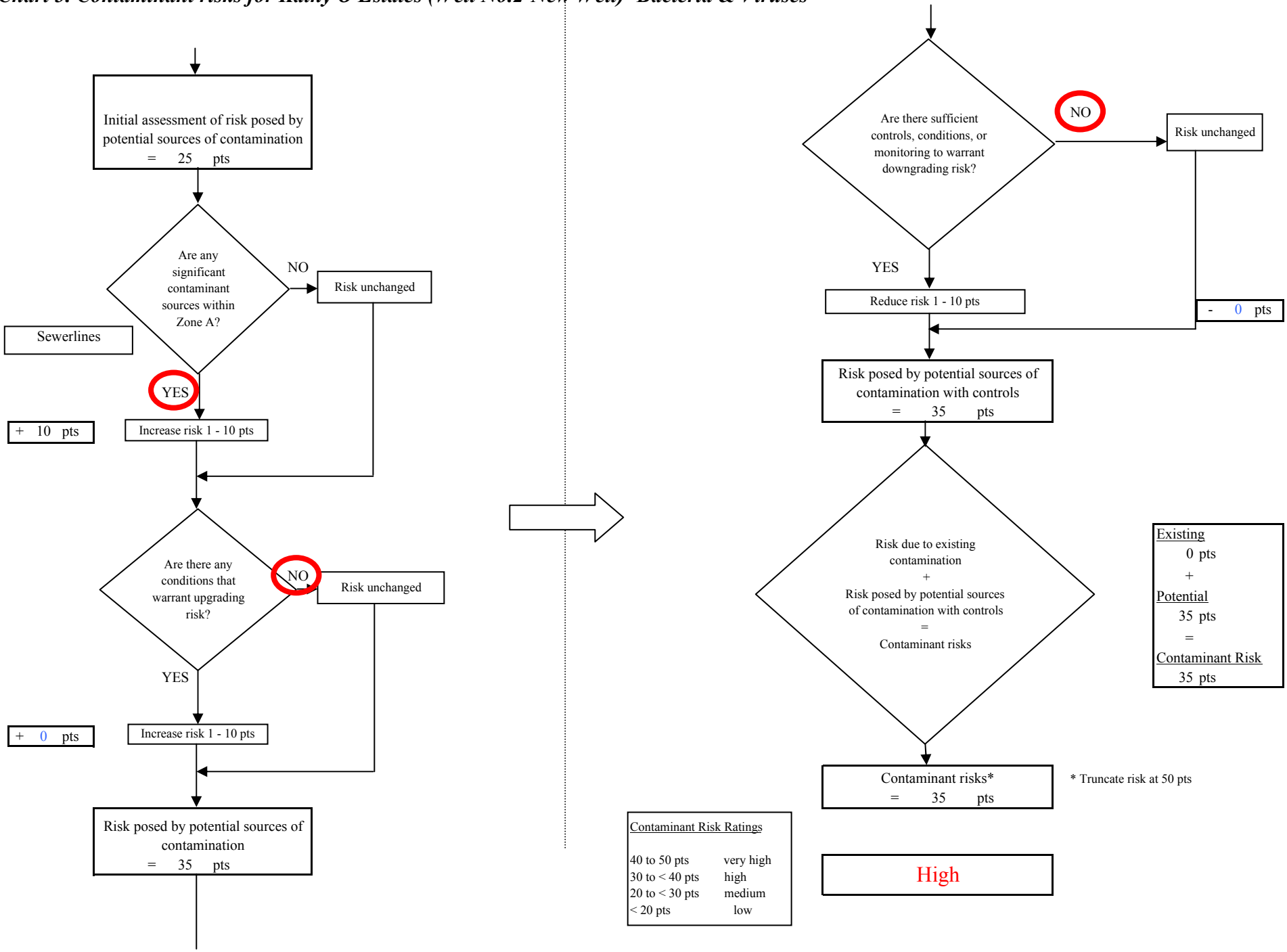


Chart 4. Vulnerability analysis for Kathy O Estates (Well No.2-New Well)- Bacteria & Viruses

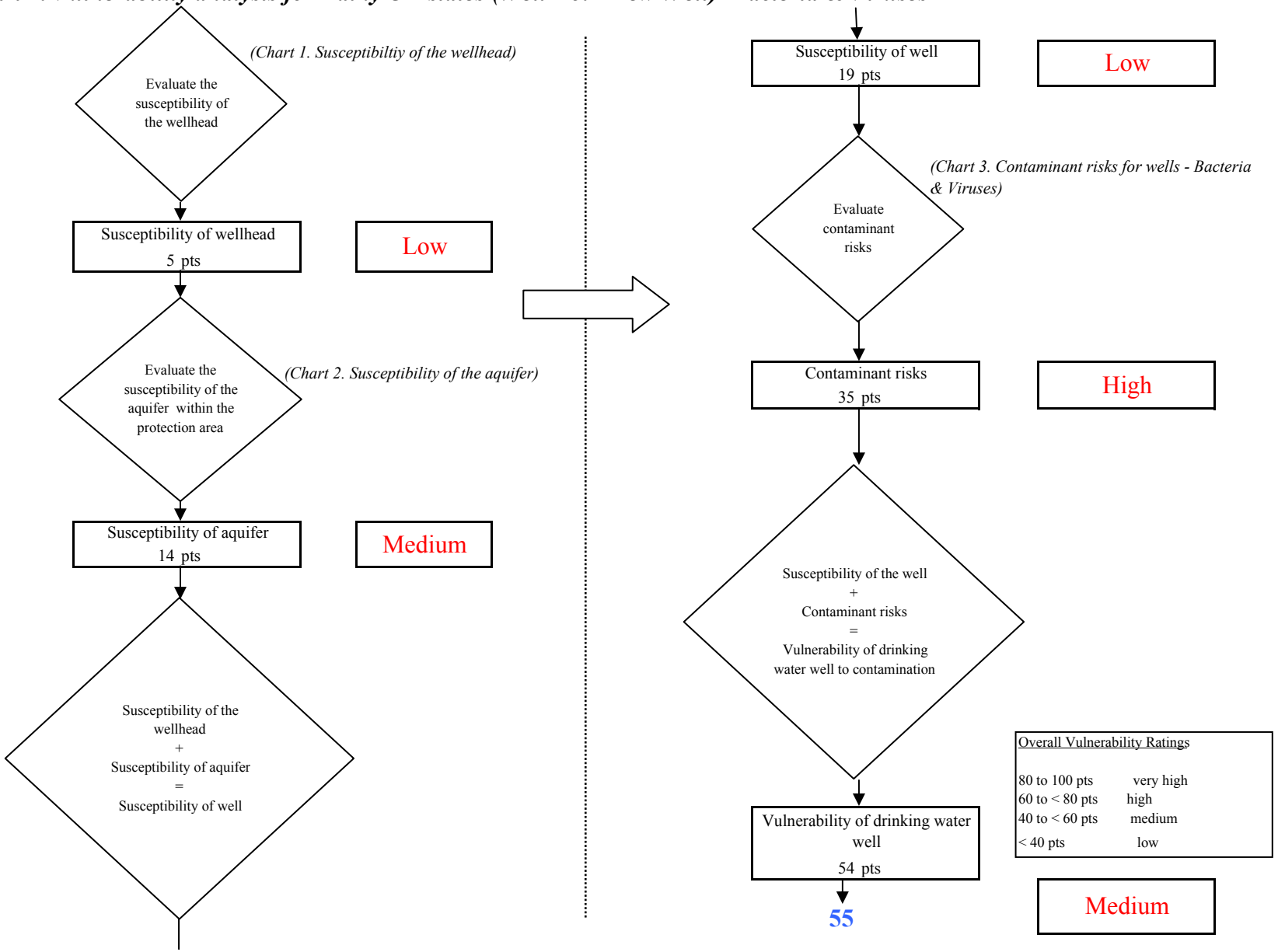


Chart 5. Contaminant risks for Kathy O Estates (Well No.2-New Well)-Nitrates and Nitrites

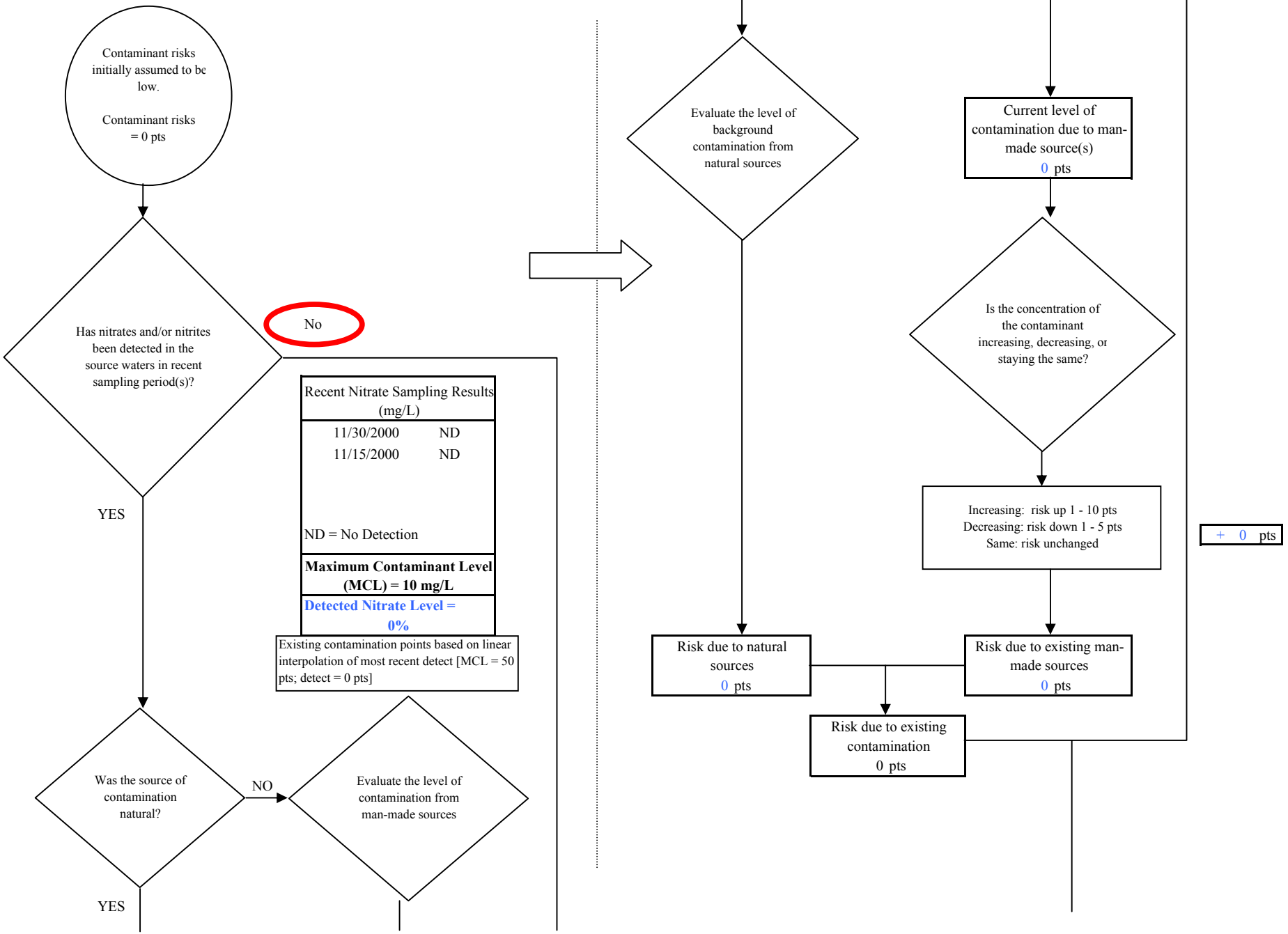


Chart 5. Contaminant risks for Kathy O Estates (Well No.2-New Well)-Nitrates and Nitrites

+ 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)	0	1	1
Medium(s)	5	1	6
Low(s)	7	17	24

	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.

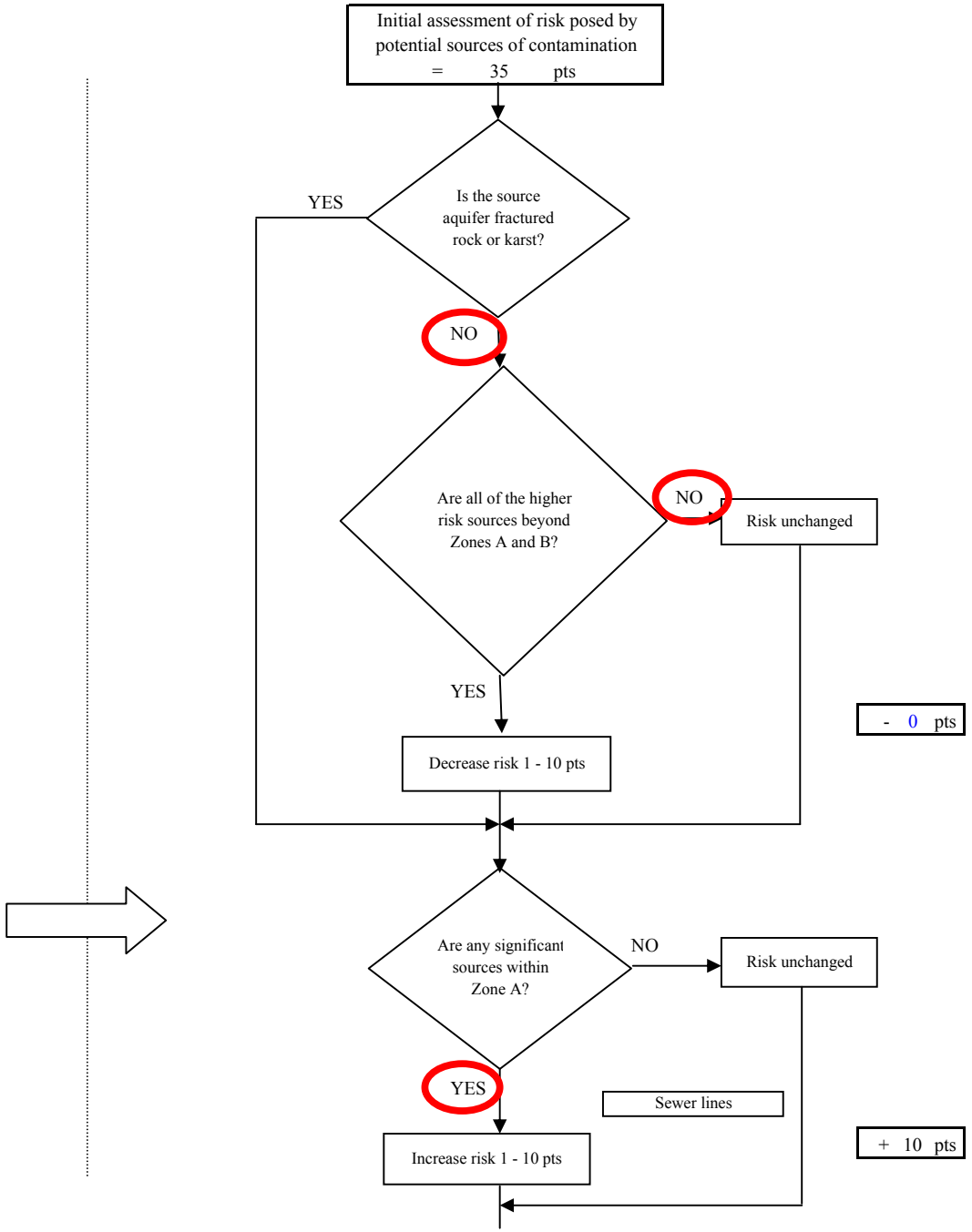


Chart 5. Contaminant risks for Kathy O Estates (Well No.2-New Well)-Nitrates and Nitrites

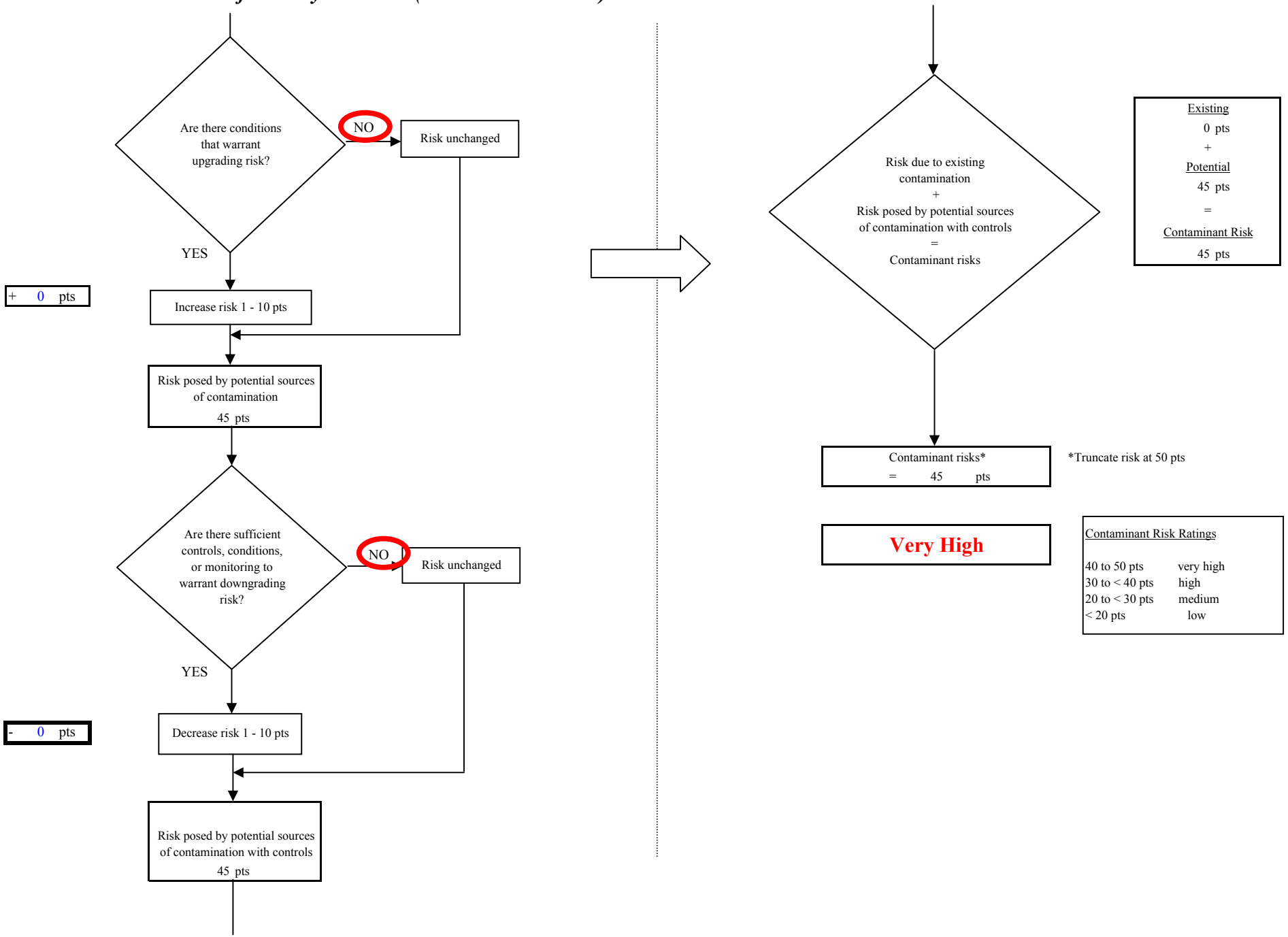


Chart 6. Vulnerability analysis for Kathy O Estates (Well No.2-New Well)- Nitrates and Nitrites

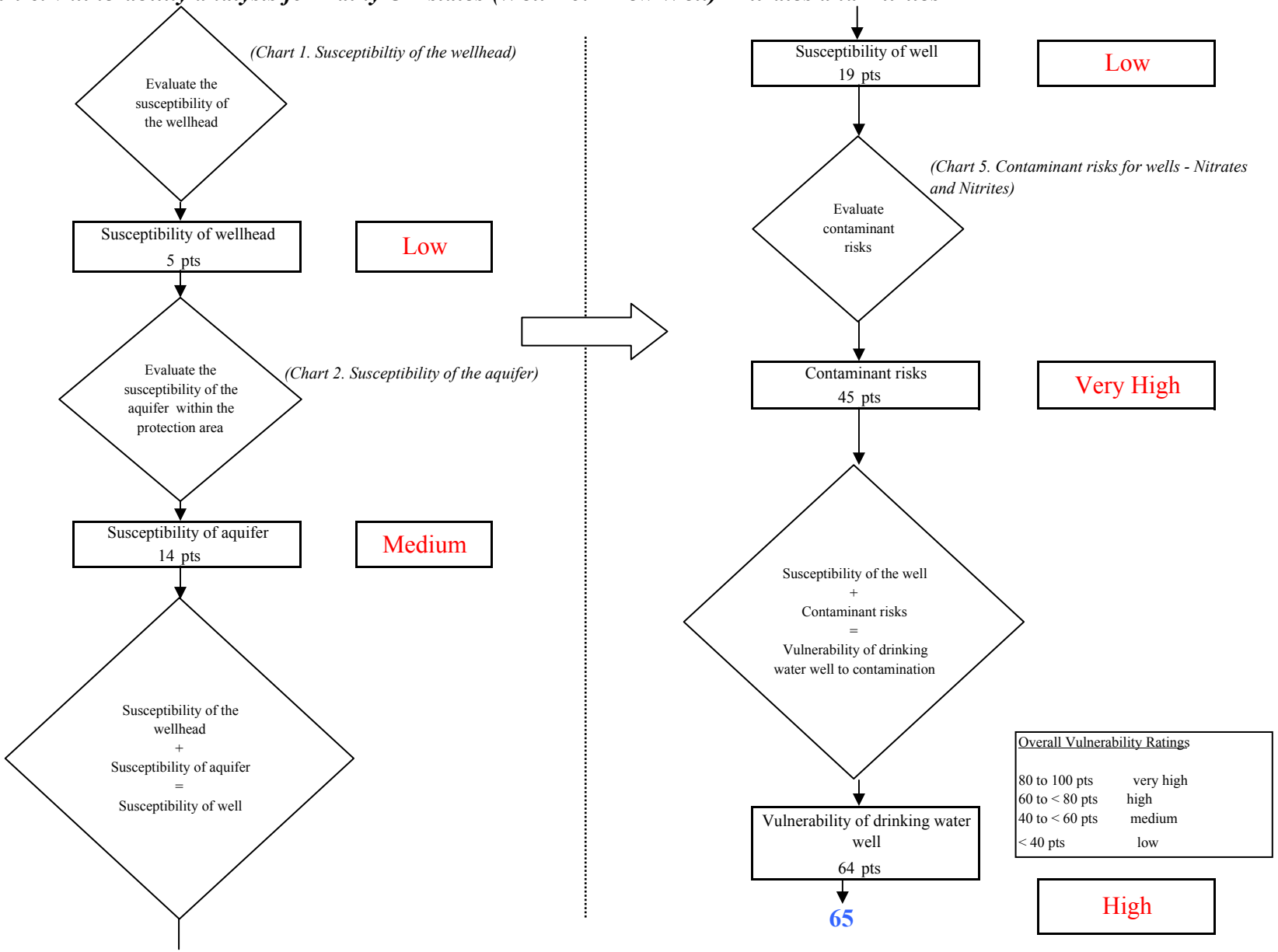


Chart 7. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Volatile Organic Chemicals

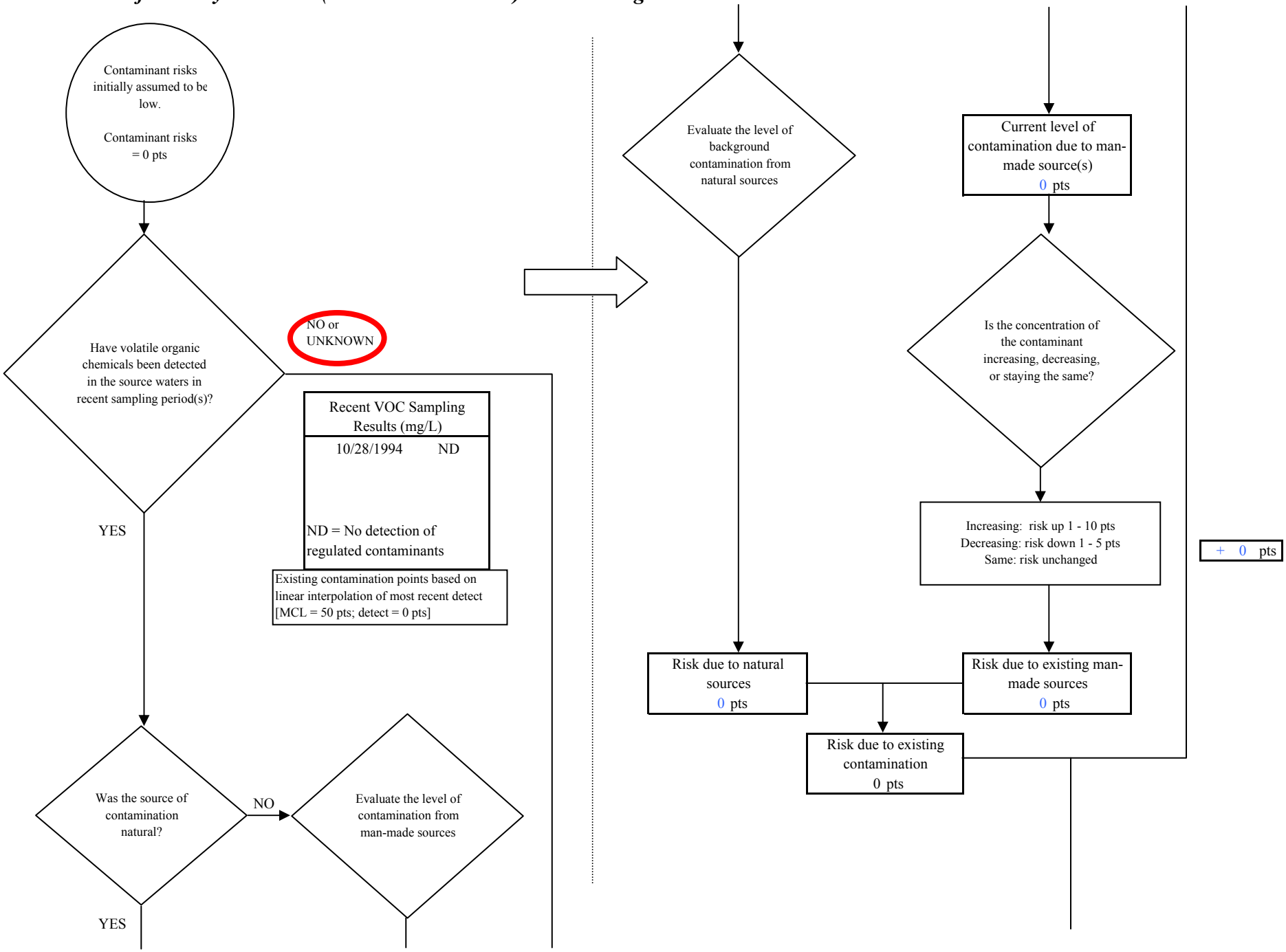


Chart 7. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Volatile Organic Chemicals

+ 50 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	3	3
High(s)	5	4	9
Medium(s)	13	10	23
Low(s)	14	21	35

	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 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 = 50 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

Underground fuel tanks, contaminated site and sign manufacturing.

YES

Increase risk 1 - 10 pts

+ 10 pts

Chart 7. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Volatile Organic Chemicals

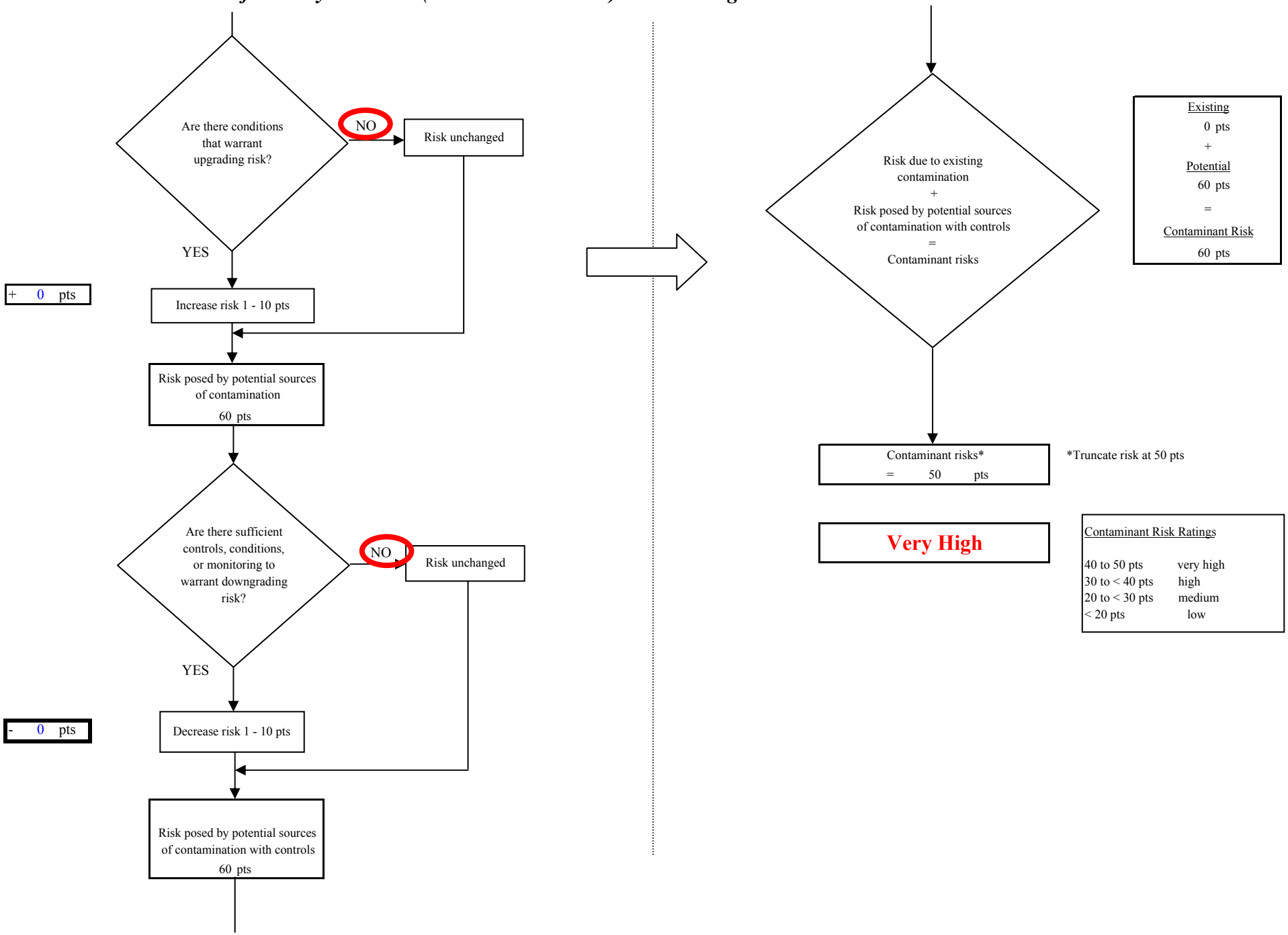


Chart 8. Vulnerability analysis for Kathy O Estates (Well No.2-New Well)- Volatile Organic Chemicals

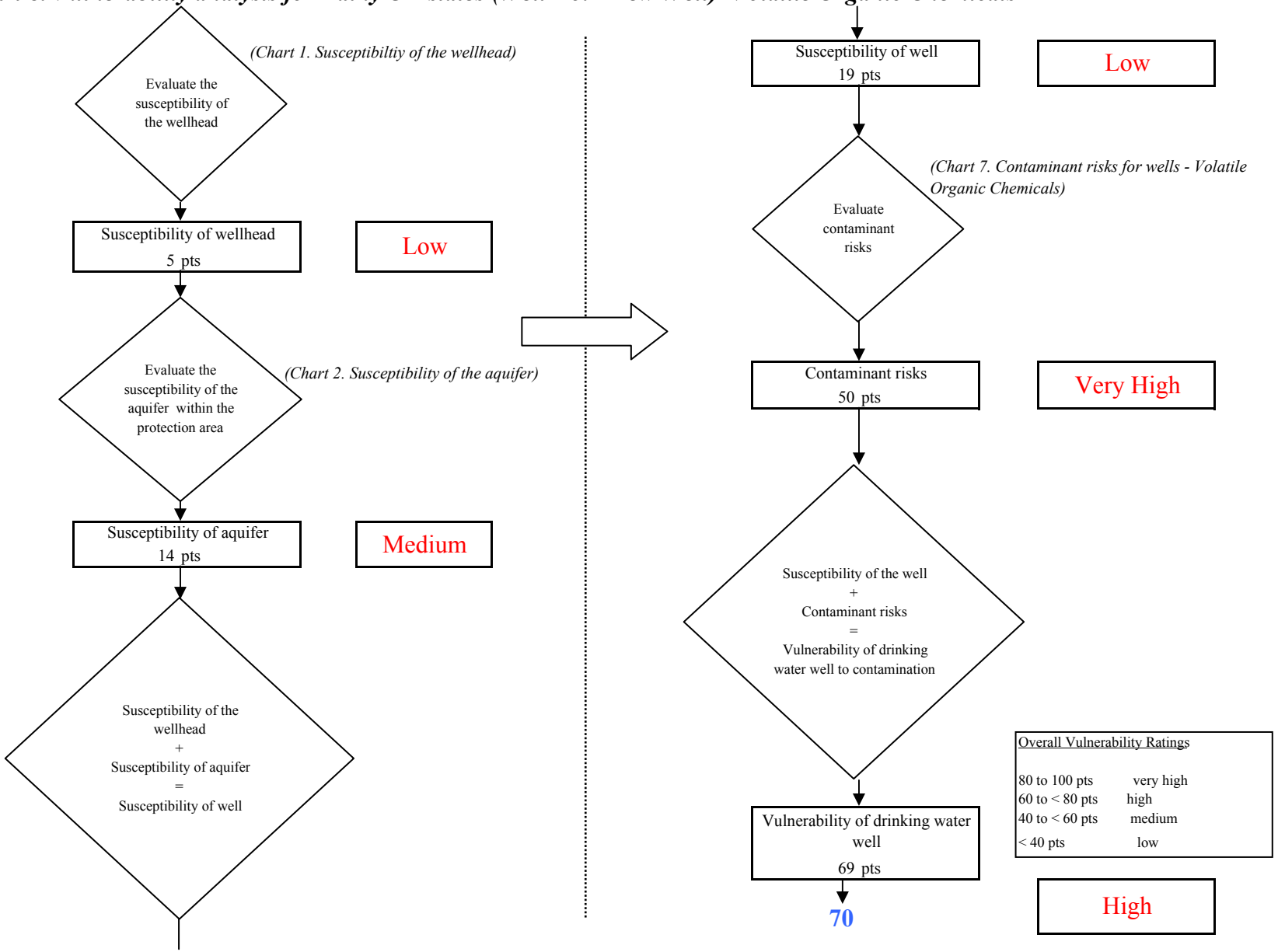


Chart 9. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Heavy Metals, Cyanide and Other Inorganic Chemicals

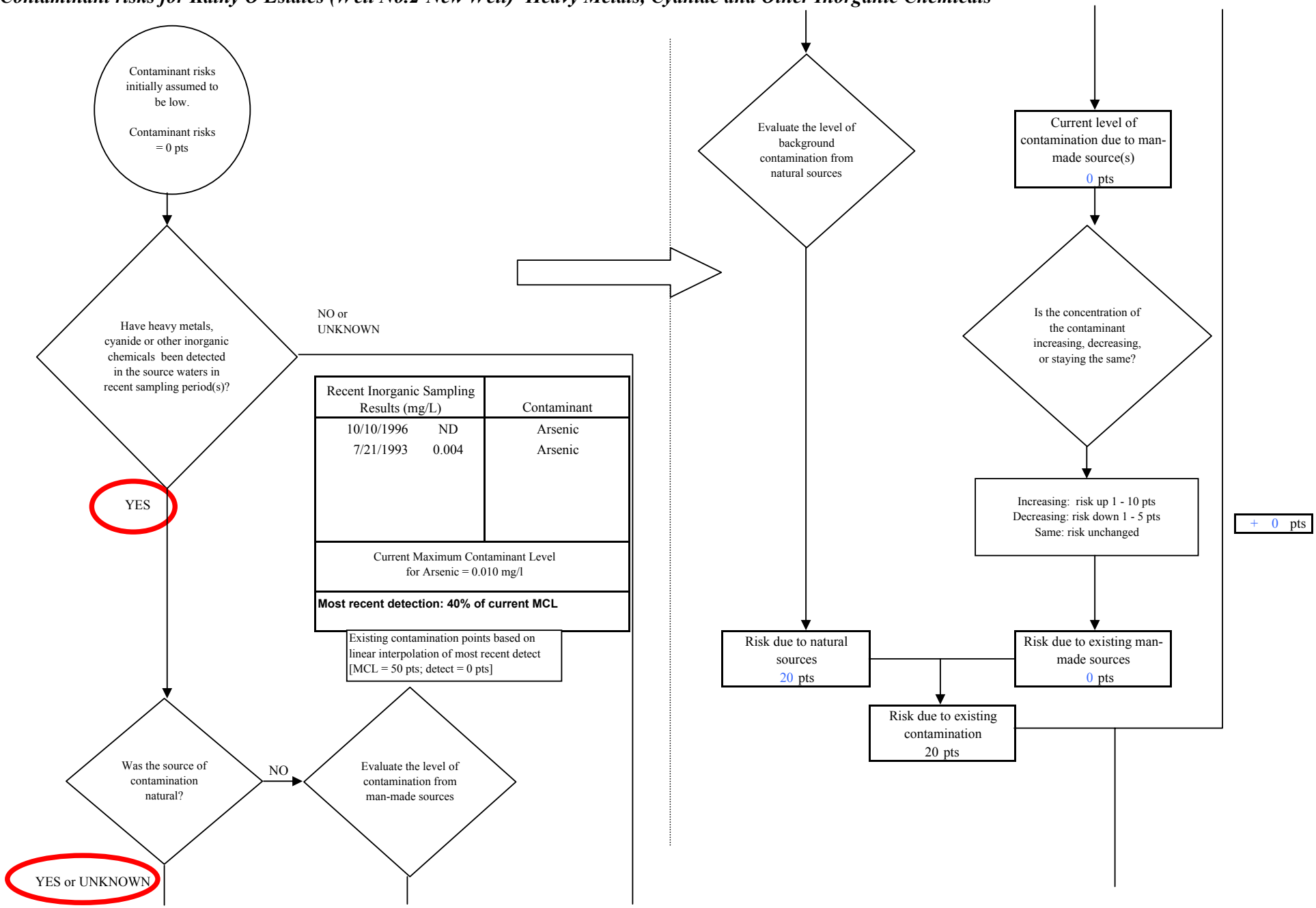


Chart 9. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Heavy Metals, Cyanide and Other Inorganic Chemicals

+ 40 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)	0	2	2
Medium(s)	7	8	15
Low(s)	22	28	50

	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.

Initial assessment of risk posed by potential sources of contamination = 40 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

Underground fuel tanks

YES

Increase risk 1 - 10 pts

+ 10 pts

Chart 9. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Heavy Metals, Cyanide and Other Inorganic Chemicals

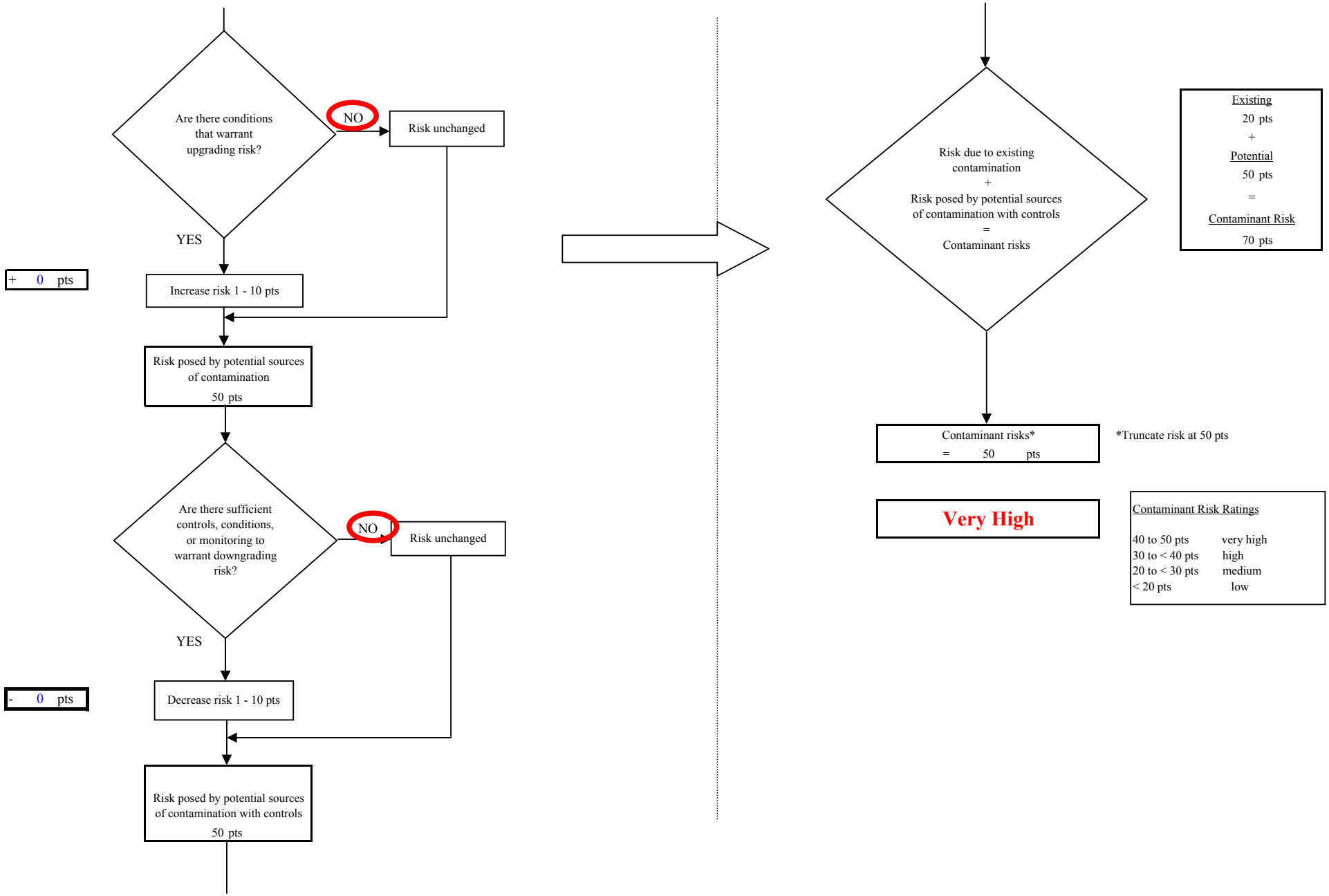


Chart 10. Vulnerability analysis for Kathy O Estates (Well No.2-New Well)- Heavy Metals, Cyanide and Other Inorganic Chemicals

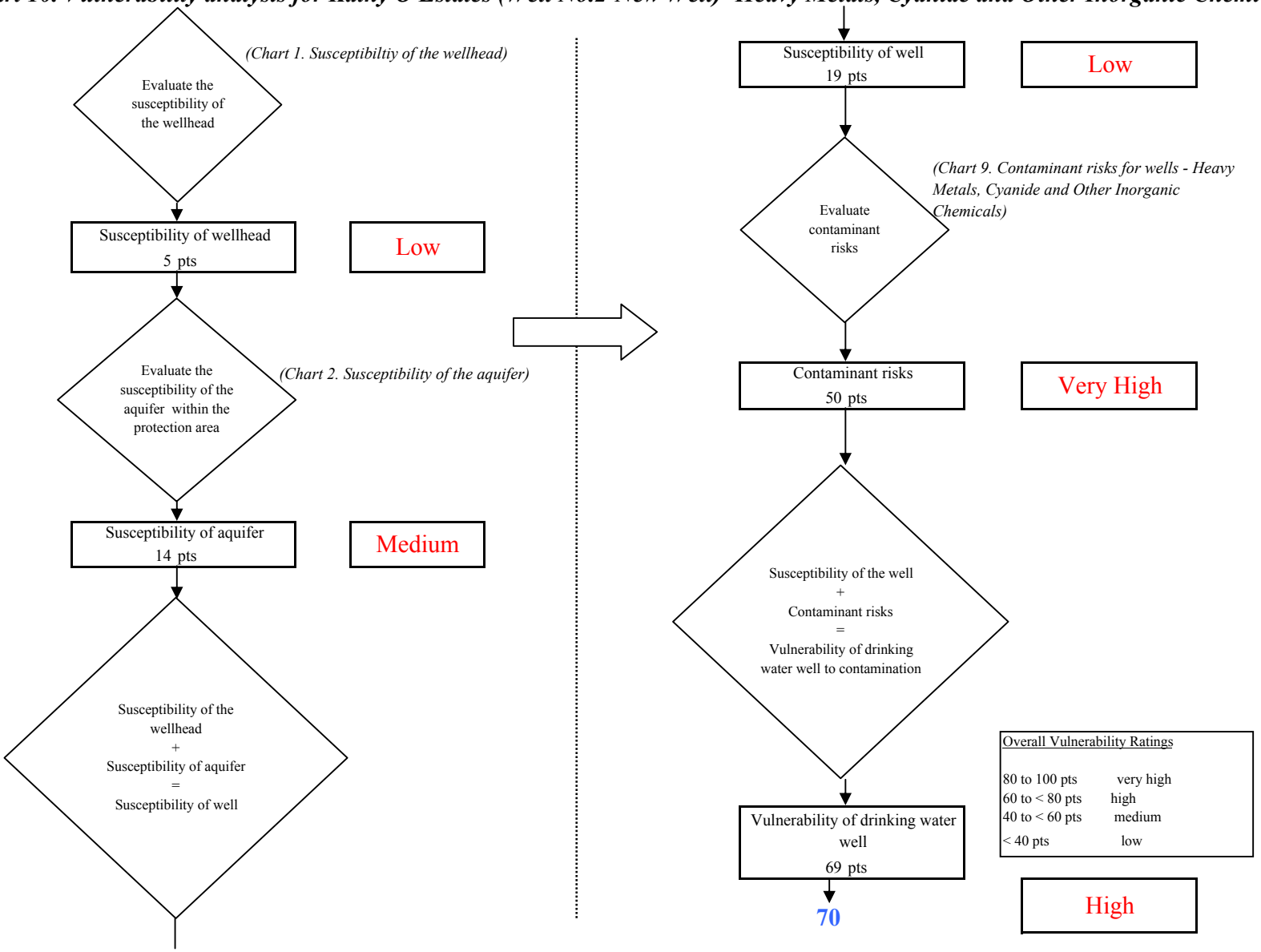


Chart 11. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Synthetic Organic Chemicals

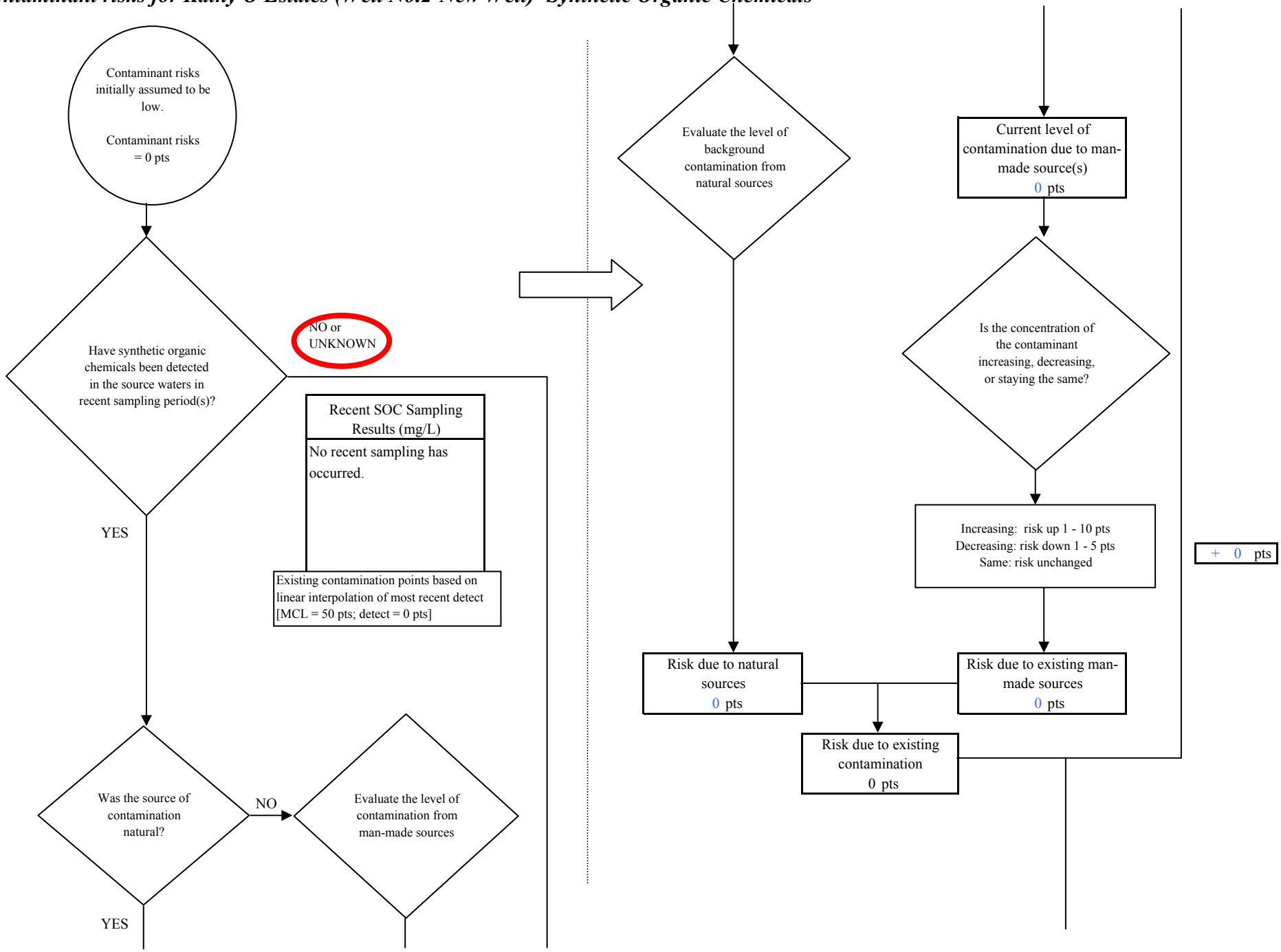


Chart 11. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Synthetic Organic Chemicals

+ 40 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)	0	2	2
Medium(s)	4	3	7
Low(s)	7	14	21

	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.

Initial assessment of risk posed by potential sources of contamination = 40 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

Sewer lines and residential area

Increase risk 1 - 10 pts

+ 10 pts

Chart 11. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Synthetic Organic Chemicals

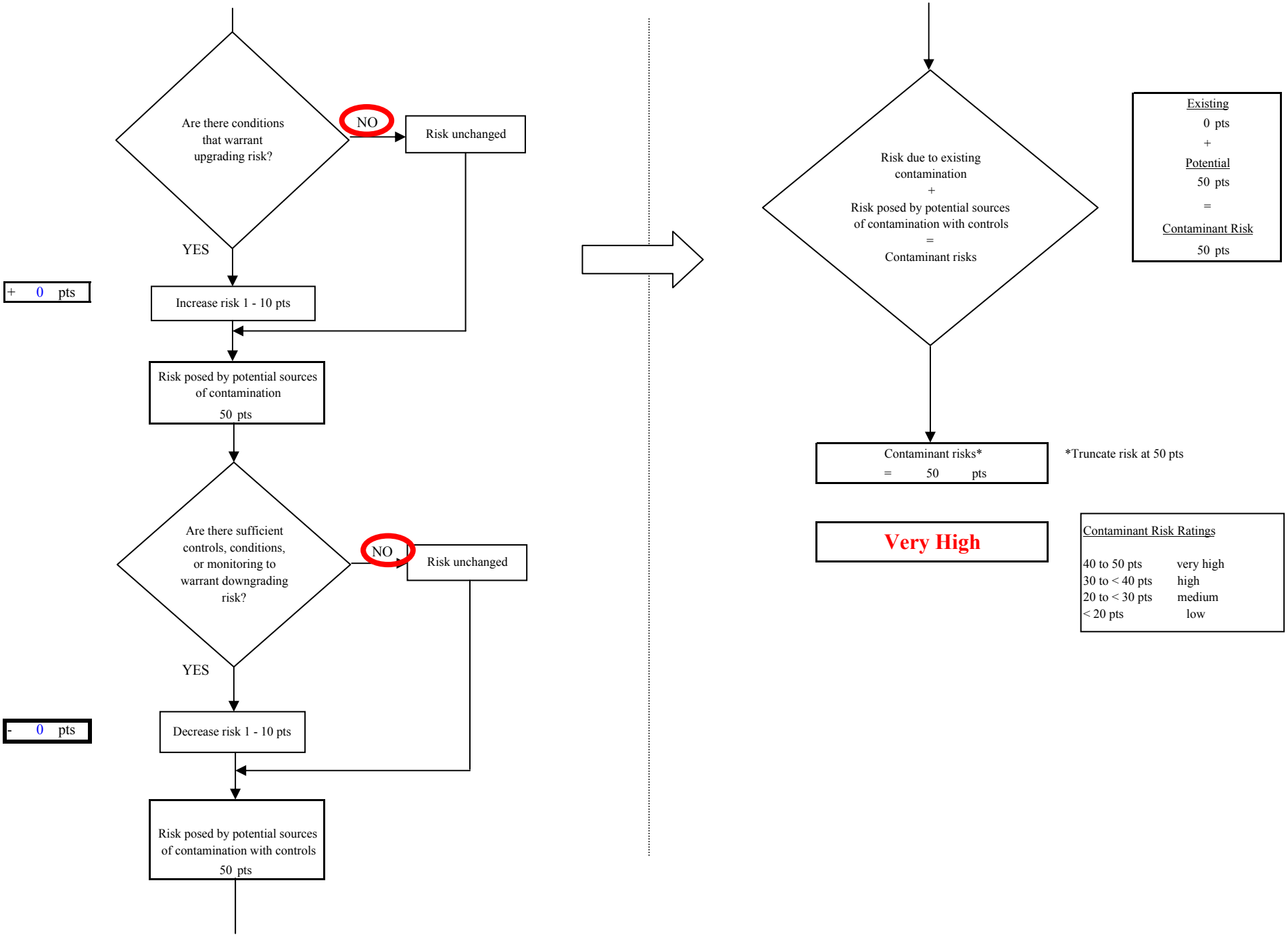


Chart 12. Vulnerability analysis for Kathy O Estates (Well No.2-New Well)- Synthetic Organic Chemicals

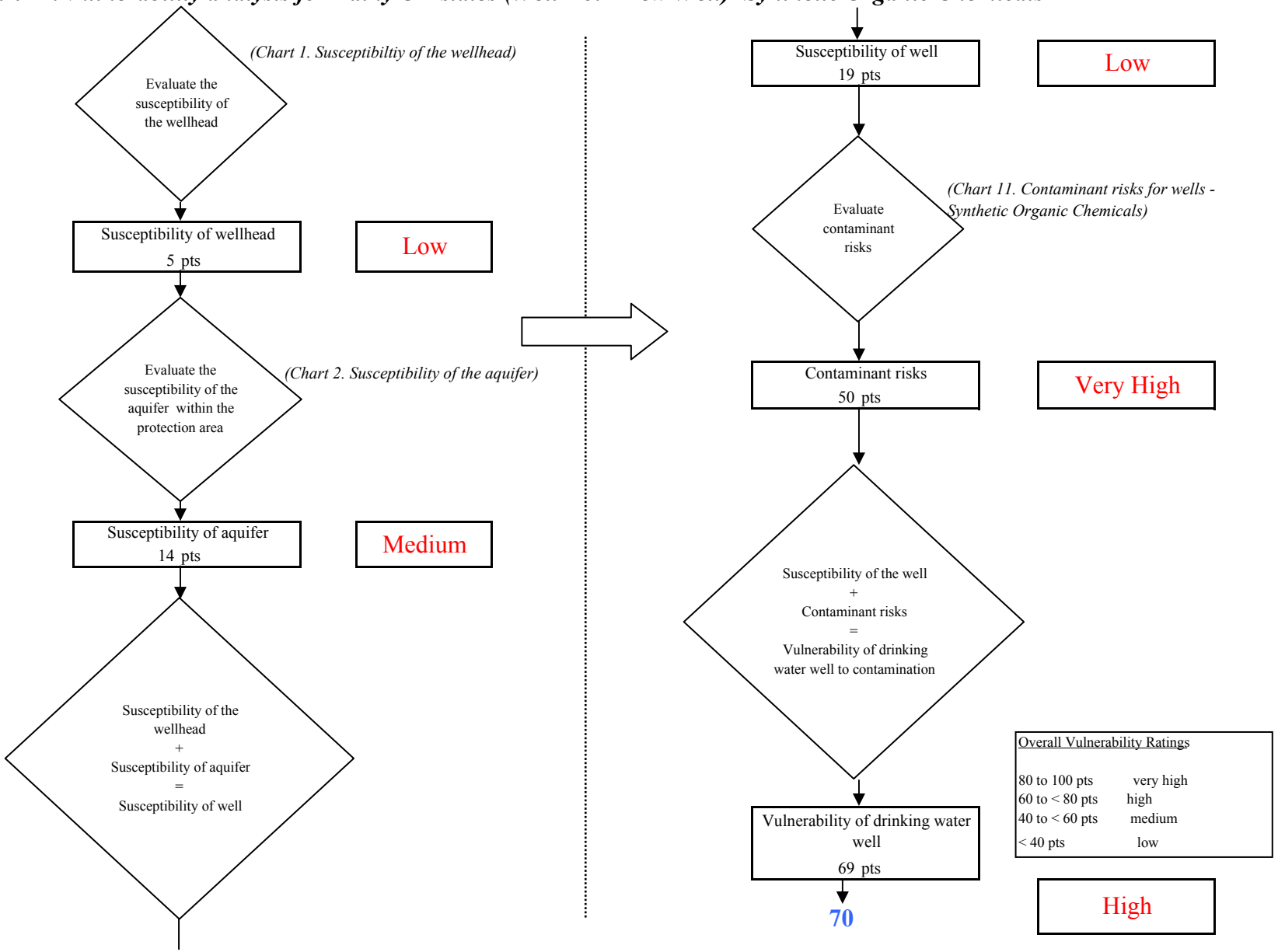


Chart 13. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Other Organic Chemicals

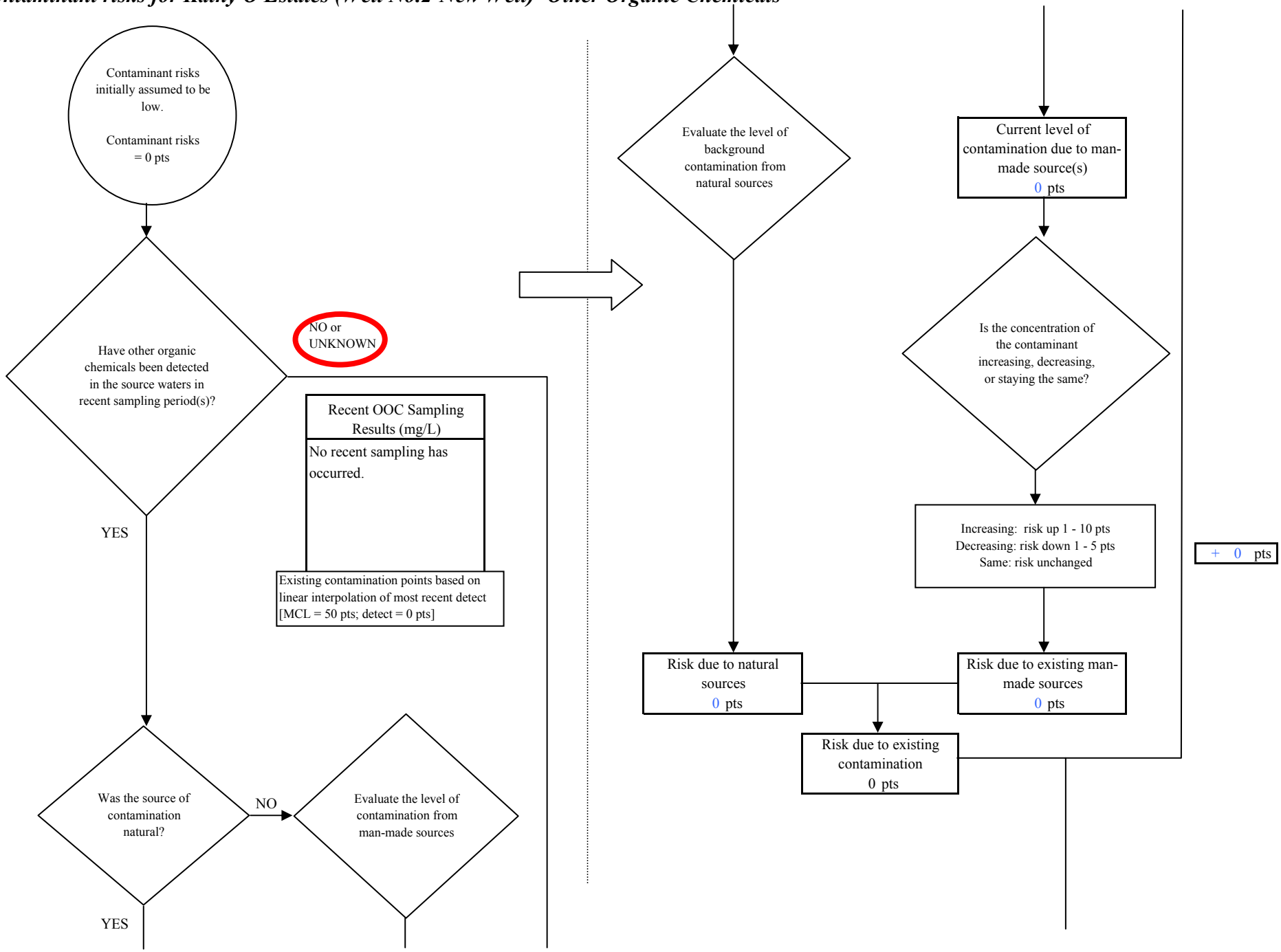


Chart 13. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Other Organic Chemicals

+ 50 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	2	2
High(s)	0	1	1
Medium(s)	8	7	15
Low(s)	14	12	26

	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 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 = 50 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

Sewer lines

YES → Increase risk 1 - 10 pts

+ 10 pts

Chart 13. Contaminant risks for Kathy O Estates (Well No.2-New Well)- Other Organic Chemicals

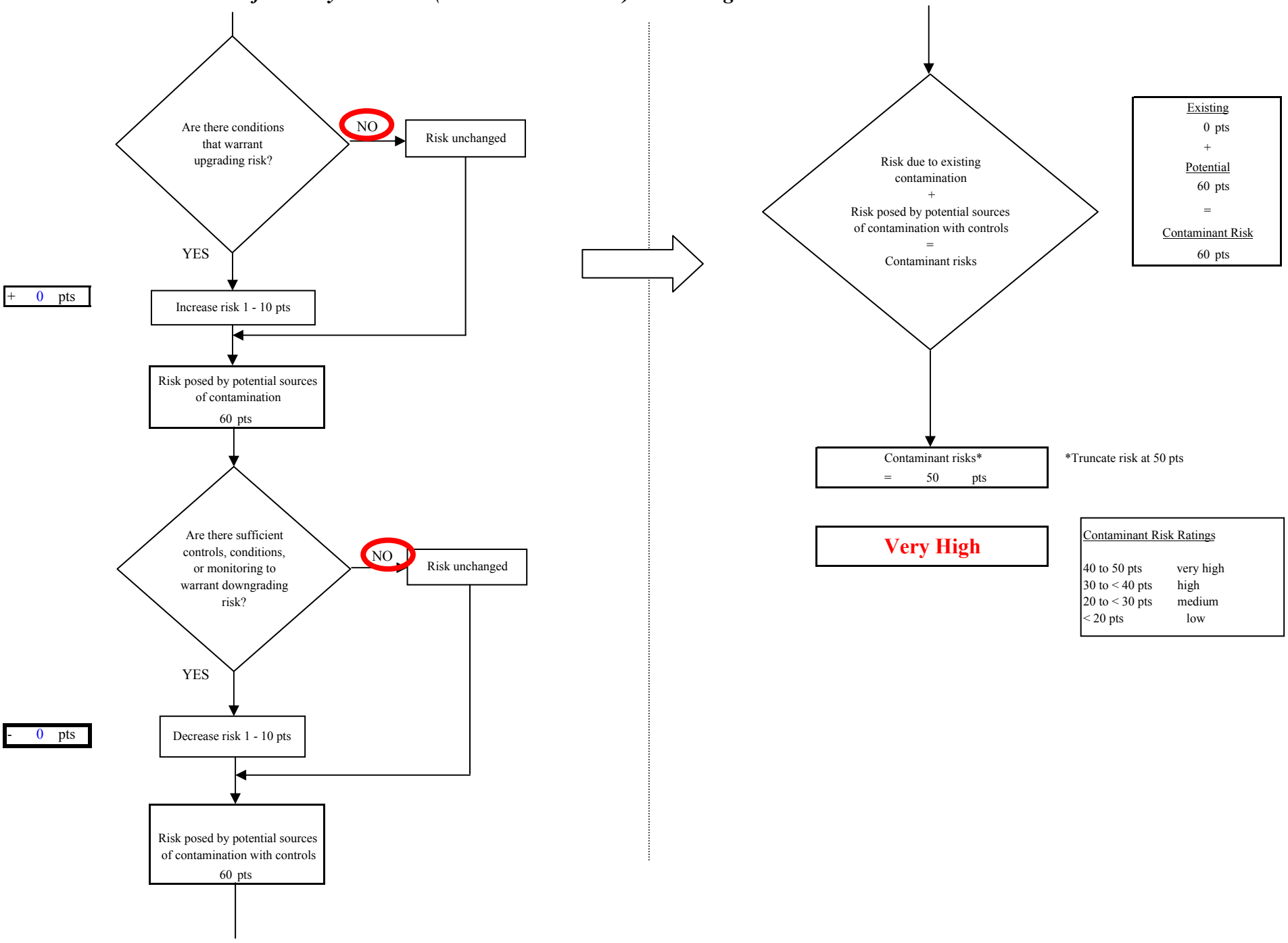


Chart 14. Vulnerability analysis for Kathy O Estates (Well No.2-New Well)- Other Organic Chemicals