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# Source Water Assessment

A Hydrogeologic Susceptibility and  
Vulnerability Assessment for  
Tudor Mobile Court ,  
Anchorage, Alaska  
PWSID # 210582.001

DRINKING WATER PROTECTION PROGRAM REPORT 689

Alaska Department of Environmental Conservation

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DRINKING WATER PROTECTION PROGRAM REPORT 689

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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# Source Water Assessment for Tudor Mobile Court 's Source of Public Drinking Water, Anchorage, Alaska

## Drinking Water Protection Program Alaska Department of Environmental Conservation

### EXECUTIVE SUMMARY

The public water system for Tudor Mobile Court is a Class A (community) water system consisting of one well in the Anchorage area. Identified potential and current sources of contaminants for Tudor Mobile Court include: sewer lines, residential areas, roads, recreation areas, a Leaking Underground Fuel Storage Tank (LUST), firehouse, a injection well, and various commercial 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, Tudor Mobile Court received a vulnerability rating of **Medium** for bacteria and viruses, nitrates and/or nitrites and other organic chemicals, **High** for volatile organic chemicals and **Low** for synthetic organic chemicals.

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

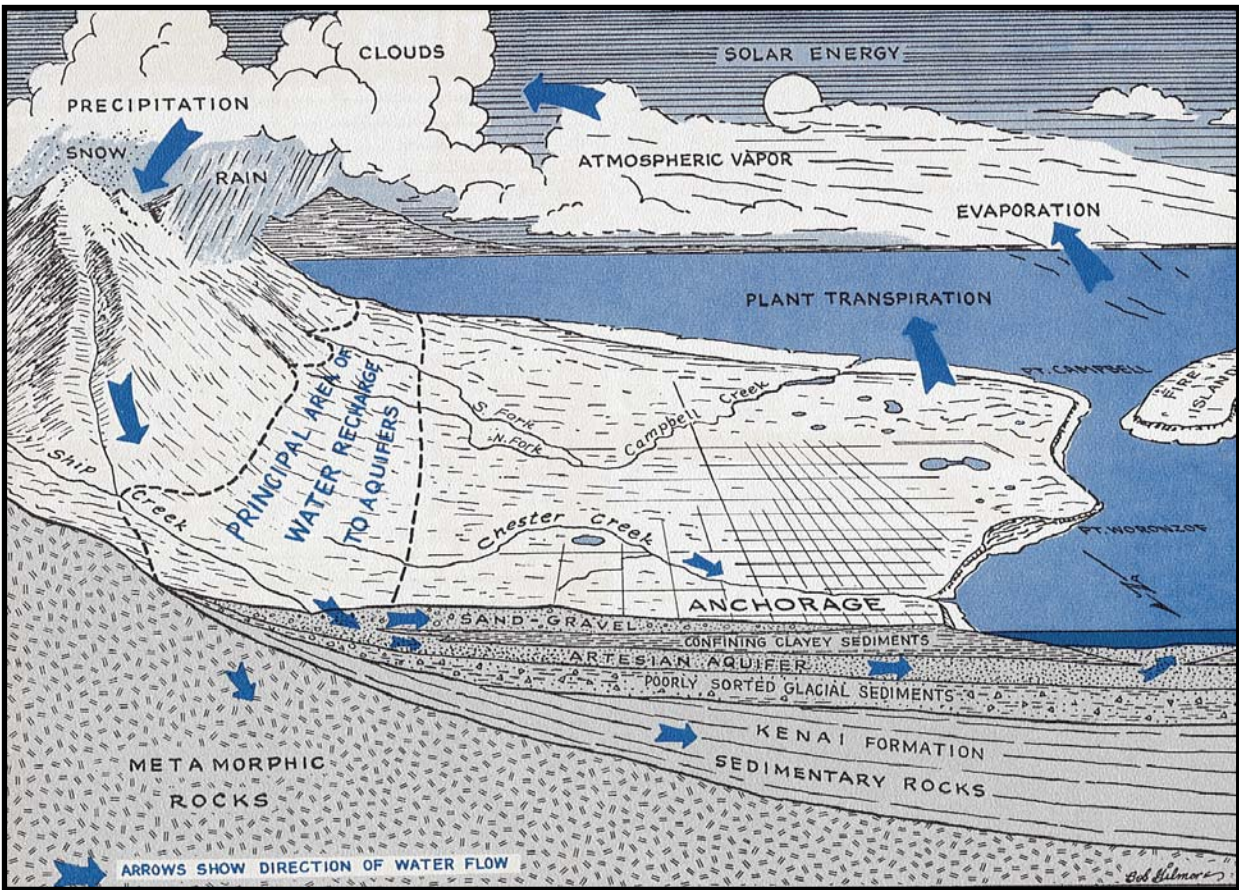


Figure 2. Generalized hydrologic cycle in the Anchorage area [Barnwell, George, Dearborn, Weeks, and Zenone, 1972].

### Climate

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

### Physiography and Groundwater Conditions

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

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

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

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

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

**TUDOR MOBILE COURT 'S PUBLIC DRINKING WATER SYSTEM**

Tudor Mobile Court is a Class A (community) water system. The system one well in the Anchorage area. (See Map 1 of Appendix A). This area is at an elevation of approximately 150 feet above sea level.

The 1988 SOC Waiver application indicates that the wells 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. Due to the date that the well was installed it is suspected that the well was not grouted according to ADEC regulations. Proper grouting provides added protection against contaminants traveling along the well casing and into source waters.

There is no well log available for the well serving Tudor Mobile Court. However, records indicate that the depth is 100 feet. Wells within a 1-2 mile radius of Tudor Mobile Court indicate that there is a clay confining layer from approximately 70 ft to 98 ft bls. This confining layer may provide protection from contaminates entering the aquifer. However, 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.

This system operates 365 days per year and serves 35 residents through 11 service connections.

**TUDOR MOBILE COURT'S 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 Tudor Mobile Court. 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**

<b>Zone</b>	<b>Definition</b>
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 Tudor Mobile Court 's 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 & 3 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 TUDOR MOBILE COURT’S DRINKING WATER SOURCE

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

- Natural susceptibility; and
- Contaminant risks.

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

$$\begin{array}{r} \text{Natural Susceptibility (0 – 50 points)} \\ + \\ \text{Contaminant Risks (0 – 50 points)} \\ = \end{array}$$

### 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.

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

Table 2 shows the Susceptibility scores and ratings for the wells serving Tudor Mobile Court .

**Table 2. Susceptibility of the well**

	Score	Rating
Susceptibility of the Wellhead	5	Low
Susceptibility of the Aquifer	10	Medium
Natural Susceptibility	15	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**

Category	Score	Rating
Bacteria and Viruses	25	Medium
Nitrates and/or Nitrites	35	High
Volatile Organic Chemicals	50	Very High
Heavy Metals, Cyanide, and Other Inorganic Chemicals	35	High
Synthetic Organic Chemicals	12	Low
Other Organic Chemicals	32	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**

Category	Score	Rating
Bacteria and Viruses	40	Medium
Nitrates and Nitrites	50	Medium
Volatile Organic Chemicals	65	High
Heavy Metals, Cyanide and Other Inorganic Chemicals	50	Medium
Synthetic Organic Chemicals	25	Low
Other Organic Chemicals	45	Medium

**Bacteria and Viruses**

The contaminant risk for bacteria and viruses is medium with sewer lines and recreational trails presenting the most significant risk to the drinking water well (See Chart 3 – Contaminant Risks for Bacteria and Viruses in Appendix D).

Sampling of the well 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 is medium.

**Nitrates and Nitrites**

The contaminant risk for nitrates and nitrites is high with a class V injection well presenting the most significant risk to the drinking water well.

Recent sampling indicates that nitrates and nitrites have not been detected.

After combining the contaminant risk for nitrates and

nitrites with the natural susceptibility of the well, the overall vulnerability of the well to contamination is medium.

**Volatile Organic Chemicals**

The contaminant risk for volatile organic chemicals is very high with a print shops, a Leaking Underground Storage Tank Site (LUSTS) presenting the most significant risk for volatile organic chemicals (See Chart 7 – Contaminant Risks for Volatile Organic Chemicals in Appendix D).

Recent sampling indicates that no volatile organic chemicals have been detected in the source waters.

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

**Heavy Metals, Cyanide, and Other Inorganic Chemicals**

The contaminant risk for heavy metals, cyanide and other inorganic chemicals is high with a class v injection well and a print shop presenting the most significant risk to the drinking water source (See Chart 9 – Contaminant Risks for Heavy Metals, Cyanide, and Other Inorganic Chemicals in Appendix D).

Sampling indicates that no heavy metals, cyanide, and other inorganic chemicals have been detected in the source waters.

Combining the contaminant risk with the natural susceptibility of the wells leads to an overall vulnerability to heavy metals and other inorganic chemical contamination of medium.

**Synthetic Organic Chemicals**

The contaminant risk for synthetic organic chemicals is low with a print shop and sewer lines presenting the most significant risk. (See Chart 11 – Contaminant Risks for Synthetic Organic Chemicals in Appendix D, respectively).

Sampling of synthetic organic chemicals has not occurred.

Combining the contaminant risk with the natural susceptibility of the wells, the overall vulnerability to synthetic organic chemicals is low.

**Other Organic Chemicals**

The contaminant risk for other organic chemicals is high with class v injection wells and asphalt and tar storage presenting the most significant risk.



Sampling of other organic chemicals has not occurred. After combining the contaminant risk with the natural susceptibility of the wells, the overall vulnerability to other organic chemicals is medium. (See Chart 13 – Contaminant Risks for Other Organic Chemicals in Appendix D, respectively).

## SUMMARY

A *Source Water Assessment* has been completed for the source of public drinking water serving Tudor Mobile Court . The overall vulnerability of Well No.1 and No.2 to contamination is **Medium** for synthetic organic chemicals, and **Low** for bacteria/viruses, nitrates and nitrites, volatile organic chemicals, and heavy metals, cyanide and other inorganic chemicals.

The overall vulnerability of Well No.3 to contamination is **Medium** for bacteria and viruses, nitrates and/or nitrites, volatile organic chemicals, heavy metals, synthetic organic chemicals and other organic chemical. This assessment of contaminant risks can be used as a foundation for local voluntary protection efforts as well as a basis for the continuous efforts on the part of Tudor Mobile Court to protect public health. It is anticipated that *Source Water Assessments* will be updated every five years to reflect any changes in the vulnerability and/or susceptibility of Tudor Mobile Court 's public drinking water source.

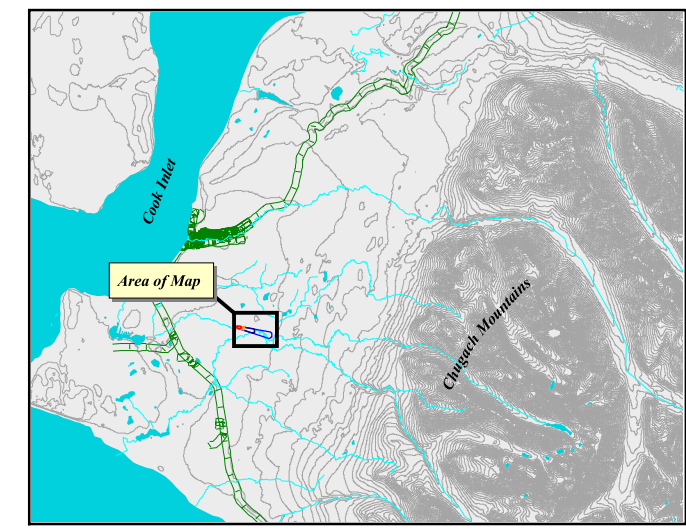
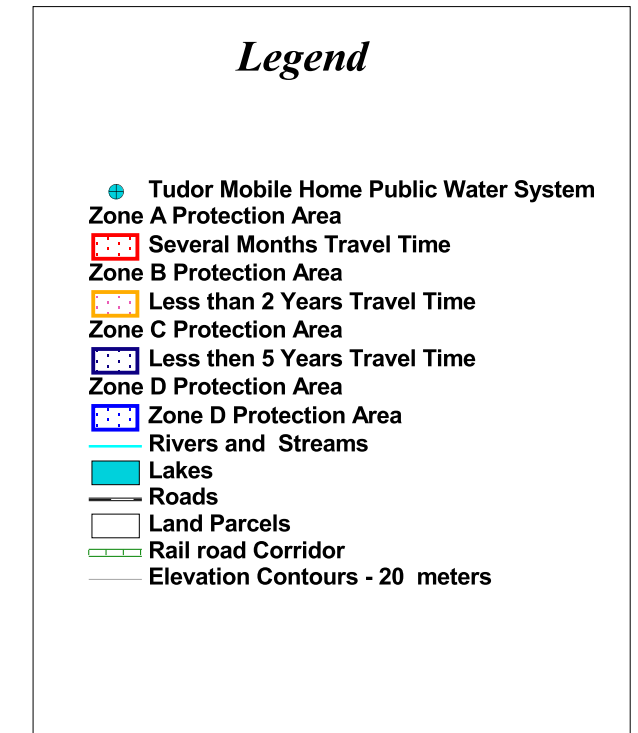
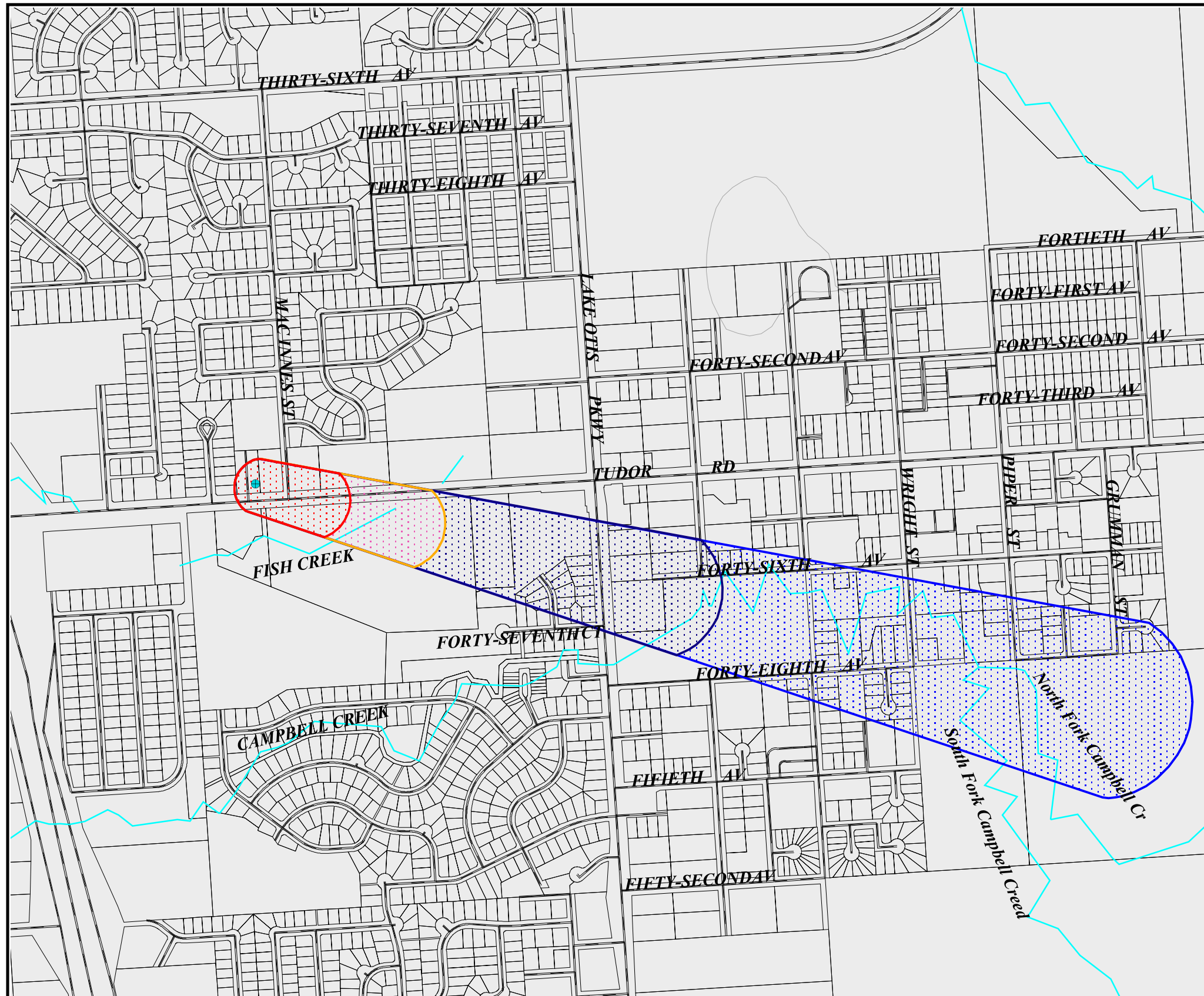
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## **APPENDIX A**

### **Tudor Mobile Court 's Drinking Water Protection Area Location Map (Map 1)**

# Drinking Water Protection Area for Tudor Mobile Court



0 2 Miles

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**Map 1**

## **APPENDIX B**

### **Contaminant Source Inventory and Risk Ranking for Tudor Mobile Court (Tables 1-7)**

**Table 1**

**Contaminant Source Inventory for  
Tudor Mobile Court**

**PWSID 210582.001**

<b>Contaminant Source Type</b>	<b>Contaminant Source ID</b>	<b>CS ID tag</b>	<b>Zone</b>	<b>Map Number</b>	<b>Comments</b>
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U04-01	A	3	Diesel spill from underground tank
Dog walking areas/foot trails	X46	X46-01	A	2	
Dog walking areas/foot trails	X46	X46-2	A	2	
Dog walking areas/foot trails	X46	X46-3	A	2	
Dry cleaners	C10	C10-01	C	4	
Florists	C12	C12-01	C	4	
Dog walking areas/foot trails	X46	X46-4	C	3	
Dog walking areas/foot trails	X46	X46-5	C	3	

**Table 2**

*Contaminant Source Inventory and Risk Ranking for  
Tudor Mobile Court  
Sources of Bacteria and Viruses*

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<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Map Number</i>	<i>Comments</i>
Dog walking areas/foot trails	X46	X46-01	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	
Dog walking areas/foot trails	X46	X46-4	C	Low	3	

**Table 3**

*Contaminant Source Inventory and Risk Ranking for  
Tudor Mobile Court  
Sources of Nitrates/Nitrites*

**PWSID 210582.001**

<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Map Number</i>	<i>Comments</i>
Dog walking areas/foot trails	X46	X46-01	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	
Dry cleaners	C10	C10-01	C	Low	4	
Florists	C12	C12-01	C	Low	4	
Dog walking areas/foot trails	X46	X46-4	C	Low	3	
Dog walking areas/foot trails	X46	X46-5	C	Low	3	



**Table 4**

*Contaminant Source Inventory and Risk Ranking for  
Tudor Mobile Court  
Sources of Volatile Organic Chemicals*

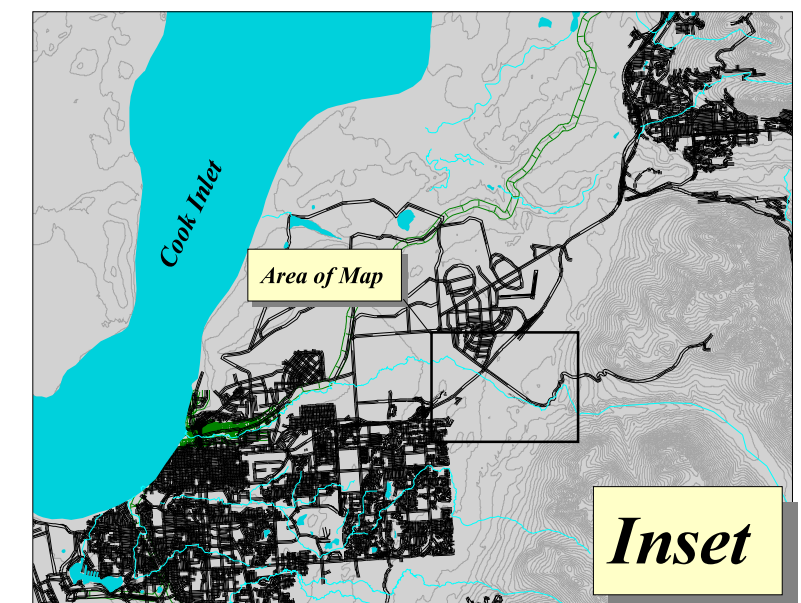
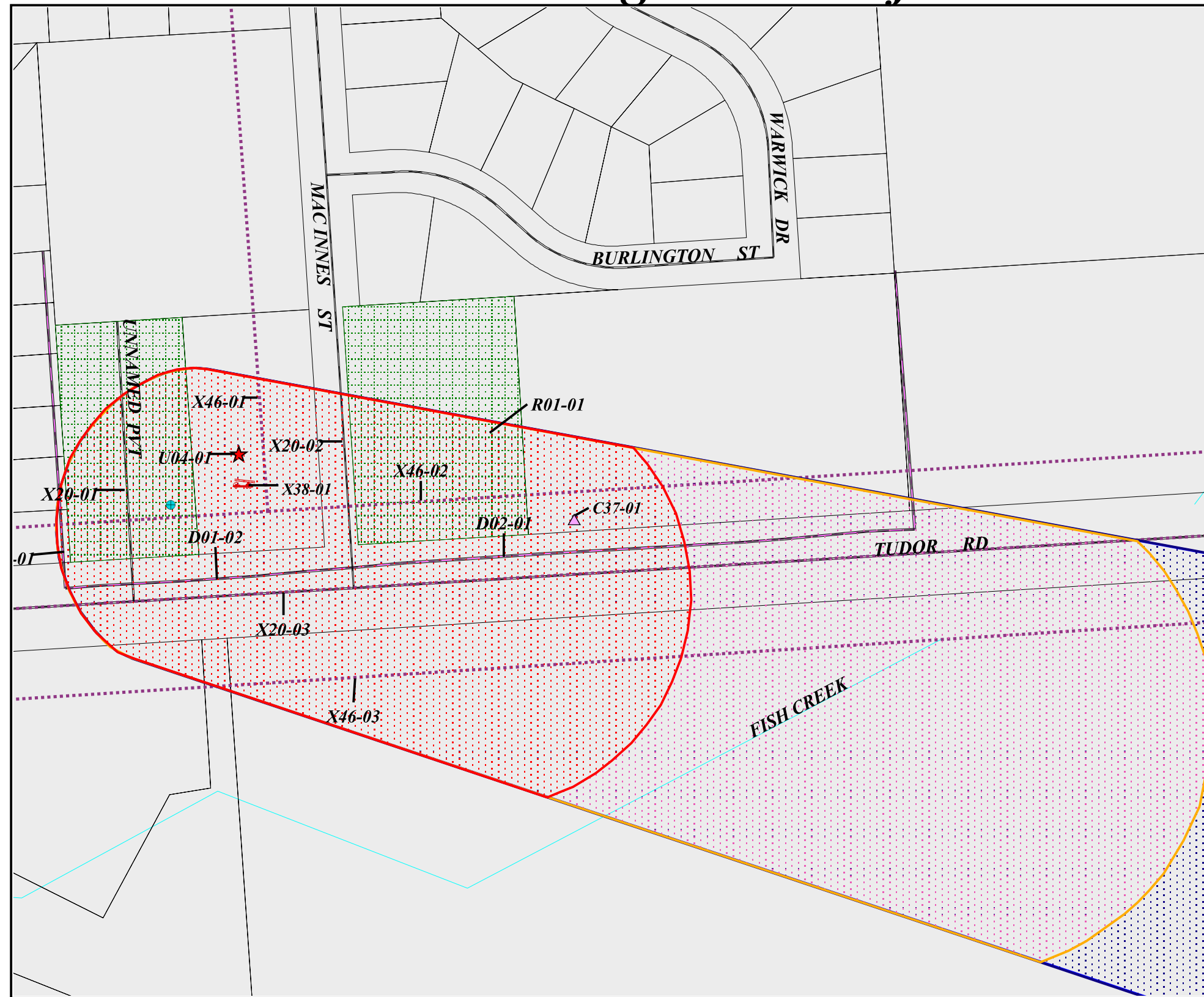
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<i>Contaminant Source Type</i>	<i>Contaminant Source ID</i>	<i>CS ID tag</i>	<i>Zone</i>	<i>Risk Ranking for Analysis</i>	<i>Map Number</i>	<i>Comments</i>
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U04-01	A	Medium	3	Diesel spill from underground tank
Dry cleaners	C10	C10-01	C	High	4	

## **APPENDIX C**

### **Tudor Mobile Court 's Drinking Water Protection Area and Potential and Existing Contaminant Sources (Maps 2 & 3)**

# Drinking Water Protection Area for Tudor Mobile Court and Potential and Existing Sources of Contamination

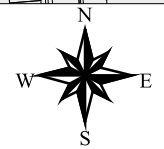
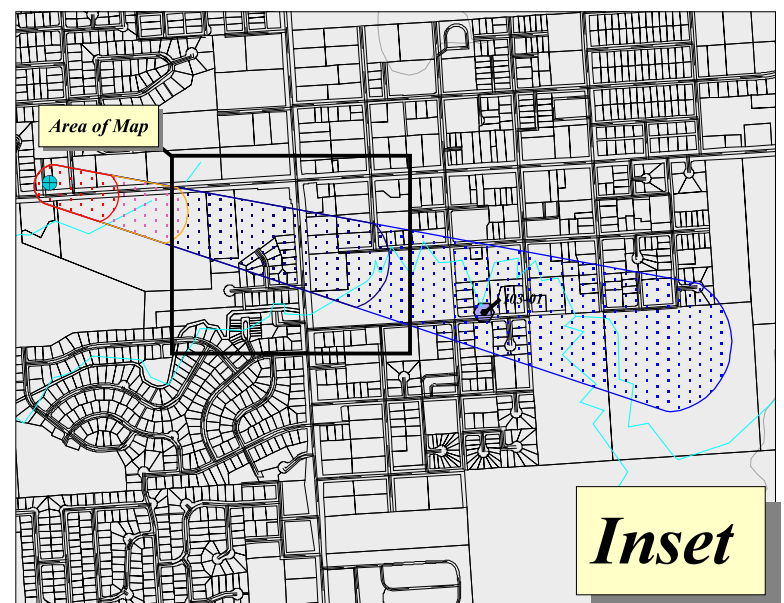
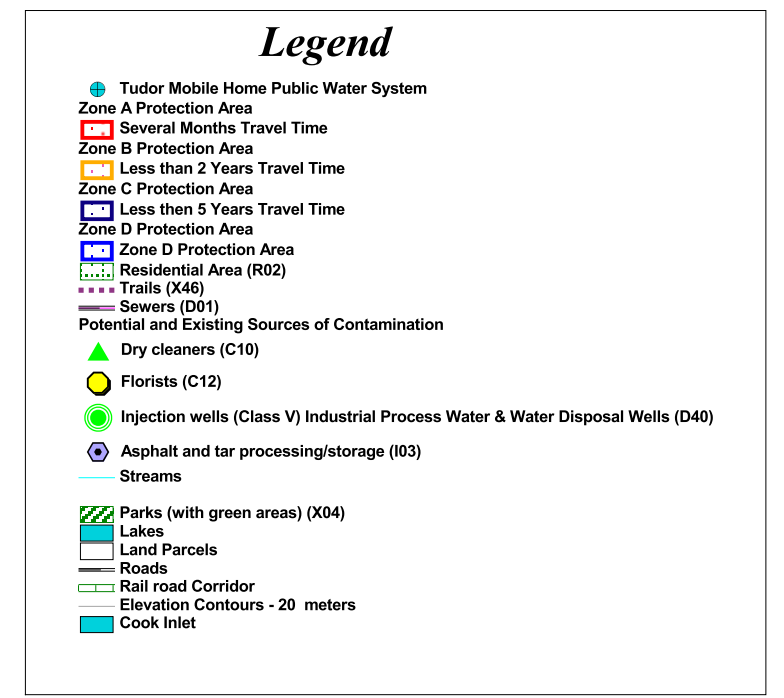
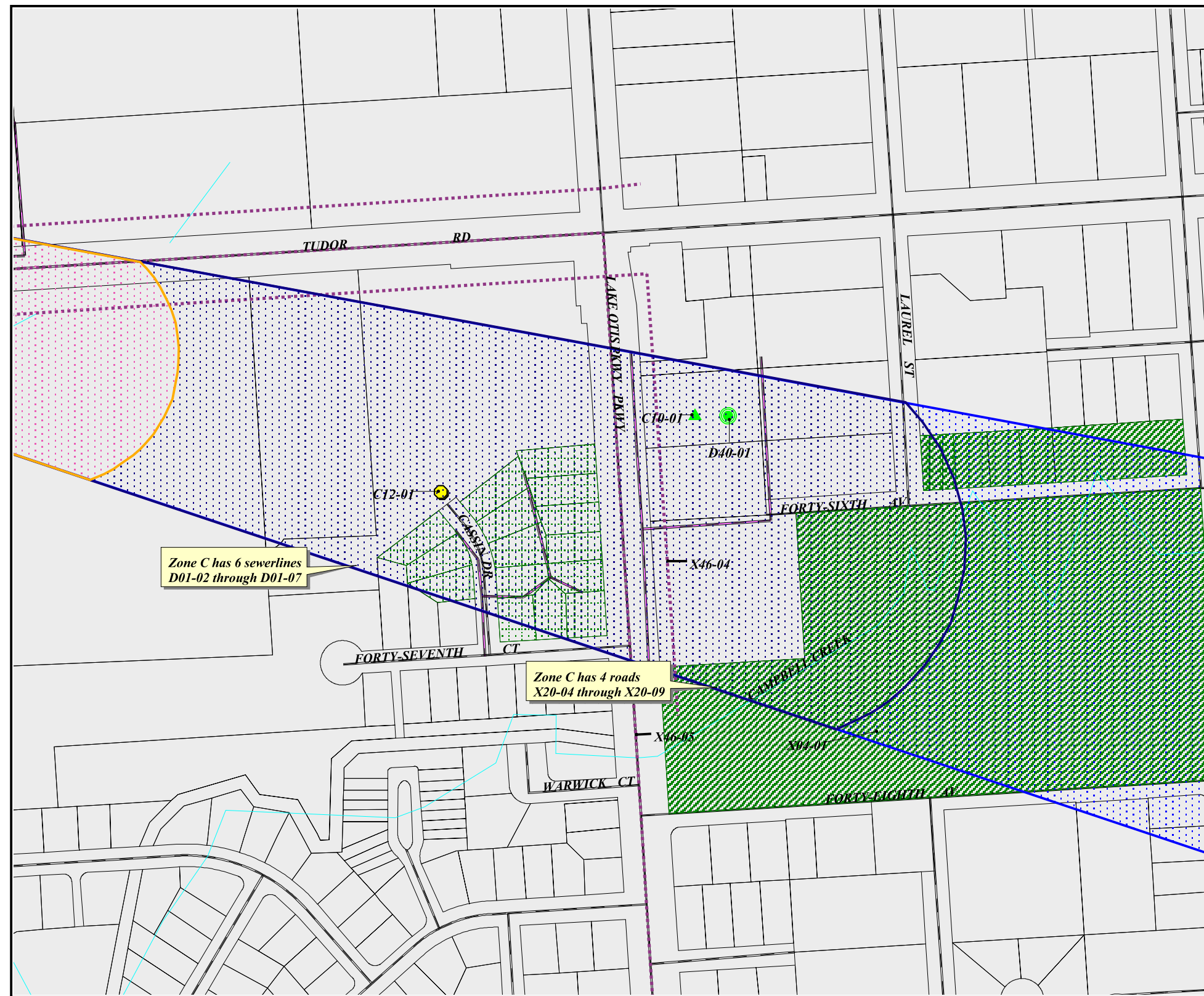


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# Map 2

# Drinking Water Protection Area for Tudor Mobile Court and Potential and Existing Sources of Contamination



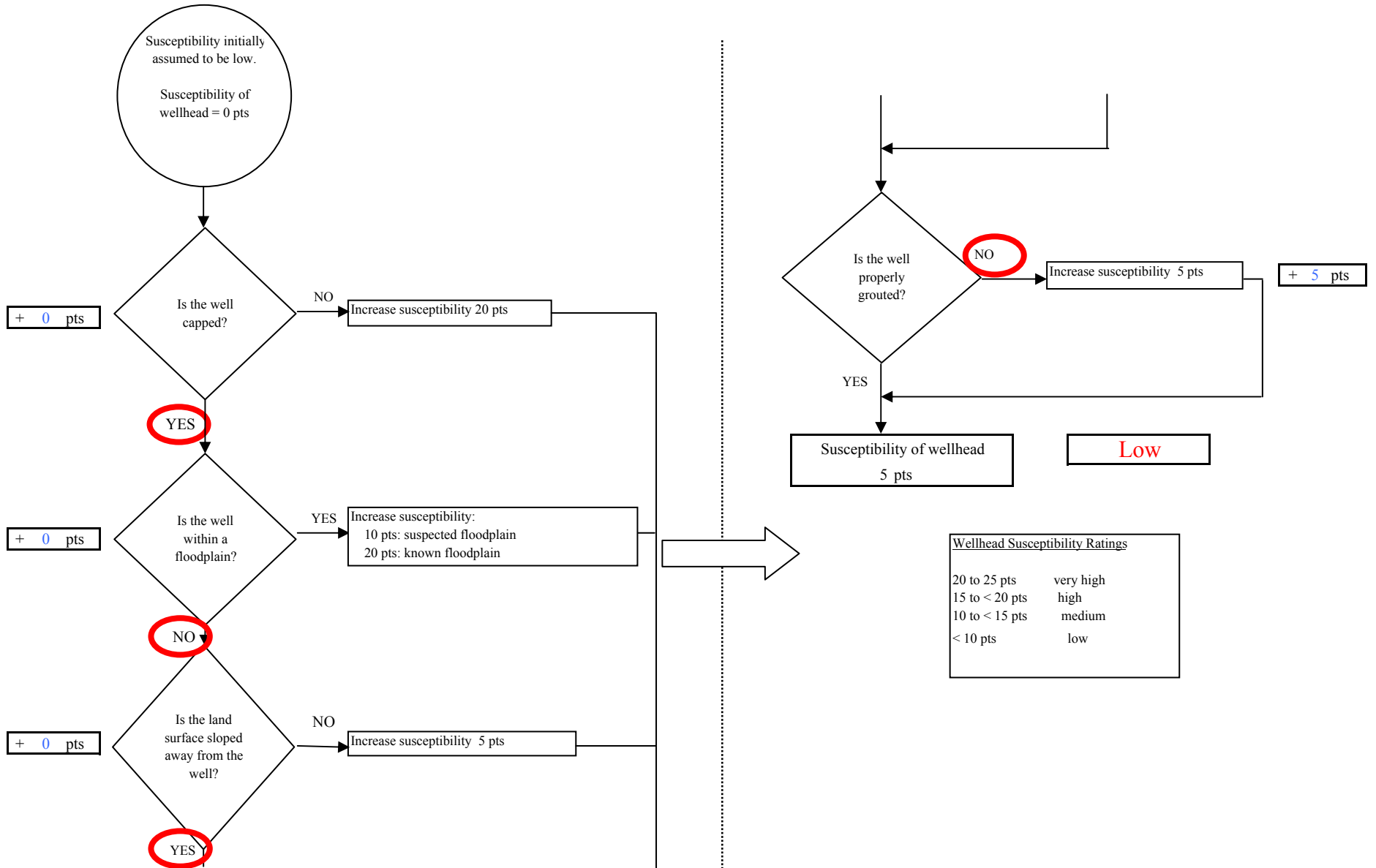
# Map 3



## **APPENDIX D**

### **Vulnerability Analysis for Tudor Mobile Court (Charts 1-14)**

**Chart 1. Susceptibility of the wellhead - Tudor Mobile Court**



**Chart 2. Susceptibility of the aquifer - Tudor Mobile Court**

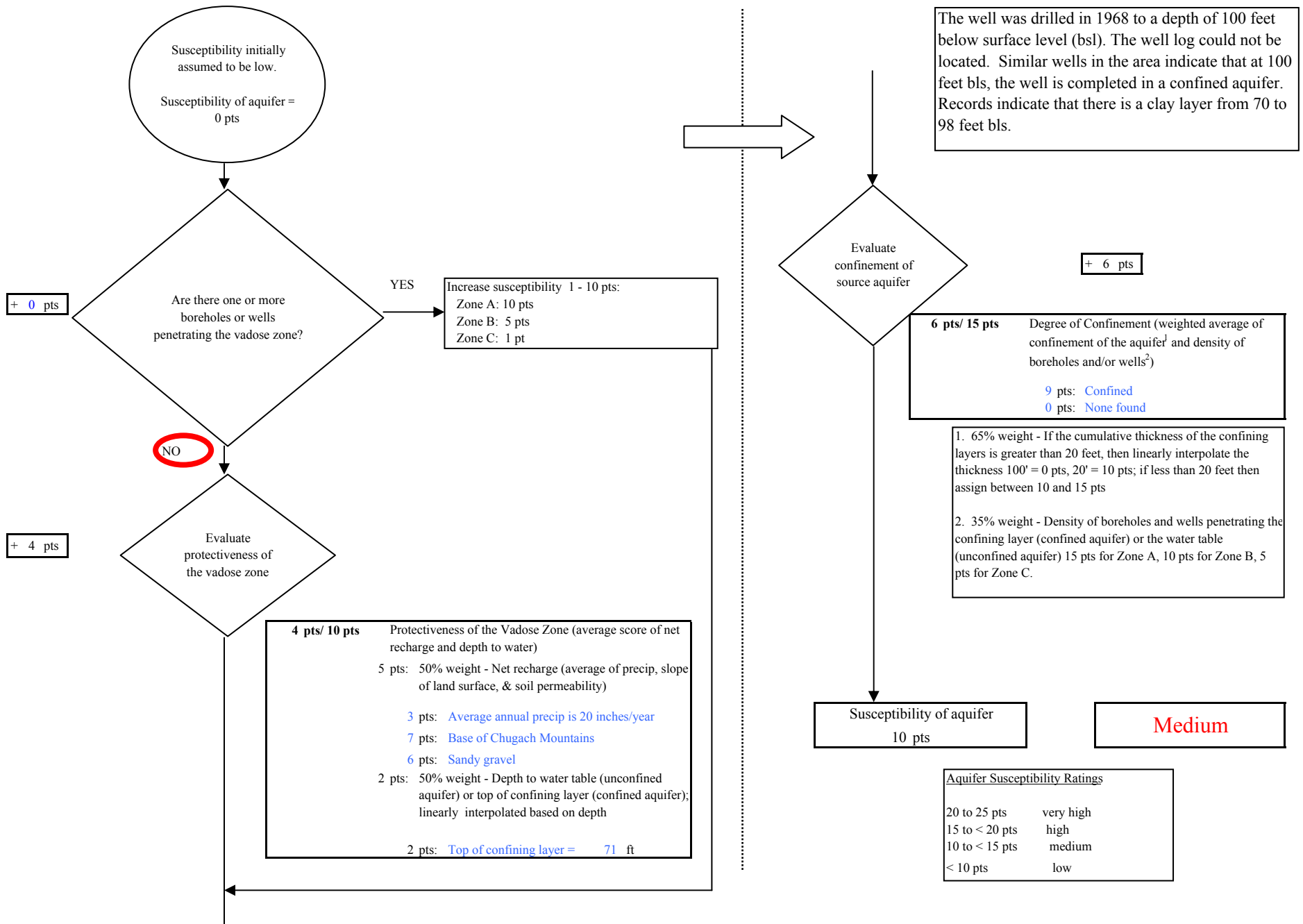
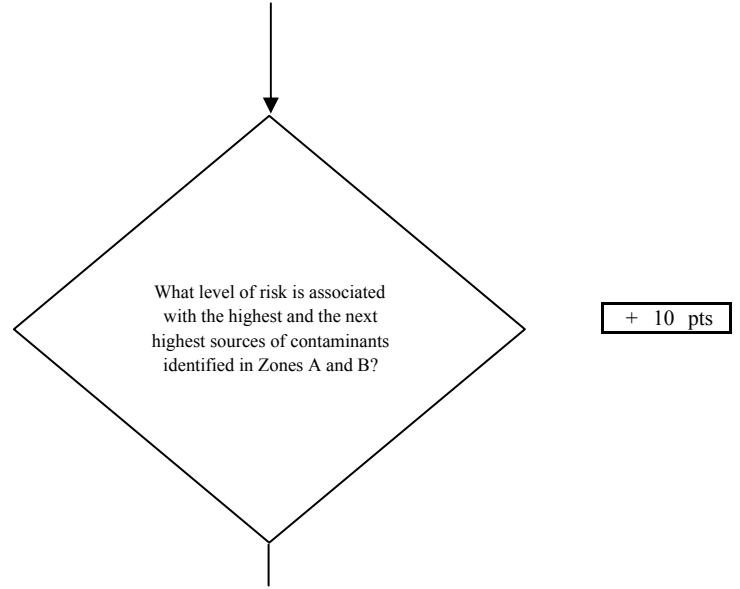
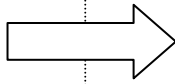
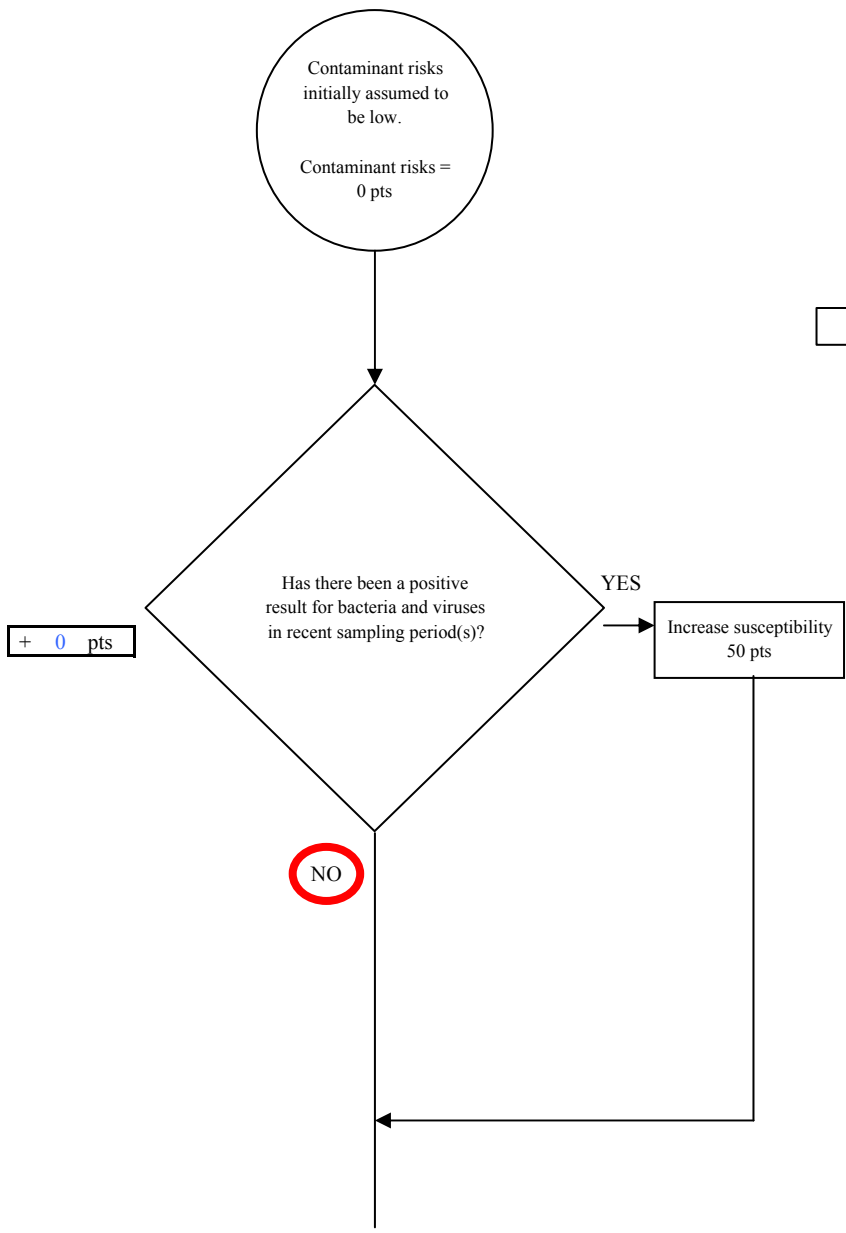


Chart 3. Contaminant risks for Tudor Mobile Court - Bacteria & Viruses



Risk Rankings for Contaminant Sources Identified in Zones A and B

	Zone A	Zone B	Total
Very High(s)	0	0	0
High(s)	0	0	0
Medium(s)	0	0	0
Low(s)	3	0	3

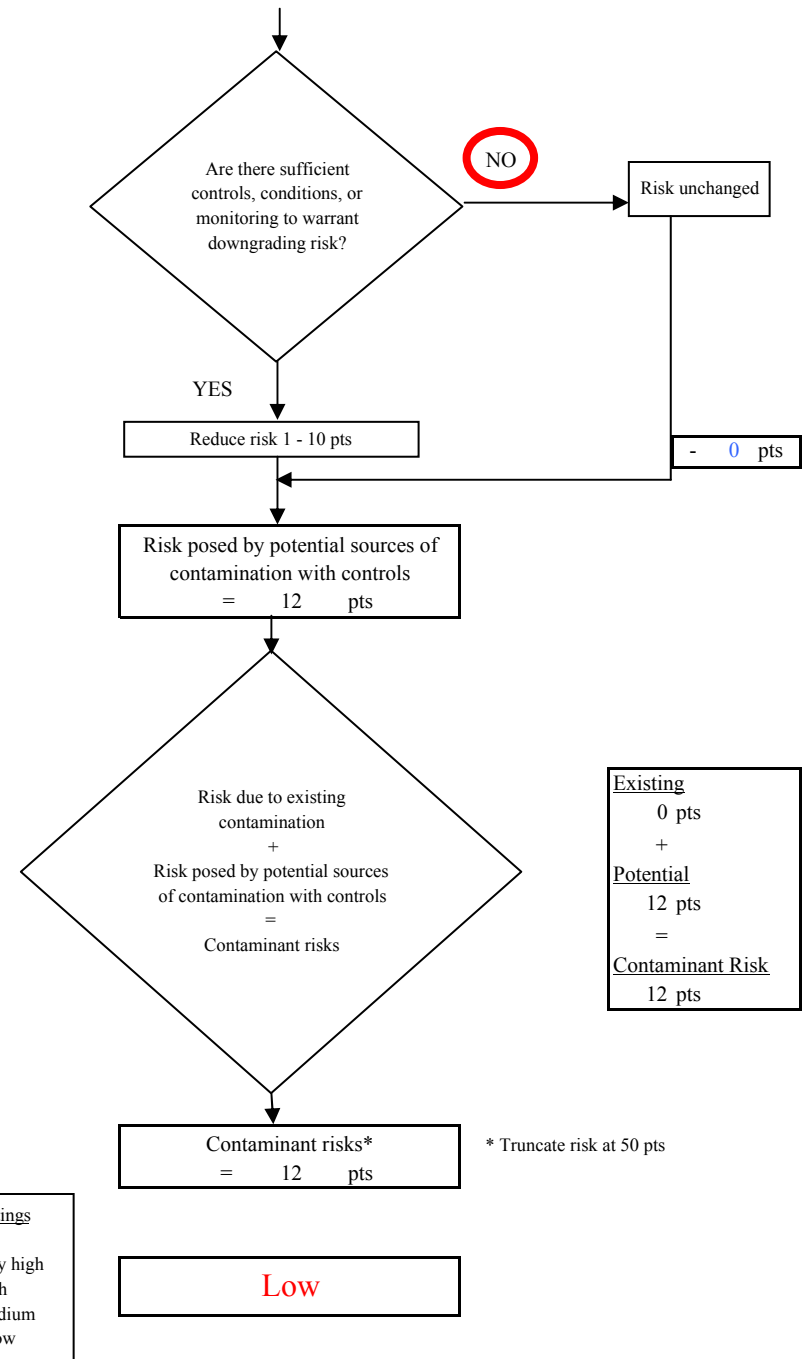
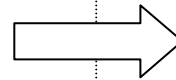
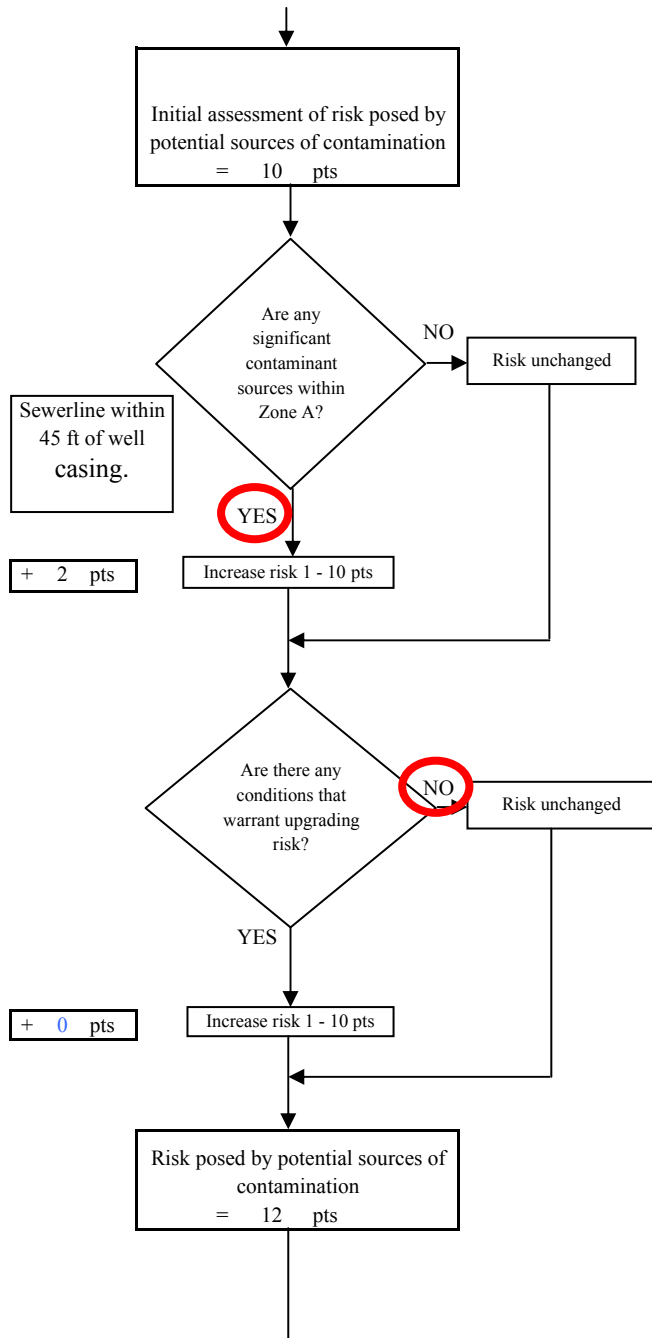
	<b>LOW</b> 10 pts	<b>MEDIUM</b> 20 pts	<b>HIGH</b> 30 pts	<b>VERY HIGH</b> 40 pts
<b>LOW</b>	≥ 10 sources + 10 pts	≥ 10 sources + 5 pts	≥ 20 sources + 5 pts	----
<b>MEDIUM</b>	----	≥ 2 sources + 5 pts	≥ 5 sources + 5 pts	≥ 10 sources + 5 pts
<b>HIGH</b>	----	----	≥ 1 source + 10 pts	≥ 2 sources + 10 pts
<b>VERY HIGH</b>	----	----	----	≥ 1 source + 10 pts

Matrix Score 10

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.

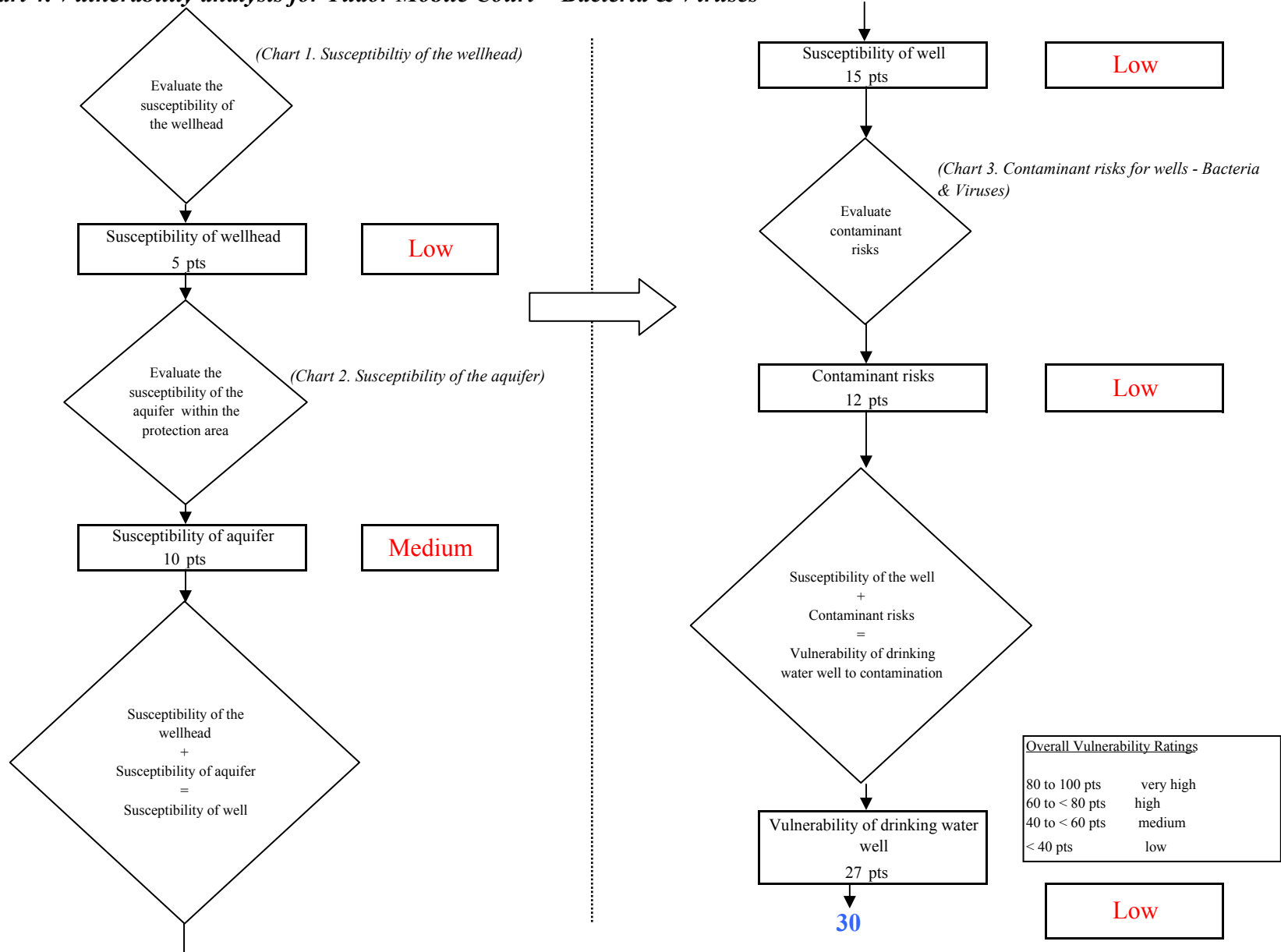


**Chart 3. Contaminant risks for Tudor Mobile Court - Bacteria & Viruses**



Contaminant Risk Ratings	
40 to 50 pts	very high
30 to < 40 pts	high
20 to < 30 pts	medium
< 20 pts	low

**Chart 4. Vulnerability analysis for Tudor Mobile Court - Bacteria & Viruses**



**Chart 5. Contaminant risks for Tudor Mobile Court - Nitrates and Nitrites**

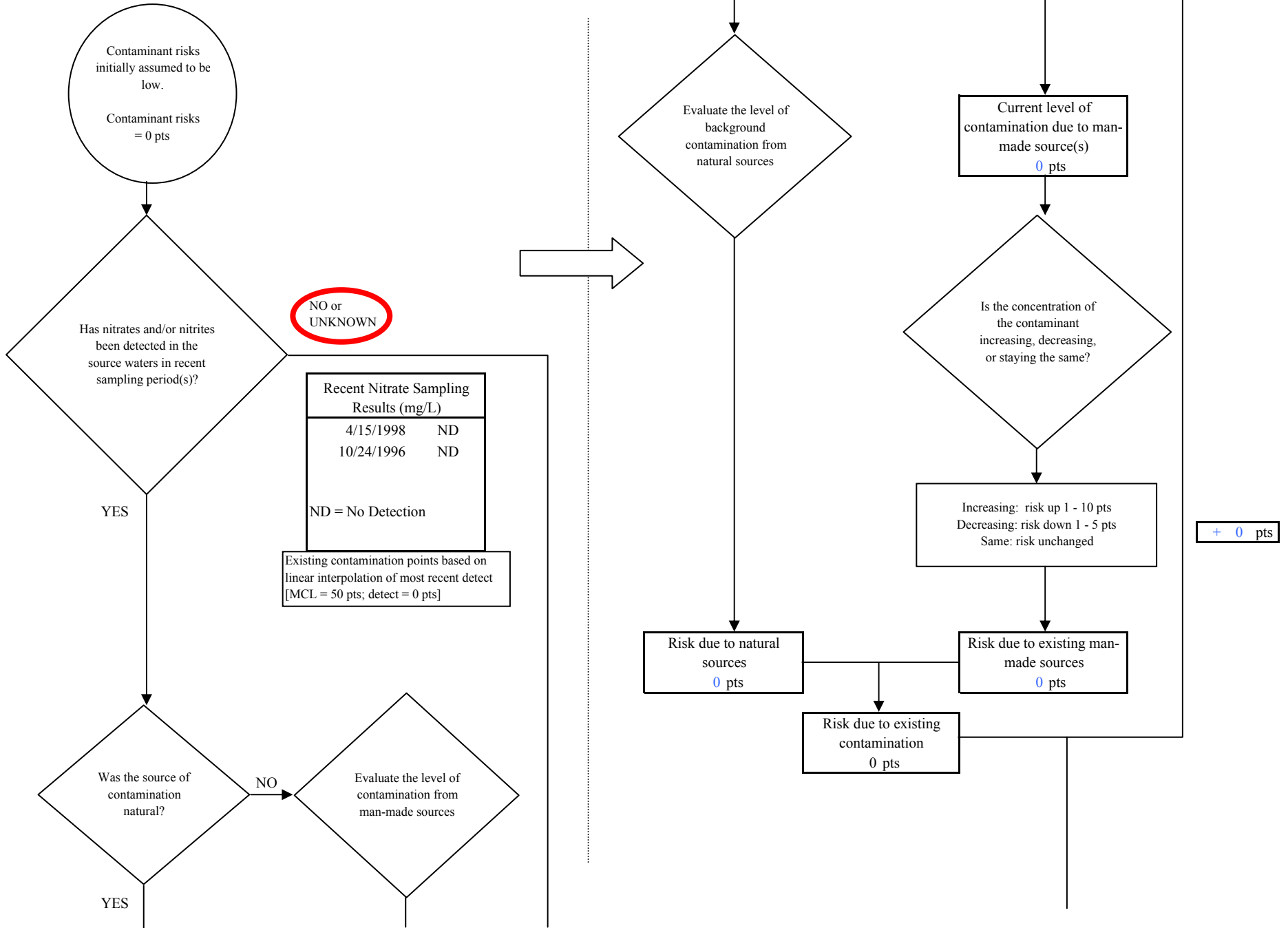
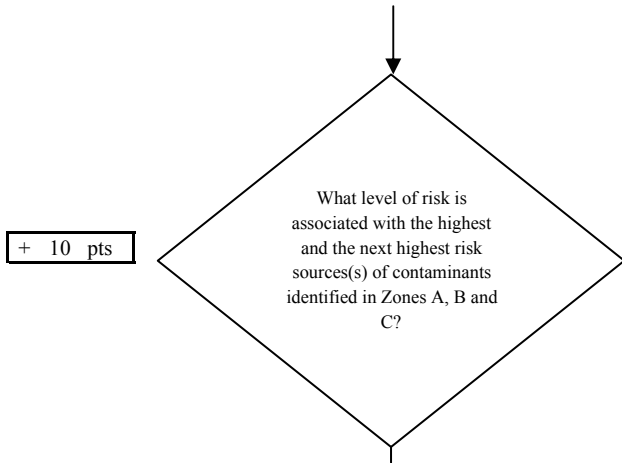


Chart 5. Contaminant risks for Tudor Mobile Court - Nitrates and Nitrites



Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0	0	0
Low(s)	3	7	10

	<b>LOW</b> 10 pts	<b>MEDIUM</b> 20 pts	<b>HIGH</b> 30 pts	<b>VERY HIGH</b> 40 pts
<b>LOW</b>	≥ 10 sources + 10 pts	≥ 10 sources + 5 pts	≥ 20 sources + 5 pts	----
<b>MEDIUM</b>	----	≥ 2 sources + 5 pts	≥ 5 sources + 5 pts	≥ 10 sources + 5 pts
<b>HIGH</b>	----	----	≥ 1 source + 10 pts	≥ 2 sources + 10 pts
<b>VERY HIGH</b>	----	----	----	≥ 1 source + 10 pts

Matrix Score 10

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.

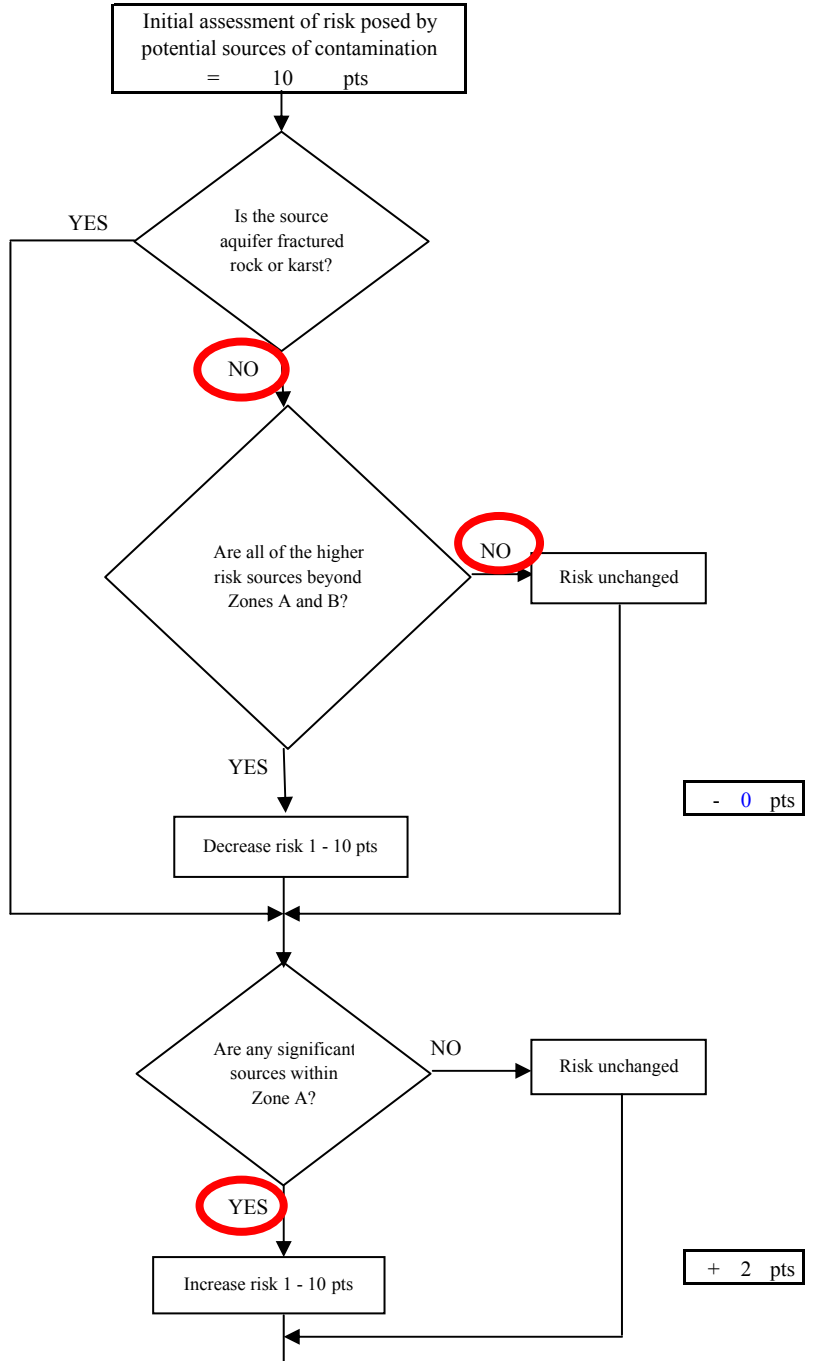
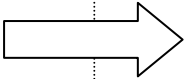
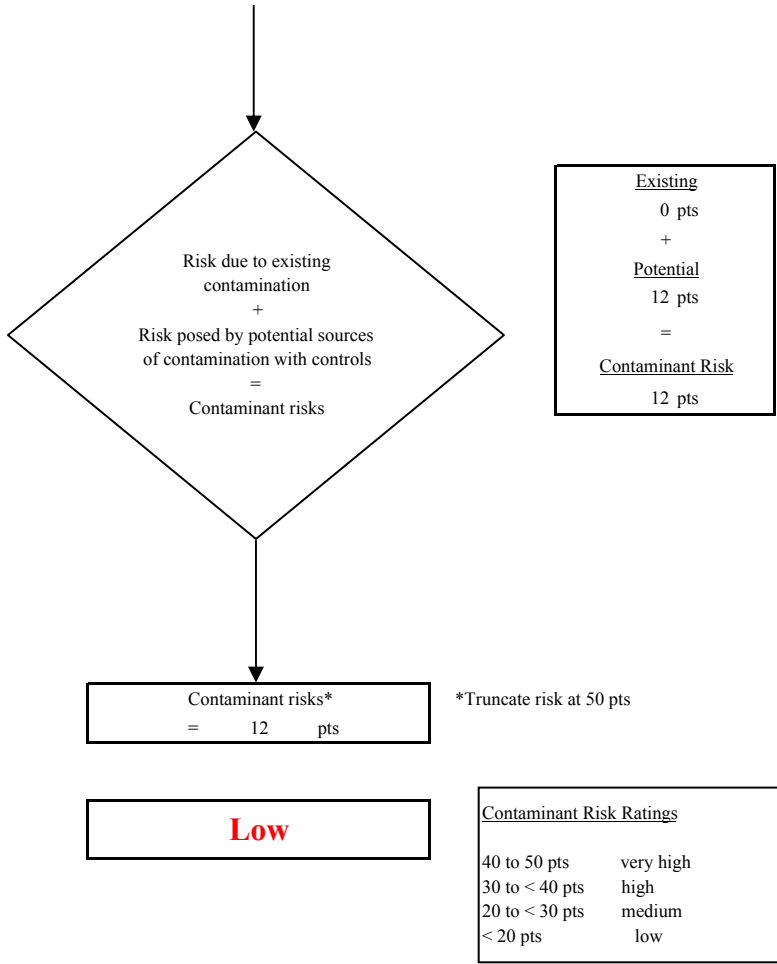
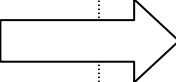
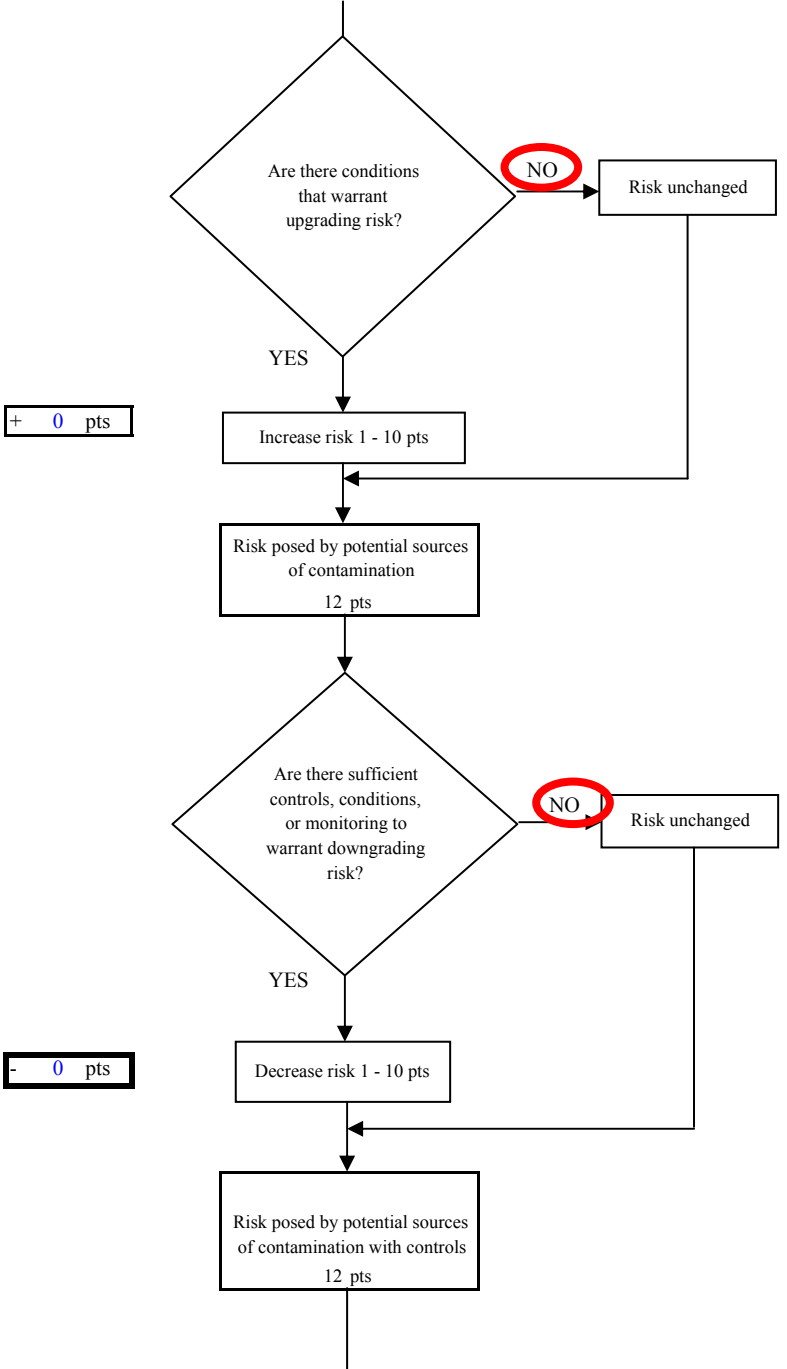
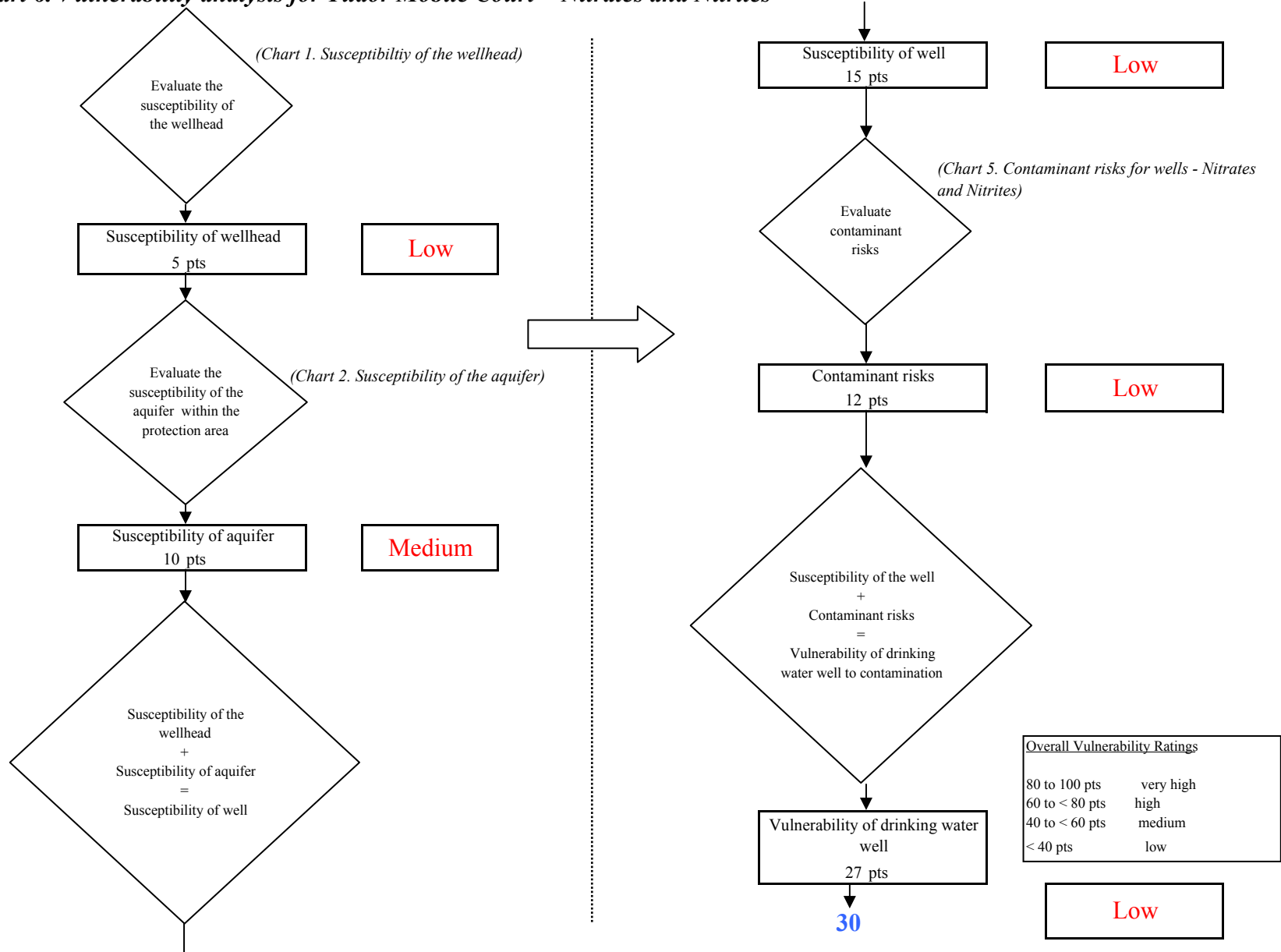


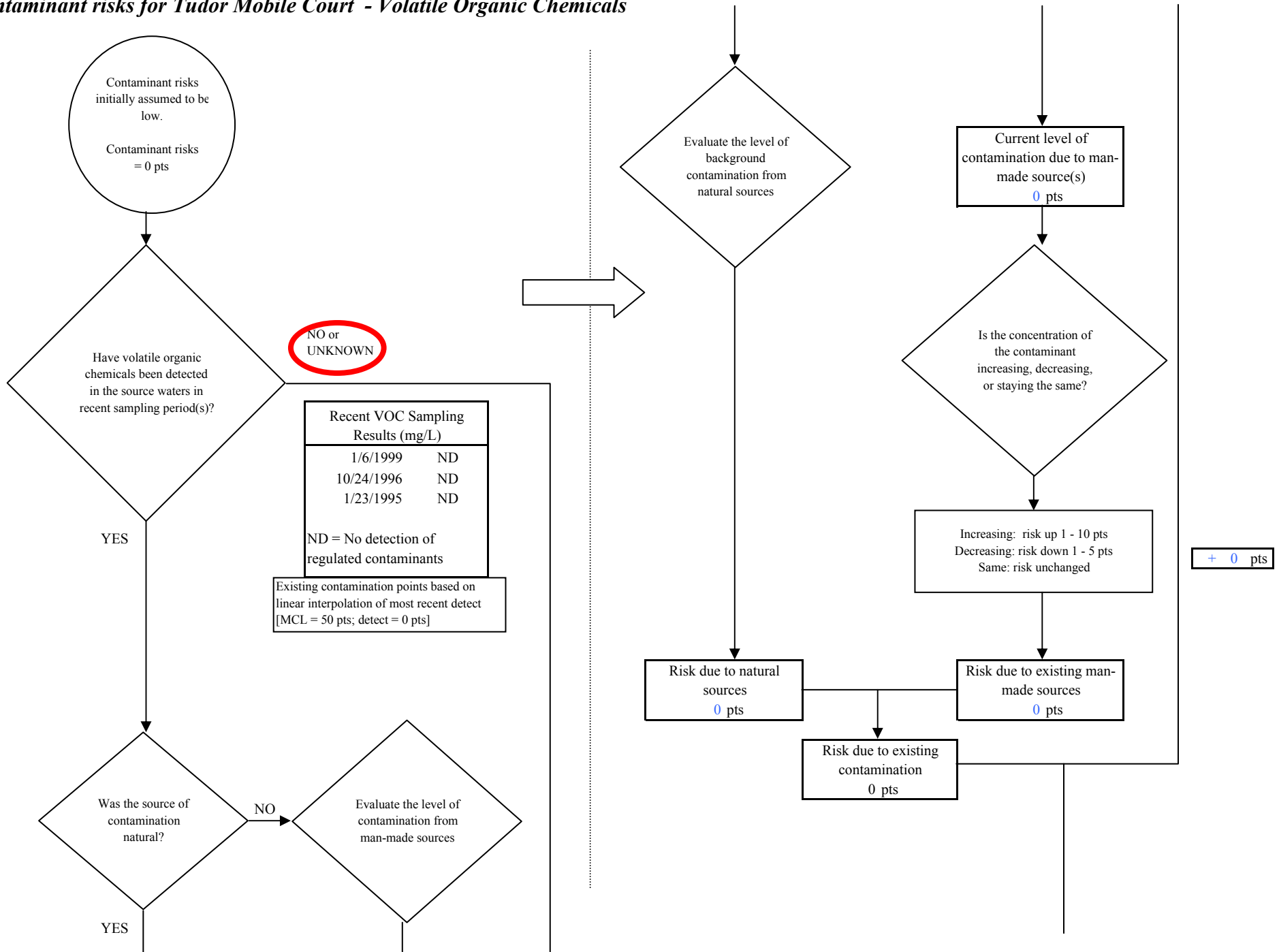
Chart 5. Contaminant risks for Tudor Mobile Court - Nitrates and Nitrites



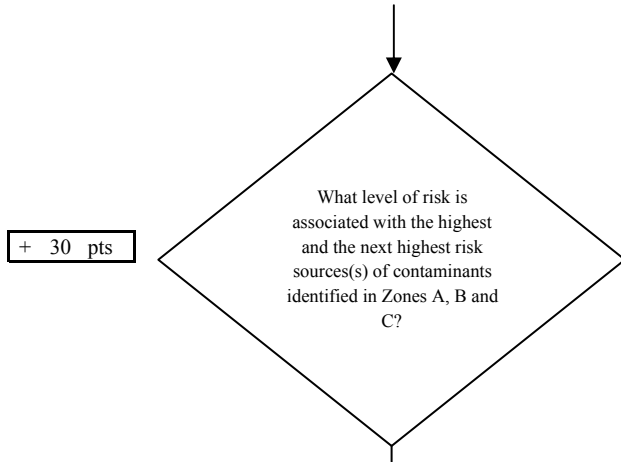
**Chart 6. Vulnerability analysis for Tudor Mobile Court - Nitrates and Nitrites**



**Chart 7. Contaminant risks for Tudor Mobile Court - Volatile Organic Chemicals**



**Chart 7. Contaminant risks for Tudor Mobile Court - Volatile Organic Chemicals**

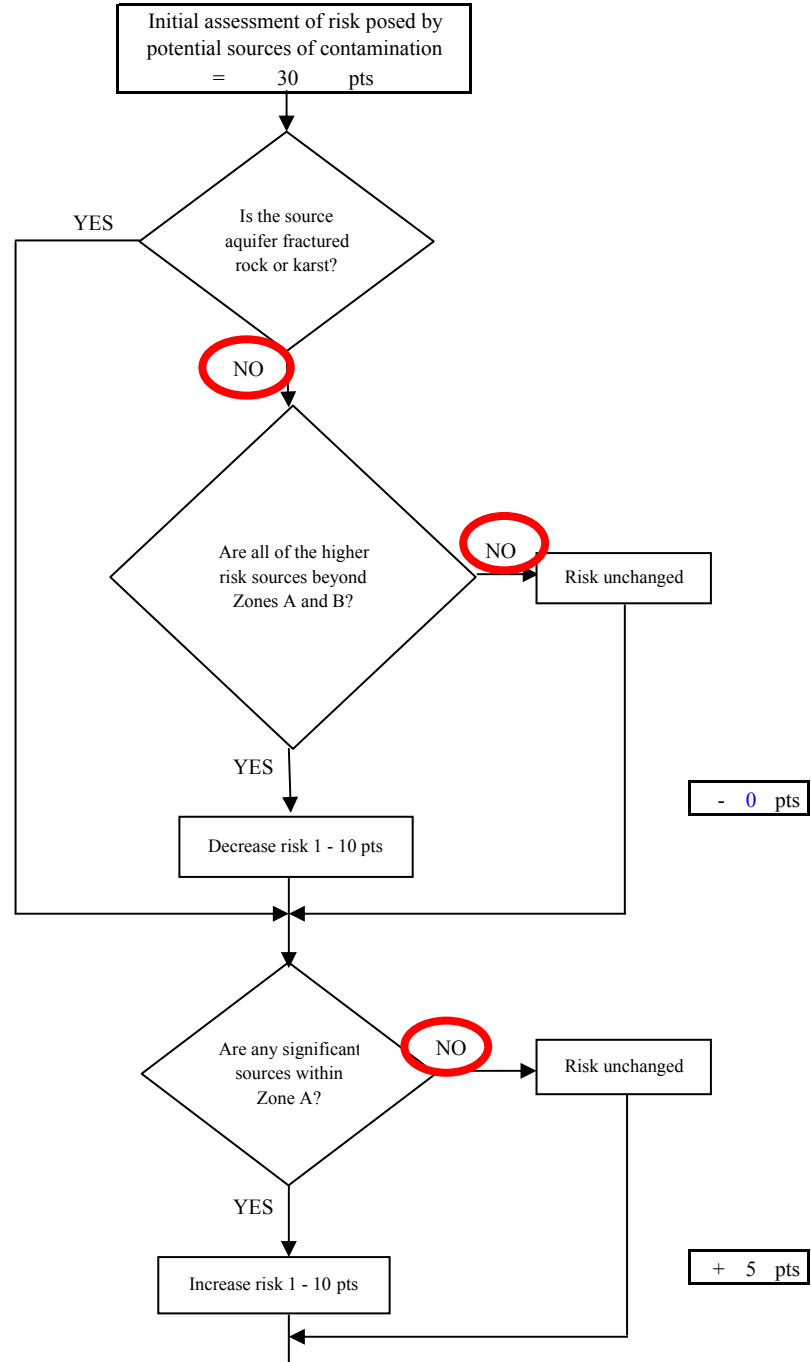
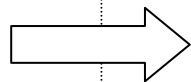


Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very High(s)	0	0	0
High(s)	0	1	1
Medium(s)	1	0	1
Low(s)	1	3	4

	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

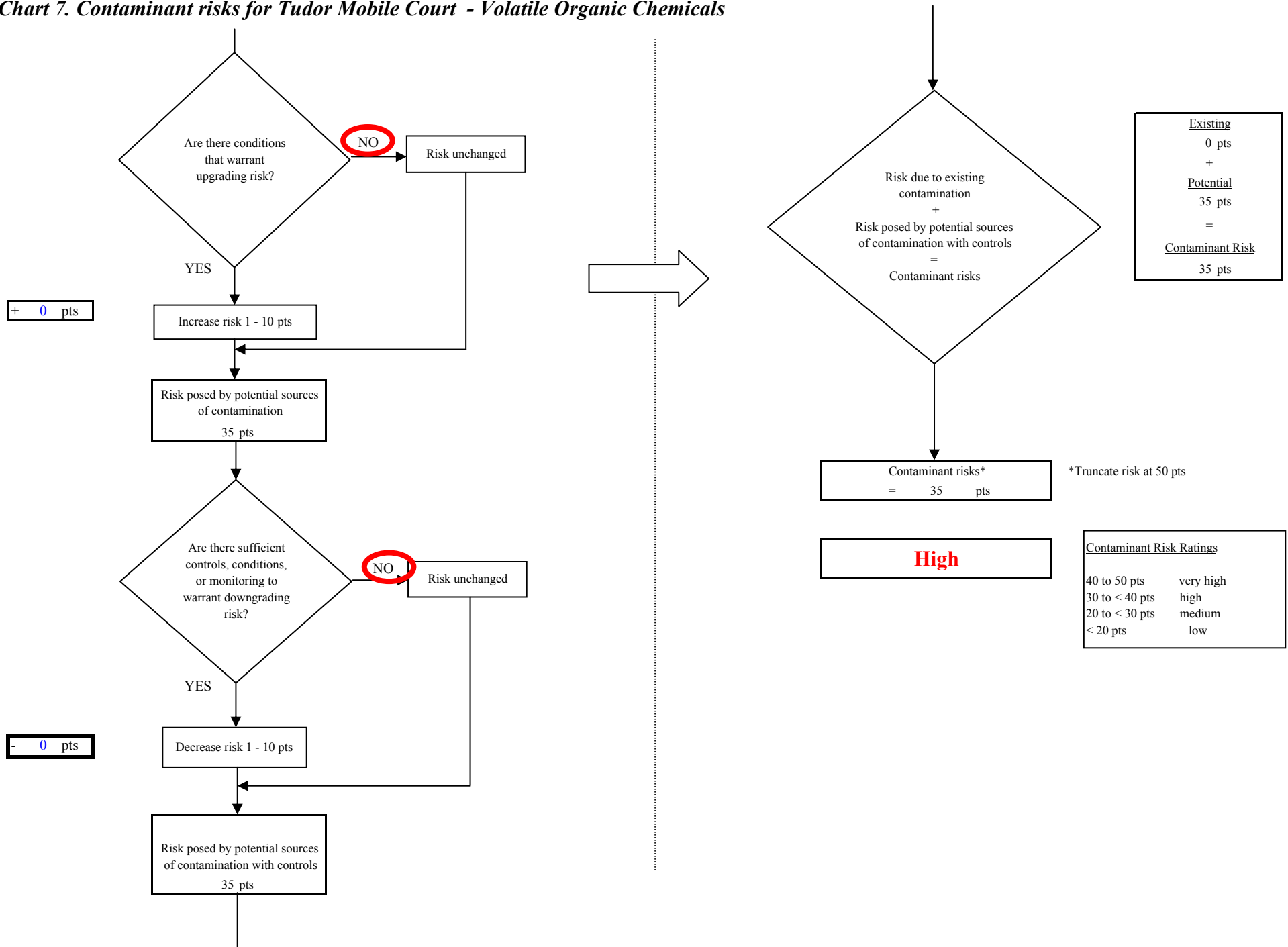
Matrix Score 30

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 7. Contaminant risks for Tudor Mobile Court - Volatile Organic Chemicals**



**Chart 8. Vulnerability analysis for Tudor Mobile Court - Volatile Organic Chemicals**

