Source Water Assessment for Palmer Correctional Center Well No.1 and No. 2

A Hydrogeologic Susceptibility and Vulnerability Assessment

DRINKING WATER PROTECTION PROGRAM REPORT 418
PWSID 226240.002 and 226240.003

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.

April 2002

Source Water Assessment for Palmer Correctional Center

Alaska Department of Environmental Conservation

DRINKING WATER PROTECTION PROGRAM REPORT 418

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION: 2002

CONTENTS

TABLES

ILLUSTRATIONS

APPENDICES

Hydrogeologic Susceptibility and Vulnerability Assessment for Palmer Correctional Center Public Drinking Water Source, Palmer, Alaska

Alaska Department of Environmental Conservation

Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

Palmer Correctional Center public water system consists of two Class A (community) wells. The potential and current sources of contaminants for Palmer Correctional Center Well No. 1 and Well No. 2 include: paved roads, residential septic systems, large capacity septic systems, and residential area. These existing and potential sources of contamination are considered a source of bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals, heavy metals, synthetic organic chemicals and other organic chemicals. Overall, Palmer Correctional Center Well No. 1 received a vulnerability rating of **Low** for bacteria and viruses and other organic chemicals; **Medium** for nitrates/nitrites, volatile organic chemicals, heavy metals, and synthetics organic chemicals. Palmer Correctional Center Well No. 2 received a vulnerability rating of **Low** for bacteria and viruses and other organic chemicals **High** for nitrates/nitrites and volatile organic chemicals; **Medium** for, heavy metals, synthetic organic chemicals.

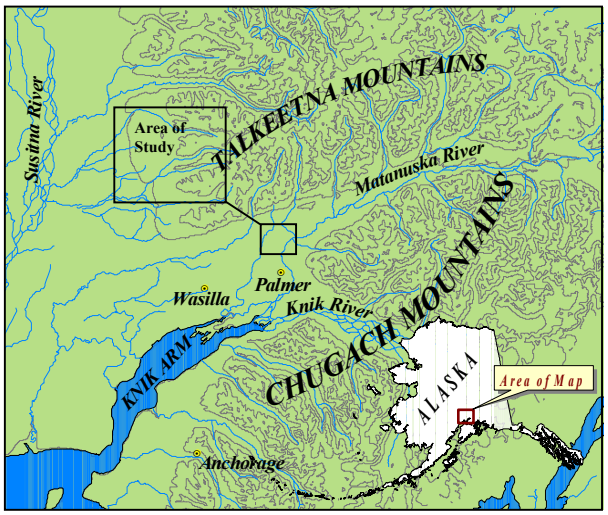

Figure 1. Index Map showing the location of the Matanuska-Susitna Valley and area of study.

INTRODUCTION

The purpose of this environmental assessment is to provide public water system owners/operators, communities, and local governments with information they can use to preserve the quality of Alaska's public drinking water supplies. This assessment was completed for the Palmer Correctional Center source of public drinking water. This source currently consists of two wells in the Sutton area (Figure 1). The system is planning to add another well in 2002. This assessment, known under the Alaska Drinking Water Protection Program as the Source Water Assessment, has combined a review of the natural hydrogeologic sensitivity with potential and existing contaminant risks to arrive at an overall vulnerability of the drinking water source to contamination. This assessment has been completed as a basis for local voluntary protection efforts and to assist agencies in their efforts to reduce risk to this public drinking water supply.

DESCRIPTION OF THE MATANUSKA-SUSITNA VALLEY-AREA, ALASKA

Location

The Matanuska-Susitna Valley is part of the lowland lying about 50 miles north of Anchorage in south central Alaska. The well described in this report is part of the Matanuska River Watershed. The study area is roughly bounded on the north by the Talkeetna Mountains; on the west by Wasilla Creek; on the south by the Knik River; and on the east by the Chugach Mountains. The area covers approximately 150 square miles.

Climate

The climate of the Matanuska-Susitna Valley is the result of a combination of marine and continental influences. The 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 is approximately 15 inches per year. On the average, the Valley receives a total snow accumulation of 58 inches per year. Precipitation generally increased inland toward the Talkeetna Mountains where annual precipitation may exceed 60 inches. Mean daily temperature ranges from 67° F during July to 5° F in January (Western Regional Climate Center, 2000).

Physiography and Groundwater Conditions

The Matanuska-Susitna Valley is surrounded by rugged mountains that rise abruptly above the valley floor. The Chugach Mountains at the southern edge of the valley reach altitudes greater than 6300 feet. These mountains are composed primarily of metamorphosed sedimentary marine and volcanic rocks. Along the northern edge of the valley, peaks in the Talkeetna Mountains reach altitudes of 3000 to 5000 feet. The Talkeenta Mountains are composed mainly of igneous rocks, granite intrusives and subordinate lavas and tuffs; Cretaceous and Tertiary sedimentary rocks form the south flank of the mountains. Although the altitude of the valley floor ranges from sea level at Knik Arm to 1000 feet at the base of Wishbone Hill, the local relief is commonly not more than 100 to 200 feet.

The Matanuska and Knik River's drain the area. These rivers are braided glacial outwash streams having wide floodplains. Drainage is poor in many interstream tracts resulting in large areas of swampy ground with shallow lakes occupying depressions.

The Matanuska-Susitna Valley is floored with unconsolidated deposits, chiefly glacial drift, that represents several episodes of glacial advances and retreats. The drift includes till, outwash stream deposits, and estuarine and lake deposits. Physiographic features formed by these deposits in or adjacent to the study area include end moraine, lateral moraines, eskers, crevasse fillings, and other pitted

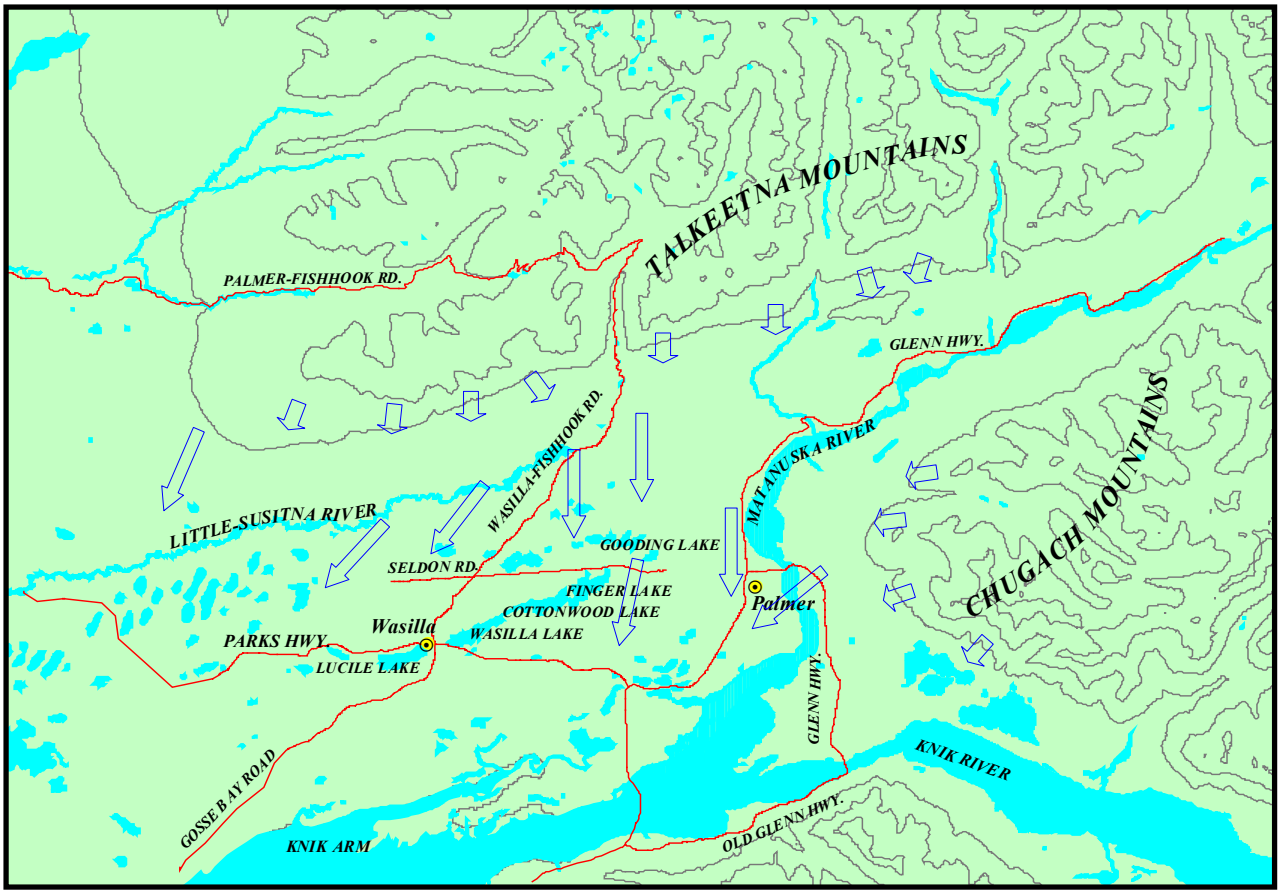

Figure 2. Map showing groundwater flow in the Matanuska-Susitna Valley (Jokela, Munter and Evans, 1991).

features, river terraces, outwash floodplains and an extensive estuarine flat (Trainer, 1960).

The glacial till and bedrock form aquifers of minor importance. The chief hydrologic significance of the till is in confining the artesian aquifer. Generally, the till is poorly permeable, although locally thin layers of sand may yield small quantities of water. Till that is present at or near the land surface in much of the area makes the acquisition of shallow groundwater difficult. The bedrock is poorly permeable. It yields water only from fractures, whose location and frequency cannot be easily predicted.

The chief aquifers are composed of outwash sand and gravel laid down by melt-water streams or in lakes. The outwash deposits are of two chief forms. The first consists of sheet-like deposits that lie just beneath the ground surface. These deposits range in thickness from a few feet to more than 100 feet. They typically rest on till or bedrock. The water in these deposits is unconfined. The other outwash deposits are buried beneath till. They are known to be as much as 50 to 60 feet thick, and probably are considerably thicker in some places. They commonly contain confined, or artesian, groundwater. Well logs and data from pumping tests suggest that outwash sand and gravel form a continuous or nearly continuous sheet in an area of more than 10 square miles north and west of Palmer (Jakola et al, 1991).

In the Mat-Su Valley, groundwater is primarily recharged by snowmelt and precipitation infiltrating both directly and also from the infiltration into the foothill slopes of the Talkeetna and Chugach Mountains. In addition,, aquifers may be recharged by streams where surface water percolates into surrounding permeable sediments (losing reaches of streams). This is the case for the water-table aquifers in the terrace south of Palmer and in the Bodenburg Butte area, which receive underground flow from the Matanuska River. Groundwater flow in the confined aquifers is generally from the north and north-northwest. 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 (Trainer,1960).

PALMER CORRECTIONAL CENTER PUBLIC WATER SOURCE

Palmer Correctional Center public water source is a Class A (community) water source, which is owned and operated by the state of Alaska. The source currently consists of two wells, is located approximately 1 mile west of the Glenn Highway off of 58 Mile Road. The two wells, Well No.1 and Well No.2 are approximately 1500 feet apart and are at an elevation of 775 feet. According to the well logs, neither Well No. 1 nor Well No. 2 are grouted. Records indicate that neither well penetrate a confining layer. The depth of Well No. 1 and No. 2 are 461 feet and 462 feet, respectively. It is unknown whether Well No. 1 is screened and the static water level at the time of drilling in 1963, was not recorded. Well No. 2 is screened from 452 feet 462 feet and had a static water level of 51 feet below the surface at the time of drilling (3/14/82). Both wells penetrate alternating layers of sand, gravel and boulders. Records indicate that the well casing for both well are not grouted. Grouting is a seal surrounding the well casing. The seal helps protect ground water resource from surface and/or subsurface contamination (NGWA, 2001).

The water from Well No. 1and Well No. 2 are mixed together prior to being distributed. This water source operates 365 days per year. According to the 1998 Sanitary Survey, the drinking water source collectively serves approximately 350 residents and 65 non-residents through one service connection.

A third well, Well No. 3 is used for irrigation and is not used as a drinking water source.

ASSESSMENT AND PROTECTION AREA FOR PALMER CORRECTIONAL CENTER DRINKING WATER SOURCE

The Drinking Water Protection and Assessment Area that has been established for the Palmer Correctional Center wells is the area that is most sensitive to contamination. This area has served as a basis for assessing the risk of the drinking water source to contamination. This zone around the drinking water source is the most critical area for the preservation of the quality of the drinking water for this source. For simplicity, this area will be known as your Drinking Water Protection Area and will serve as the area of focus for voluntary protection efforts.
Conceptually, groundwater enters the aquifer systems along the front range of the Talkeetna Mountains and flows toward Cook Inlet. An analytical calculation was used to calculate the size and shape of the area that contributes water to the well. The input parameters describing the attributes of the aquifer in this calculation were adopted from the well log and the recent Sanitary Survey. This analytical calculation was used as a guide in establishing the protection area for Palmer Correctional Center. Additional methods were further employed to take into account any uncertainties in groundwater flow and aquifer characteristics to arrive at a meaningful and conservative protection area

with respect to public health (Please refer to the Guidance Manual for Class A Public Water Systems for additional information).

The Drinking Water Protection Areas established for wells by the Alaska Department of Environmental Conservation (ADEC) are separated into zones. These zones correspond to a time-of-travel. Time-of-travel is the time required for water to move in the saturated zone of the ground from a specific point to the well. The Drinking Water Protection Areas for Palmer Correctional Center contains four zones, Zone A, Zone B, Zone C and Zone D (Map 1, Appendix A). Zone A corresponds to the area between the well and the distance equal to ¼ of the distance of the 2-year time-of-travel. Depending on where a contaminant source is located within Zone A, travel time for a contaminant to the well may be on the order of several days to several hours. Zone A also extends down gradient from the well to take into account the area of the aquifer that is influenced by pumping of the well. The Zone B protection area for Palmer Correctional Center corresponds to a time-of-travel of less than two years and extends toward base of the Talkeetna Mountains. Zone C protection area corresponds to a time-of-travel of greater than 2 years and less than 5 years. Zone D corresponds to a time-of-travel of greater than 5 years and less than 10 years.

INVENTORY OF POTENTIAL AND EXISTING CONTAMINANT SOURCES

The Drinking Water Protection Program has completed an inventory of potential and existing sources of contamination within the Drinking Water Protection Area for Palmer Correctional Center Well No. 1 and Well No. 2. This survey was completed through a search of agency records and other publicly available information.

Potential sources of contamination to drinking water supplies cover a wide range of categories and types. Potential drinking water contaminants are found within agricultural, residential, commercial, and industrial areas, but can also occur within areas that have little or no development.

For the basis of this assessment and all Class A public water system assessments, six categories of drinking water contaminants were inventoried. They include:

- Bacteria and viruses
- Nitrates and/or nitrites
- Volatile organic chemicals
- Heavy metals, cyanide, and other inorganic chemicals
- Synthetic organic chemicals
- Other organic chemicals

Table 1 in Appendix C lists the Contaminant Source Inventory for Palmer Correctional Center.
Below is a summary of the contaminant sources inventoried within the Palmer Correctional Center Well No. 1 and Well No. 2 protection area:

Well No. 1

- Paved roads
- Cropland
- Underground diesel tanks
- Underground gasoline tanks
- Underground used oil tanks
- Recognized contaminated sites
- Open Leaking Underground Storage Tank sites
- Closed Leaking Underground Storage Tank sites
- Solvent storage
- Residential area
- Injection Wells (Class V) Large Capacity Septic Systems

Well No. 2

- Paved roads
- Recognized contaminated sites
- Cropland
- Residential septic systems
- Injection Wells (Class V) Large Capacity Septic Systems

These potential contaminant sources present risks for all six categories of drinking water contaminants for Palmer Correctional Center drinking water source.

RANKING OF CONTAMINANT RISKS

Potential and existing sources of contamination have been identified, sorted, and ranked according to what type and level of risk they represent. Ranking of contaminant risks for a "potential" or "existing" source of contamination is a function of toxicity and volumes of specific contaminants associated with that source. Contaminant risks are further a function of the number and density of those types of contaminant sources as well as the proximity of those sources to the well (Appendices B & C).

VULNERABILITY OF PALMER CORRECTIONAL CENTER DRINKING WATER SOURCES

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

- Natural susceptibility; and
- Contaminant risks.

Each of the three 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)

The Well No. 1 and Well No. 2 are completed in an unconfined-aquifer setting. The well log indicates that alternating layers of sand, gravel, boulders exist from near the surface to the bottom of the well. These deposits are coarse and highly transmissive, allowing water to flow rapidly through the aquifer material. The lack of a confining layer, highly transmissive deposits and the absence of grouting decrease the protectiveness of the aquifer, allowing contaminants that enter the subsurface to enter the aquifer uninhibited.

Combining the susceptibilities of the wellhead and the aquifer to contamination leads to a score (0 – 50 points) and rating of overall Susceptibility (Appendix D). Table 1 shows the overall Susceptibility score and rating for Palmer Correctional Center.

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

Well No. 1	**Score**	**Rating**
Susceptibility of the Wellheads	5	Low
Susceptibility of the Aquifer	9	Medium
Natural Susceptibility	14	Low
Well No. 2		
Susceptibility of the Wellheads	5	Low
Susceptibility of the Aquifer	9	Medium
Natural Susceptibility	14	Low

Contaminant risks to a drinking water source depend on the type, number or density, and distribution of contaminant sources. A score (0 – 50 points) and rating of Contaminant Risks (See Appendix D) is assigned based on the findings of the Contaminant Source Inventory (See Appendix B - Table 1 – Table 7). This portion of the analysis examines recent existing or historical contamination that has been detected at the drinking water sources through routine sampling. It also reviews contamination that has or may have occurred but has not arrived or been detected at the either well. Table 2 summarizes the Contaminant Risks for each category of drinking water contaminants.

Table 2. Contaminant Risks

Contaminant Risks	**Score**	**Rating**
Well No. 1		
Bacteria and Viruses	12	Low
Nitrates and/or Nitrites	34	High
Volatile Organic Chemicals	42	Very High
Heavy Metals, Cyanide, And Other Inorganic Chemicals	27	Medium
Synthetic Organic Chemicals	30	High
Other Organic Chemicals	22	Medium
Well No. 2		
Bacteria and Viruses	12	Low
Nitrates and/or Nitrites	44	Very High
Volatile Organic Chemicals	50	High
Heavy Metals, Cyanide, And Other Inorganic Chemicals	22	Medium
Synthetic Organic Chemicals	50	Medium
Other Organic Chemicals	12	Low

Appendix D contains fourteen charts, which together form the 'Vulnerability Analysis' for a Class A public drinking water system. Chart 1 analyzes the 'Susceptibility of the Wellhead' to contamination by looking at the construction of the well and its surrounding area. Chart 2 analyzes the 'Susceptibility of the Aquifer' to contamination by looking at the naturally occurring attributes of the water source and influences on the groundwater system that might lead to contamination. Chart 3 analyzes 'Contaminant Risks' for the drinking water source with respect to bacteria and viruses. The 'Contaminant Risks' portion of the analysis considers potential sources of contaminants as well as a review of contamination that has or may have occurred but has not arrived or been detected at the well. Lastly, Chart 4 contains the 'Vulnerability Analysis for Bacteria and Viruses'. Charts 5 through 14 contain the Contaminant Risks and Vulnerability Analysis for nitrates and nitrites, volatile organic chemicals, heavy metals, synthetic organic chemicals, and other organic chemicals, respectively.

Vulnerability of drinking water sources to contamination is the combination of susceptibility of the aquifer and the well with contaminant risks. Table 3 contains the overall vulnerability scores (0 – 100) and ratings for each of the six categories of drinking water contaminants (See Appendix D). Note: scores are rounded off to the nearest five.

Table 3. Overall Vulnerability of Palmer Correctional Center Public Drinking Water Source to Contamination by Category

Category	Score	Rating
Well No. 1		
Bacteria and Viruses	25	Low
Nitrates and Nitrites	50	Medium
Volatile Organic Chemicals	55	Medium
Heavy Metals, Cyanide, and Other Inorganic Chemicals	41	Medium
Synthetic Organic Chemicals	45	Medium
Other Organic Chemicals	36	Low
Well No. 2		
Bacteria and Viruses	30	Low
Nitrates and Nitrites	60	High
Volatile Organic Chemicals	70	High
Heavy Metals, Cyanide, and Other Inorganic Chemicals	40	Medium
Synthetic Organic Chemicals	50	Medium
Other Organic Chemicals	30	Low

Tables 2 through 7 in Appendix B contain the ranking of potential and existing sources of contamination with respect to bacteria and viruses, nitrates and/or nitrites, heavy metals, synthetic organic chemicals, and other organic chemicals, respectively.

The contamination risk for the bacteria/viruses for Well No. 1 and Well No.2 are driven by the potential risk associated roads. No detection of bacteria and viruses has occurred in recent sampling history for either well. Combining the contamination risk with the natural susceptibility of the well leads to an overall vulnerability to bacteria and virus contamination of low.

The contamination risk for nitrate/nitrites at Well No.1 are driven by the potential risk associated with roads, cropland, resdidential area and large capacity septic systems.

Exisitng risk was determined by reviewing recent historical sampling data. The most recent detection at Well No. 1 indicates that nitrates were detected at 4% of the maximum contaminant level (MCL) of 10 mg/l on 7/5/01. (See Chart 5 – Contaminant Risks for nitrates and/or nitrites in Appendix D.) The MCL is the maximum level of contaminant that is allowed to exist in drinking water and still be consumed by humans without harmful effects. Combining the contamination risk with the natural susceptibility of the well leads to an overall vulnerability to nitrate/nitrite contamination of medium.

The contamination risk for nitrate/nitrites at Well No.2 are driven by the potential risk associated with roads, cropland, resdidential area, residential septic systems and large capacity septic systems.

Exisitng risk was determined by reviewing recent historical sampling data. The most recent detection at Well No. 2 indicates that nitrates were detected at 4% of the maximum contaminant level (MCL) of 10 mg/l on 7/23/01. (See Chart 5 – Contaminant Risks for nitrates and/or nitrites in Appendix D.) The MCL is the maximum level of contaminant that is allowed to exist in drinking water and still be consumed by humans without harmful effects. Combining the contamination risk with the natural susceptibility of the well leads to an overall vulnerability to nitrate/nitrite contamination of high. The difference in risk between the Well No.1

and Well No. 2 can be attributed to the number of Large Capacity Septic Systems (LCSS's) and the proximity to the well.

For purposes of this study, LCSS's are defined as septic systems serving more then one single family home. The United States Environmental Protection Agency's (USEPA) Underground Injection Control Program (UICP) is responsible for regulating large capacity septic systems (LCSS's) serving 20 or more individuals (USEPA, 1999).

Nitrates and/or nitrites are found in natural background concentration at this site, as elsewhere in Alaska. Other sources of nitrate and/or nitrites are human sewage, livestock manure, especially from feedlots and fertilizers. Due to high solubility and weak retention by soil, nitrates are very mobile often moving at approximately the same rate as water. According to the USEPA, short-term exposure to levels excessively above the MCL has caused serious illness and sometimes death. Serious illness in infants can occur due to the conversion of nitrate to nitrite by the body, which can interfere with the oxygen-carrying capacity of the child's blood. This can be an acute condition in which health deteriorates rapidly over a period of days. Symptoms include shortness of breath and blueness of the skin. Long term exposure to nitrates and nitrites at levels above the MCL can lead to diuresis, increased starchy deposits and hemorrhaging of the spleen (USEPA, 2001).

Because naturally less than 2 mg/l (or 20% the MCL), it is suspected that the nitrate levels detected are not being influenced by man made sources. (Wang, Strelakos, Jokela, 2000). The level of nitrate/nitrite detected at Palmer Correctional Center Well No.1 and No.2 remain at very safe levels with respect to human health.

The contaminant risks for volatile organic chemicals at Well No. 1are driven by the potential risk associated with roads, underground fuel tanks, recognized contaminated sites and leaking underground fuel storage tank (LUST) sites and large capacity septic systems.

Recent historical sampling of Well No. 1 indicates no detection of volatile organic chemicals. Combining the potential and existing contaminant risk with the natural susceptibility of the wells leads to an overall vulnerability to volatile organic chemical contamination of medium.

In December of 1993 approximately 480 gallons of diesel no. 1 was spilled from a 500-gallon above ground storage tank. (CS ID Tag: U04—03) 150 cubic yards of soil was excavated. The soil was stock piled, bermed and lined with passively vented biocell. The site is currently active and is classified as low priority.

In 1995, 165 gallons of diesel no. 1 spilled near the Medium Security Facility. CS ID Tag: U04-01) very little information is recorded for this site. The site was reviewed by Shannon and Wilson Environmental and a priority rating of low was assigned. The site is currently active.

During the removal of one 500 gallon diesel underground storage tank and one 1500 gallon buried heating oil tank, petroleum contamination was encountered near the Medium Security Facility. The site was originally designated as a Leaking Underground Storage Tank (LUST). The site was reclassified as a recognized contaminated site on 5/19/98 (CS ID Tag U04-02). This site is currently active and has a priority ranking of medium.

There is an active LUST site near the Maximum Security Facility. (Facility ID: 94, Event ID 672). Soil contamination was encountered during an underground tank closure. (CS ID Tag: U07-01) Information is limited as to what corrective action was taken. As of 1/18/94 levels of contamination still remain a the site. Records indicate that the site is still active and has a priority ranking of medium.
A closed LUST site (Facility ID 94 Event ID 977) exists near the Medium Security Facility. During the removal of tank #2 (CS ID Tag U08-01) soil contamination was discovered. Soil contaminated above the acceptable 200 kg/mg level for diesel was excavated from the site. It was determined that no further clean up was needed. However, as of 3/21/97, the excavated soil still needed to be treated. It is unknown whether the excavated soil was treated.

The contaminant risks for volatile organic chemicals at Well No. 2 are driven by the potential risk associated with roads, residential areas, residential septic systems, underground fuel tanks, recognized contaminated sites, leaking underground fuel storage tank (LUST) sites and large capacity septic systems.

Recent historical sampling of Well No. 2 indicates no detection of volatile organic chemicals. Combining the potential and existing contaminant risk with the natural susceptibility of the wells leads to an overall vulnerability to volatile organic chemical contamination of high.

In 1989 and 1998, respectively an estimated 20,000 gallons and 10,000 gallons of diesel spilled near the Maximum Security Facility. The cause of the spill was

a faulty fitting installed during a modification to the line. Clean up the site was deemed unfeasible due location of the spill being near a building structure. The contamination has been detected between 10ft and 82 ft below the surface. Monitoring wells have been established near the sites. The plan is to monitor the movement of the contaminants through 2008. To date, monitoring indicates that the contamination has not entered the groundwater and remains over 200 feet above the Well No. 2.

A closed LUST site (Facility ID 94 Event ID 878) During the removal of tank #4 soil contamination was discovered. (CS ID Tag- U07-01) Soil contaminated above the acceptable 200 kg/mg level for diesel was excavated from the site. However, as of 3/21/97, the excavated soil still needed to be treated. This site is considered active and is considered low priority.

The higher vulnerability ranking for Well No.2 can be attributed to the volume associated with past diesel spills that have occurred in the protection area.

The contaminant risks for heavy metals and inorganics at Well No. 1 are driven by the potential risks associated with roads, residential area, cropland, underground fuel tanks, recognized contaminated sites and large capacity septic systems.

Recent historical sampling of Well No. 1 indicates no detection of heavy metals and inorganics. Combining the potential and existing contaminant risk with the natural susceptibility of the wells leads to an overall vulnerability to heavy metals and inorganic chemical contamination of medium.

The contaminant risks for heavy metals and inorganics at Well No. 2 are driven by the potential risks associated with roads, residential area, residential septic systems, cropland, and large capacity septic systems.

Recent historical sampling of Well No. 2 indicates no detection of heavy metals and inorganics. Combining the potential and existing contaminant risk with the natural susceptibility of the wells leads to an overall vulnerability to heavy metals and inorganics chemical contamination of medium.

The contaminant risk for synthetic organic chemicals at Well No.1 is driven by the potential risk associated with a cropland, large capacity septic systems, residential septic systems and residential area.

Recent historical sampling of Well No. 1indicates no detection of regulated synthetic organic chemicals. Combining the potential and existing contaminant risk with the natural susceptibility of the wells leads to an overall vulnerability to synthetic organic chemical contamination of medium.

The contaminant risk for synthetic organic chemicals at Well No.2 is driven by the potential risk associated with cropland, large capacity septic systems, and residential area.

Recent historical sampling of Well No. 2 indicates no detection of regulated synthetic organic chemicals. Combining the potential and existing contaminant risk with the natural susceptibility of the wells leads to an overall vulnerability to synthetic organic chemical contamination of medium.

The contaminant risk for other organic chemicals at Well No. 1 is driven by the potential risk associated with roads, solvent storage, residential areas and large capacity septic systems.

Recent historical sampling of Well No. 1indicates no detection of other organic chemicals. Combining the potential and existing contaminant risk with the natural susceptibility of the wells leads to an overall vulnerability to other organic chemical contamination of low.

The contaminant risk for other organic chemicals at Well No. 2 is driven by the potential risk associated with roads, large capacity septic systems, residential septic systems and residential areas.

Recent historical sampling of Well No. 2 indicates no detection of other organic chemicals. Combining the potential and existing contaminant risk with the natural susceptibility of the wells leads to an overall vulnerability to other organic chemical contamination of low.

SUMMARY

A Source Water Assessment has been completed for the source of public drinking water serving Palmer Correctional Center. Well No.1 and Well No.2. The overall vulnerability of Well No.1 to contamination is **Low** for bacteria and viruses and other organic chemicals; **Medium** for nitrates/nitrites, volatile organic chemicals, heavy metals, and synthetics organic chemicals. The overall vulnerability of Well No.2 is to contamination is **Low** for bacteria and viruses and other organic chemicals; **High** for nitrates/nitrites and volatile organic chemicals and **Medium** for heavy metals and synthetic organic chemicals.

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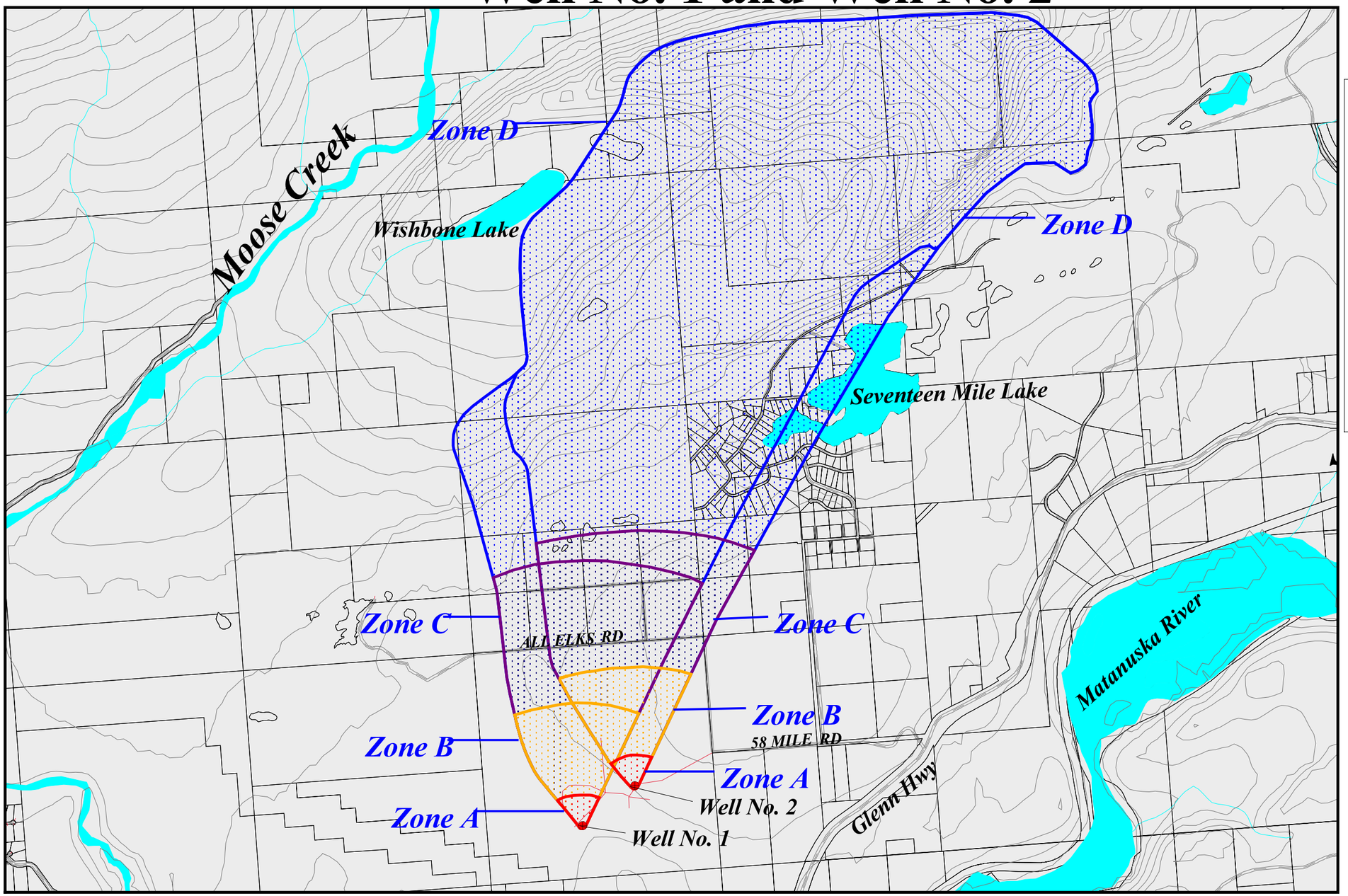
APPENDIX A

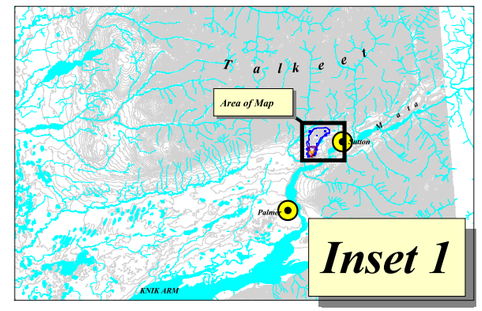
Palmer Correctional Center
Drinking Water Protection Area

Drinking Water Protection Area for Palmer Correctional Center
Well No. 1 and Well No. 2



Legend

- Palmer Correctional Center Public Water System
- Zone A Protection Area
- Several Months Travel Time
- Zone B Protection Area
- Less than 2 YearsTravel Time
- Zone C Protection Area
- Less than 5 Years Travel Time
- Zone D Protection Area
- Less than 10 Years Travel Time
- Elevation Contours
- Palmer Correctional Center Driveway
- Cities
- Lakes and streams
- Streams and Rivers
- Matanuska Susitna Borough Parcels
- Roads



N
W E
S

4000 0 4000 8000 Feet

PWSID 226240.002 and 226240.003

Map 1

APPENDIX B

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center

Table 1 *Contaminant Source Inventory for* ***PWSID 226240.002***

Palmer Correctional Center

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Location*	*Map Number*	*Comments*
Highways and roads, dirt/gravel	X24	X24-01	A	Palmer Correctional Center Driveway	3	
Highways and roads, dirt/gravel	X24	X24-02	A	Palmer Correctional Center Driveway	3	
Highways and roads, dirt/gravel	X24	X24-03	A	Palmer Correctional Center Driveway	3	
Cropland	A02	A02-01	B		3	Inactive airport runway. Currently used for agricultural purposes.
Tanks, diesel (underground)	T08	T08-01	B	Near Medium Security Facility	3	1000 gallons underground diesel tank. Double walled and cathodically protected. 10 years old. ADEC Tank No. 8. Next inspection 10/31/03.
Tanks, diesel (underground)	T08	T08-02	B	Near Medium Security Facility	3	2000 Gallons underground gasoline tank. Double walled and cathodically protected.The age is unknown. Next inspection 10/31/03 ADEC Tank No. 10.
Tanks, gasoline (underground)	T12	T12-01	B	Near Medium Security Facility	3	2000 gallons underground gasoline tank. Double walled and cathodically protected. The age is unknown. Next inspection 10/31/03 ADEC Tank No. 9.
Closed tanks, gasoline (underground)	T13	T13-01	B	Near Medium Security Facility	3	Tank No. 6 is repportedly permanently out of use. Closure status unknown. No recordsindicate that tank has been removed.
Closed tanks, gasoline (underground)	T13	T13-02	B	Near Medium Security Facility	3	Tank No. 7 Permanently out of use. Closure status unknown. No records that tank has been removed.
Tanks, heating oil, nonresidential (underground)	T16	T16-01	B	Near Medium Security Facility	3	500 gallons heating oil tank stored underground. Age not known. ADEC Tank No. 13.
Tanks, heating oil, nonresidential (underground)	T16	T16-02	B	Near Medium Security Facility	3	500 gallons heating oil tank stored underground. Age not known. ADEC Tank No. 14.
Tanks, heating oil, nonresidential (underground)	T16	T16-03	B	Near Medium Security Facility	3	10000 gallons of heating oil double walled and cathodically protected. 8 years old. Next inspection date not established. ADEC Tank No. 12.
Tanks, lubricants or other petroleum products (underground)	T20	T20-01	B	Near Medium Security Facility	3	500 gallons used oil stored underground. 8 years old. Next inspection date not established. ADEC Tank No. 11.

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Location*	*Map Number*	*Comments*
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	B	Near Medium Security Facility	3	Active: 165 gallons Diesel No. 1 spilled in 1995. Site assessed by Shannon and Wilson. Priority: Low
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	B	Near Medium Security Facility	3	Active: During the removal of one 500 gallon diesel Underground storage tank and one 1500 gallon buried heating oil tank, petroleum contamination encountered at both excavations. Priority: Medium
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-03	B	Near runway	3	Active: Release of less then 480 gallons diesel No. 1 from a 500 gallon above ground storage tank in 1993. Priority: Low
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-01	B	Near Maximum facility	3	Active: Soil contamination encountered during tank closure. Levels of contamination above cleanup action levels remain at the site. Priority: Medium
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U8-01	B	Near Medium Security Facility	3	Inactive:A 300 gallon diesel tank #2 was pulled. Soil contaminated above 200 kg.mg level for diesel. Soil excavated from the site. Soil presently stored on site must be treated. Priority: Low
Solvents (storage)	X13	X13-01	B	Near Medium Facility	3	
Residential Areas	R01	R01-01	C	Residential Area in Zone	2	
Highways and roads, dirt/gravel	X24	X24-04	C	All Elks Road	2	
Highways and roads, dirt/gravel	X24	X24-05	C	Christian Ridge Road	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	D	Near Christian Ridge Road	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	D	Near Yellowstone Circle	2	

Table 2

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center Sources of Bacteria and Viruses

PWSID 226240.002

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Location*	*Map Number*	*Comments*
Highways and roads, dirt/gravel	X24	X24-01	A	Low	Palmer Correctional Center Driveway	3	
Highways and roads, dirt/gravel	X24	X24-02	A	Low	Palmer Correctional Center Driveway	3	
Highways and roads, dirt/gravel	X24	X24-03	A	Low	Palmer Correctional Center Driveway	3	

Table 3

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center Sources of Nitrates/Nitrites

PWSID 226240.002

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Location*	*Map Number*	*Comments*
Cropland	A02	A02-01	B	High		3	Inactive airport runway. Currently used for agricultural purposes.
Highways and roads, dirt/gravel	X24	X24-01	A	Low	Palmer Correctional Center Driveway	3	
Highways and roads, dirt/gravel	X24	X24-02	A	Low	Palmer Correctional Center Driveway	3	
Highways and roads, dirt/gravel	X24	X24-03	A	Low	Palmer Correctional Center Driveway	3	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	D	High	Near Christian Ridge Road	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	D	High	Near Yellowstone Circle	2	
Highways and roads, dirt/gravel	X24	X24-04	C	Low	All Elks Road	2	
Highways and roads, dirt/gravel	X24	X24-05	C	Low	Christian Ridge Road	2	
Residential Areas	R01	R01-01	C	Low	Residential Area in Zone	2	

Table 4

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center Sources of Volatile Organic Chemicals

PWSID 226240.002

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Location	Map Number	Comments
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-01	B	Medium	Near Maximum facility	3	Active: Soil contamination encountered during tank closure. Levels of contamination above cleanup action levels remain at the site. Priority: Medium
Tanks, heating oil, nonresidential (underground)	T16	T16-03	B	Low	Near Medium Security Facility	3	10000 gallons of heating oil double walled and cathodically protected. 8 years old. Next inspection date not established. ADEC Tank No. 12.
Tanks, diesel (underground)	T08	T08-02	B	High	Near Medium Security Facility	3	2000 Gallons underground gasoline tank. Double walled and cathodically protected.The age is unknown. Next inspection 10/31/03 ADEC Tank No. 10.
Tanks, gasoline (underground)	T12	T12-01	B	High	Near Medium Security Facility	3	2000 gallons underground gasoline tank. Double walled and cathodically protected. The age is unknown. Next inspection 10/31/03 ADEC Tank No. 9.
Tanks, diesel (underground)	T08	T08-01	B	High	Near Medium Security Facility	3	1000 gallons underground diesel tank. Double walled and cathodically protected. 10 years old. ADEC Tank No. 8. Next inspection 10/31/03.
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-03	B	Medium	Near runway	3	Active: Release of less then 480 gallons diesel No. 1 from a 500 gallon above ground storage tank in 1993. Priority: Low
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-01	B	Medium	Near Medium Security Facility	3	Active: 165 gallons Diesel No. 1 spilled in 1995. Site assessed by Shannon and Wilson. Priority: Low
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	B	Medium	Near Medium Security Facility	3	Active: During the removal of one 500 gallon diesel Underground storage tank and one 1500 gallon buried heating oil tank, petroleum contamination encountered at both excavations. Priority: Medium
Solvents (storage)	X13	X13-01	B	Medium	Near Medium Facility	3	
Highways and roads, dirt/gravel	X24	X24-02	A	Low	Palmer Correctional Center Driveway	3	
Highways and roads, dirt/gravel	X24	X24-01	A	Low	Palmer Correctional Center Driveway	3	
Highways and roads, dirt/gravel	X24	X24-03	A	Low	Palmer Correctional Center Driveway	3	

Table 4 (continued)

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center
Sources of Volatile Organic Chemicals

PWSID 226240.002

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Location*	*Map Number*	*Comments*
Closed tanks, gasoline (underground)	T13	T13-01	B	Medium	Near Medium Security Facility	3	Tank No. 6 is repportedly permanently out of use. Closure status unknown. No recordsindicate that tank has been removed.
Closed tanks, gasoline (underground)	T13	T13-02	B	Medium	Near Medium Security Facility	3	Tank No. 7 Permanently out of use. Closure status unknown. No records that tank has been removed.
Tanks, heating oil, nonresidential (underground)	T16	T16-01	B	Low	Near Medium Security Facility	3	500 gallons heating oil tank stored underground. Age not known. ADEC Tank No. 13.
Tanks, heating oil, nonresidential (underground)	T16	T16-02	B	Low	Near Medium Security Facility	3	500 gallons heating oil tank stored underground. Age not known. ADEC Tank No. 14.
Closed Leaking Underground Fuel Storage Tank (LUST) Sites	U08	U8-01	B	Low	Near Medium Security Facility	3	Inactive:A 300 gallon diesel tank #2 was pulled. Soil contaminated above 200 kg.mg level for diesel. Soil excavated from the site. Soil presently stored on site must be treated. Priority: Low
Residential Areas	R01	R01-01	C	Low	Residential Area in Zone	2	
Highways and roads, dirt/gravel	X24	X24-04	C	Low	All Elks Road	2	
Highways and roads, dirt/gravel	X24	X24-05	C	Low	Christian Ridge Road	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	D	Low	Near Christian Ridge Road	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	D	Low	Near Yellowstone Circle	2	

Table 5

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

PWSID 226240.002

Contaminant Source Type	Contaminant Source ID	CS ID tag	Zone	Risk Ranking for Analysis	Location	Map Number	Comments
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	B	Medium	Near Medium Security Facility	3	Active: During the removal of one 500 gallon diesel Underground storage tank and one 1500 gallon buried heating oil tank, petroleum contamination encountered at both excavations. Priority: Medium
Tanks, gasoline (underground)	T12	T12-01	B	Medium	Near Medium Security Facility	3	2000 gallons underground gasoline tank. Double walled and cathodically protected. The age is unknown. Next inspection 10/31/03 ADEC Tank No. 9.
Tanks, heating oil, nonresidential (underground)	T16	T16-01	B	Low	Near Medium Security Facility	3	500 gallons heating oil tank stored underground. Age not known. ADEC Tank No. 13.
Tanks, heating oil, nonresidential (underground)	T16	T16-02	B	Low	Near Medium Security Facility	3	500 gallons heating oil tank stored underground. Age not known. ADEC Tank No. 14.
Tanks, heating oil, nonresidential (underground)	T16	T16-03	B	Low	Near Medium Security Facility	3	10000 gallons of heating oil double walled and cathodically protected. 8 years old. Next inspection date not established. ADEC Tank No. 12.
Cropland	A02	A02-01	B	Medium		3	Inactive airport runway. Currently used for agricultural purposes.
Highways and roads, dirt/gravel	X24	X24-01	A	Low	Palmer Correctional Center Driveway	3	
Highways and roads, dirt/gravel	X24	X24-02	A	Low	Palmer Correctional Center Driveway	3	
Highways and roads, dirt/gravel	X24	X24-03	A	Low	Palmer Correctional Center Driveway	3	
Highways and roads, dirt/gravel	X24	X24-04	C	Low	All Elks Road	2	
Residential Areas	R01	R01-01	C	Low	Residential Area in Zone	2	
Highways and roads, dirt/gravel	X24	X24-05	C	Low	Christian Ridge Road	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	D	Low	Near Christian Ridge Road	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	D	Low	Near Yellowstone Circle	2	

Table 6

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center Sources of Synthetic Organic Chemicals

PWSID 226240.002

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Location*	*Map Number*	*Comments*
Cropland	A02	A02-01	B	High		3	Inactive airport runway. Currently used for agricultural purposes.
Residential Areas	R01	R01-01	C	Low	Residential Area in Zone	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	D	Low	Near Christian Ridge Road	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	D	Low	Near Yellowstone Circle	2	

Table 7

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center Sources of Other Organic Chemicals

PWSID 226240.002

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Location*	*Map Number*	*Comments*
Solvents (storage)	X13	X13-01	B	Medium	Near Medium Facility	3	
Highways and roads, dirt/gravel	X24	X24-01	A	Low	Palmer Correctional Center Driveway	3	
Highways and roads, dirt/gravel	X24	X24-02	A	Low	Palmer Correctional Center Driveway	3	
Highways and roads, dirt/gravel	X24	X24-03	A	Low	Palmer Correctional Center Driveway	3	
Residential Areas	R01	R01-01	C	Low	Residential Area in Zone	2	
Highways and roads, dirt/gravel	X24	X24-04	C	Low	All Elks Road	2	
Highways and roads, dirt/gravel	X24	X24-05	C	Low	Christian Ridge Road	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	D	Low	Near Christian Ridge Road	2	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	D	Low	Near Yellowstone Circle	2	

Table 1 *Contaminant Source Inventory for* ***PWSID 226240.003***

Palmer Correctional Center

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Location*	*Map Number*	*Comments*
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	A	Near maximum Facility	5	Status:Active. Estmated 20,000 gallons of Diesel No. 1spill occurred in 1989. Clean was unfeasible due to the location of the spill. Extensive monitoring wells are in place. Priority: High
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-03	A	Near maximum Facility	5	Status Active. Estimated 10,000 gallons of Diesel No. 1 spill occurred in 1998. Cotamination levels noted to 82 feet below the surface. Excavation deemed not feasible. Monitoring wells in place. Status: High. Site is being monitorred.
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-01	A	Near Maximum Facility	5	Status: Active. Tank No. 4 pulled. Stored 300 gallons of diesel. Contamiantion was present. Priority: Low
Highways and roads, dirt/gravel	X24	X24-01	A	Palmer Correctional Center Driveway	4	Road name unknown
Cropland	A02	A02-01	B	Near maximum Facility	4	Inactive airport runway. Currently used for agricultural purposes.
Highways and roads, dirt/gravel	X24	X24-02	B	Palmer Correctional Center Driveway	4	Road name unknown
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	C	Near Christian Ridge Road	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	C	Near Seventeenmile Lake	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-03	C	Near Seventeenmile Lake	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-04	C	Near Seventeenmile Lake	4	
Residential Areas	R01	R01-01	C	All Residential area in Zone C	4	
Septic systems (serves one single-family home)	R02	R02-01	C	Near Christian Ridge	4	
Highways and roads, dirt/gravel	X24	X24-03	C	All Elks Road	4	
Highways and roads, dirt/gravel	X24	X24-04	C	Christian Ridge Road	4	

Table 2

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center Sources of Bacteria and Viruses

PWSID 226240.003

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Location*	*Map Number*	*Comments*
Highways and roads, dirt/gravel	X24	X24-01	A	Low	Palmer Correctional Center Driveway	4	Road name unknown
Highways and roads, dirt/gravel	X24	X24-02	B	Low	Palmer Correctional Center Driveway	4	Road name unknown

Table 3

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center Sources of Nitrates/Nitrites

PWSID 226240.003

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Location*	*Map Number*	*Comments*
Cropland	A02	A02-01	B	High	Near maximum Facility	4	Inactive airport runway. Currently used for agricultural purposes.
Highways and roads, dirt/gravel	X24	X24-01	A	Low	Palmer Correctional Center Driveway	4	Road name unknown
Highways and roads, dirt/gravel	X24	X24-02	B	Low	Palmer Correctional Center Driveway	4	Road name unknown
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	C	High	Near Christian Ridge Road	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	C	High	Near Seventeenmile Lake	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-03	C	High	Near Seventeenmile Lake	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-04	C	High	Near Seventeenmile Lake	4	
Residential Areas	R01	R01-01	C	Low	All Residential area in Zone C	4	
Septic systems (serves one single-family home)	R02	R02-01	C	Low	Near Christian Ridge	4	
Highways and roads, dirt/gravel	X24	X24-03	C	Low	All Elks Road	4	
Highways and roads, dirt/gravel	X24	X24-04	C	Low	Christian Ridge Road	4	

Table 4

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center Sources of Volatile Organic Chemicals

PWSID 226240.003

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Location*	*Map Number*	*Comments*
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-02	A	High	Near maximum Facility	5	Status:Active. Estmated 20,000 gallons of Diesel No. 1spill occurred in 1989. Clean was unfeasible due to the location of the spill. Extensive monitoring wells are in place. Priority: High
Contaminated sites, DEC recognized, non-Superfund, non-RCRA	U04	U04-03	A	High	Near maximum Facility	5	Status Active. Estimated 10,000 gallons of Diesel No. 1 spill occurred in 1998. Cotamination levels noted to 82 feet below the surface. Excavation deemed not feasible. Monitoring wells in place. Status: High. Site is being monitorred.
Open Leaking Underground Fuel Storage Tank (LUST) Sites	U07	U07-01	A	Low	Near Maximum Facility	5	Status: Active. Tank No. 4 pulled. Stored 300 gallons of diesel. Contamiantion was present. Priority: Low
Highways and roads, dirt/gravel	X24	X24-01	A	Low	Palmer Correctional Center Driveway	4	Road name unknown
Highways and roads, dirt/gravel	X24	X24-02	B	Low	Palmer Correctional Center Driveway	4	Road name unknown
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	C	Low	Near Christian Ridge Road	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	C	Low	Near Seventeenmile Lake	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-03	C	Low	Near Seventeenmile Lake	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-04	C	Low	Near Seventeenmile Lake	4	
Residential Areas	R01	R01-01	C	Low	All Residential area in Zone C	4	
Septic systems (serves one single-family home)	R02	R02-01	C	Low	Near Christian Ridge	4	
Highways and roads, dirt/gravel	X24	X24-03	C	Low	All Elks Road	4	
Highways and roads, dirt/gravel	X24	X24-04	C	Low	Christian Ridge Road	4	

Table 5

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center

Sources of Heavy Metals, Cyanide and Other Inorganic Chemicals

PWSID 226240.003

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Location*	*Map Number*	*Comments*
Cropland	A02	A02-01	B	Medium	Near maximum Facility	4	Inactive airport runway. Currently used for agricultural purposes.
Highways and roads, dirt/gravel	X24	X24-01	A	Low	Palmer Correctional Center Driveway	4	Road name unknown
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	C	Low	Near Christian Ridge Road	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	C	Low	Near Seventeenmile Lake	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-03	C	Low	Near Seventeenmile Lake	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-04	C	Low	Near Seventeenmile Lake	4	
Residential Areas	R01	R01-01	C	Low	All Residential area in Zone C	4	
Highways and roads, dirt/gravel	X24	X24-03	C	Low	All Elks Road	4	
Highways and roads, dirt/gravel	X24	X24-04	C	Low	Christian Ridge Road	4	
Septic systems (serves one single-family home)	R02	R02-01	C	Low	Near Christian Ridge	4	
Highways and roads, dirt/gravel	X24	X24-02	B	Low	Palmer Correctional Center Driveway	4	Road name unknown

Table 6

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center Sources of Synthetic Organic Chemicals

PWSID 226240.003

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Location*	*Map Number*	*Comments*
Cropland	A02	A02-01	B	High	Near maximum Facility	4	Inactive airport runway. Currently used for agricultural purposes.
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	C	Low	Near Christian Ridge Road	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	C	Low	Near Seventeenmile Lake	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-03	C	Low	Near Seventeenmile Lake	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-04	C	Low	Near Seventeenmile Lake	4	
Residential Areas	R01	R01-01	C	Low	All Residential area in Zone C	4	
Septic systems (serves one single-family home)	R02	R02-01	C	Low	Near Christian Ridge	4	

Table 7

Contaminant Source Inventory and Risk Ranking for Palmer Correctional Center Sources of Other Organic Chemicals

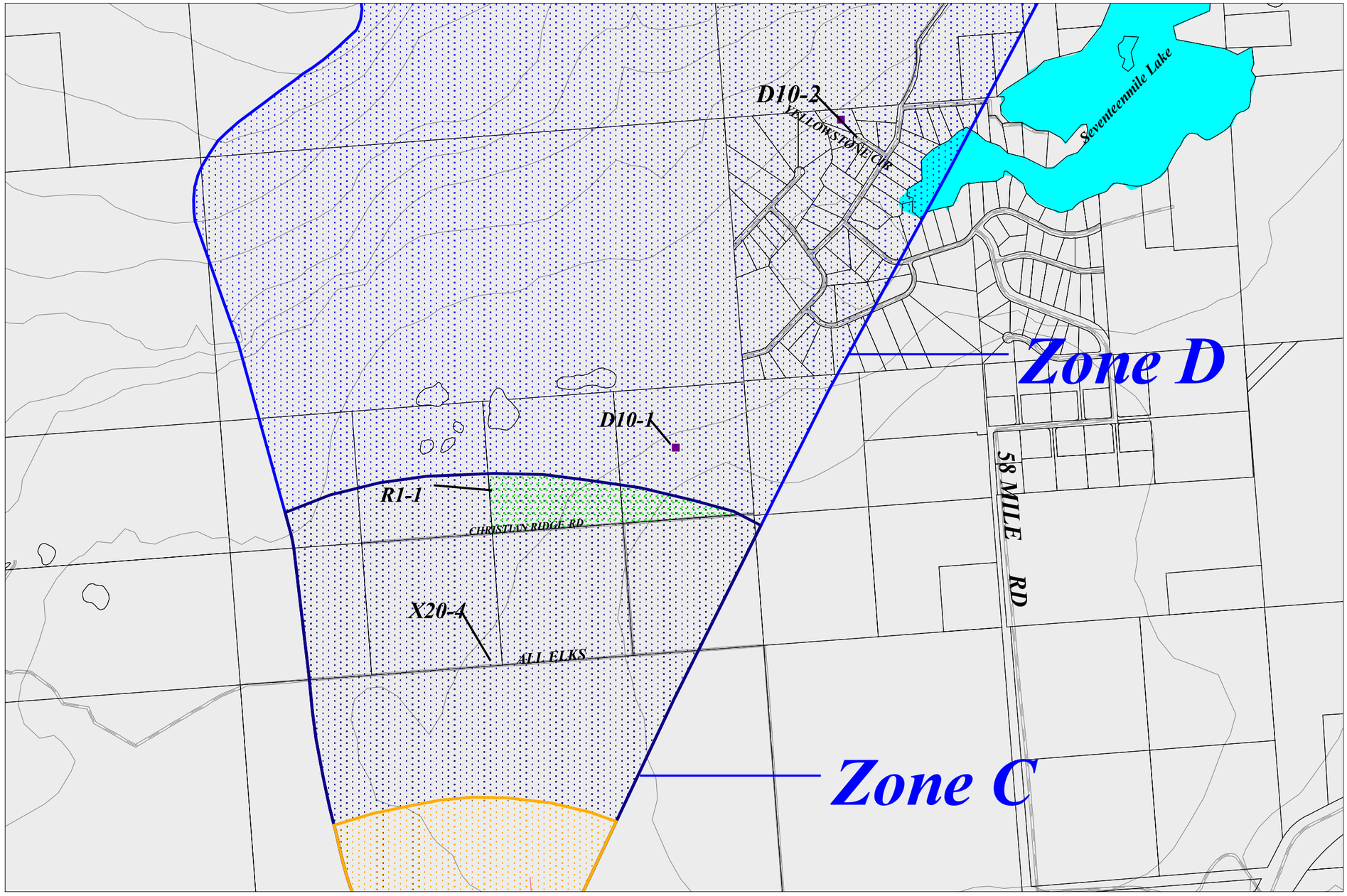
PWSID 226240.003

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Location*	*Map Number*	*Comments*
Highways and roads, dirt/gravel	X24	X24-01	A	Low	Palmer Correctional Center Driveway	4	Road name unknown
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-01	C	Low	Near Christian Ridge Road	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-02	C	Low	Near Seventeenmile Lake	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-03	C	Low	Near Seventeenmile Lake	4	
Injection wells (Class V) Large-Capacity Septic System (Drainfield Disposal Method)	D10	D10-04	C	Low	Near Seventeenmile Lake	4	
Residential Areas	R01	R01-01	C	Low	All Residential area in Zone C	4	
Septic systems (serves one single-family home)	R02	R02-01	C	Low	Near Christian Ridge	4	
Highways and roads, dirt/gravel	X24	X24-02	B	Low	Palmer Correctional Center Driveway	4	Road name unknown
Highways and roads, dirt/gravel	X24	X24-03	C	Low	All Elks Road	4	
Highways and roads, dirt/gravel	X24	X24-04	C	Low	Christian Ridge Road	4	

APPENDIX C

Palmer Correctional Center
Drinking Water Protection Area
and Potential & Existing Contaminant Sources

Drinking Water and Protection Area for Palmer Correctional Center Well No. 1 and Potential and Exisiting Sources of Contamination



Legend

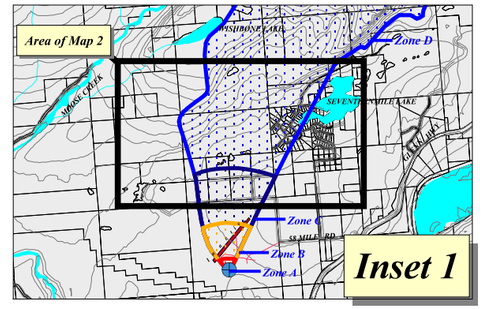
- Palmer Correctional Center Well No.1

Zone A Protection Area
- Several Months Travel Time

Zone B Protection Area
- Palmer Correctional Center

- Zone C Protection Area

Zone D Protection Area
- Palmer Correctional Center
- Class V Injection Wells (D10)
- Residential (R01)
- Mat-Su Borough Parcels
- Lakes and Rivers
- Rivers and Streams
- Roads
- Palmer Correctional Center Driveway
- Elevation Contours



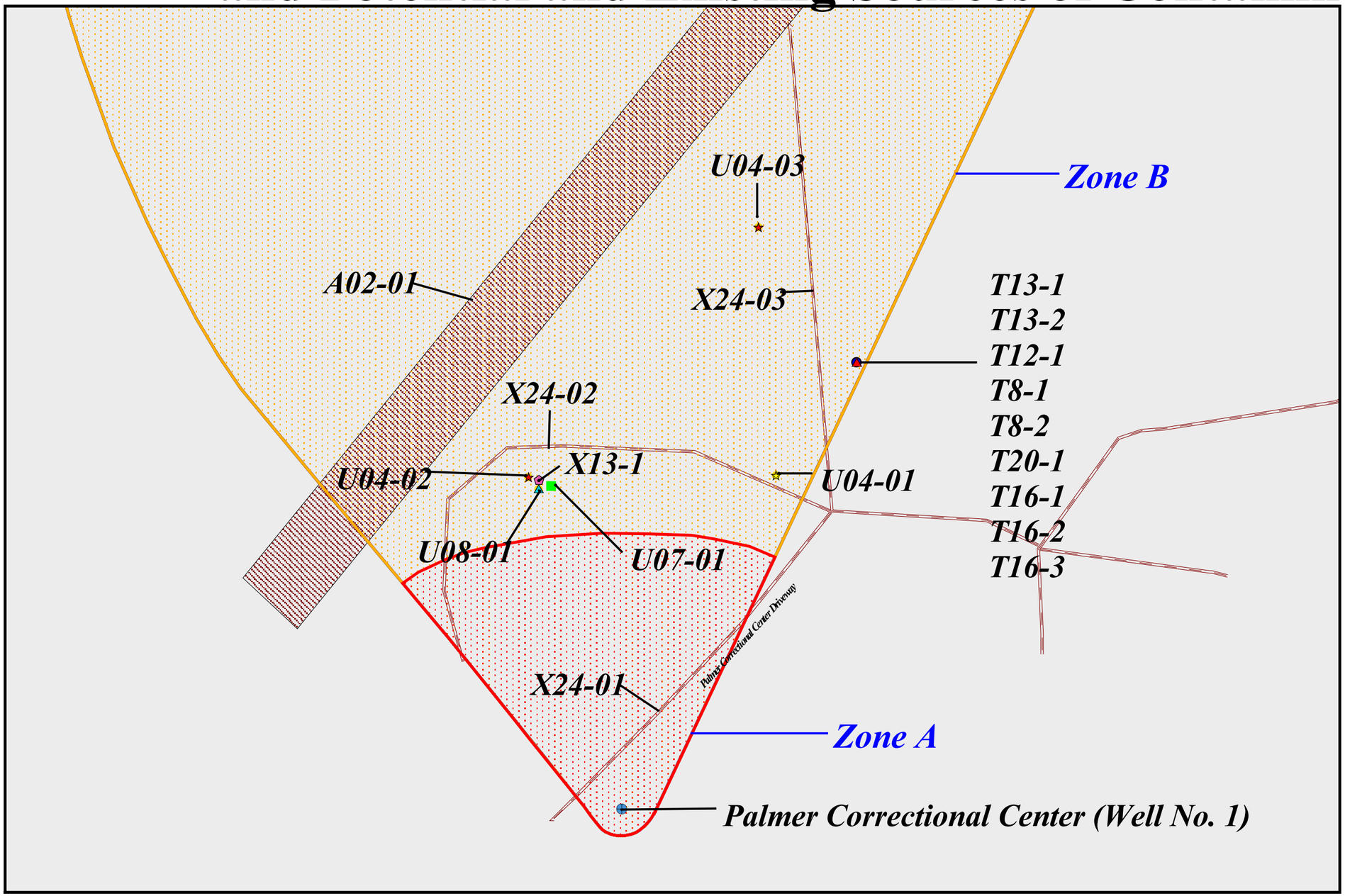
N
W E
S

2000 0 2000 Feet

PWSID 226240.002 (Well No. 1)

Map 2

Drinking Water Protection Area for Palmer Correctional Center Well No.1 and Potential and Existing Sources of Contamination



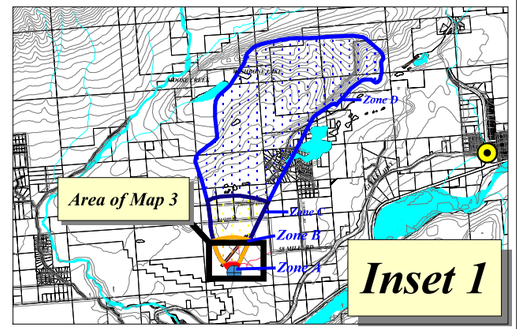
Legend

Palmer_csi_well_1.shp
- Closed Leaking Underground Fuel Storage Tank (LUST) Site
- Closed tanks, gasoline (underground)
- Contaminated sites, DEC recognized, non-Superfund, non
- Open Leaking Underground Fuel Storage Tank (LUST) Site
- Solvent Storage
- Tanks, diesel (underground)
- Tanks, gasoline (underground)
- Tanks, heating oil, nonresidential (underground)
- Tanks, lubricants or other petroleum products (undergr
- Palmer Correctional Center Well No.1

Zone A Protection Area
- Several Months Travel Time

Zone B Protection Area
- Palmer Correctional Center
- Zone C Protection Area

Zone D Protection Area
- Palmer Correctional Center
- Cropland (A02)
- Rivers and Streams
- Mat-Su Borough Parcels
- Roads
- Palmer Correctional Center Driveway



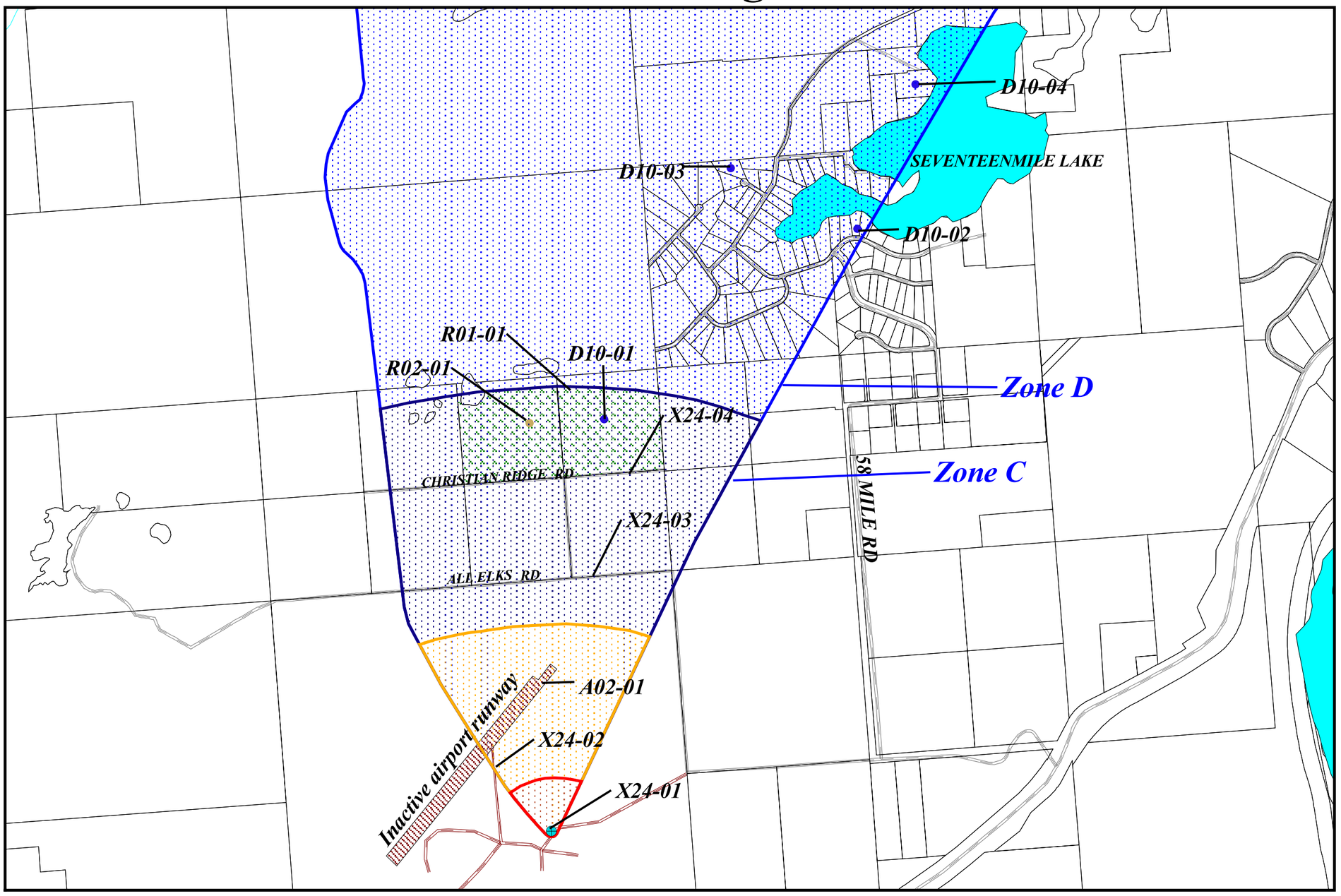
N
W E
S

600 0 600 Feet

PWSID 226240.002 (Well No. 1)

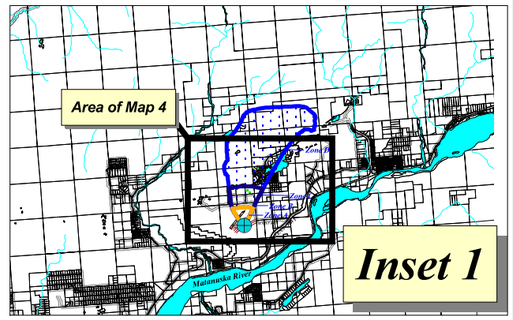
Map 3

Drinking Water Protection Area for Palmer Correctional Center Well No. 2 and Potential and Existing Sources of Contamination



Legend

- Palmer Correctional Center Well No. 2
- 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
- Class V Injection Wells (D10)
- Septics (R02)
- Residential (R01)
- Lakes and streams
- Rivers and Streams
- Mat-Su Borough Parcels
- Cropland (A02)
- Roads
- Palmer Correctional Center Driveway



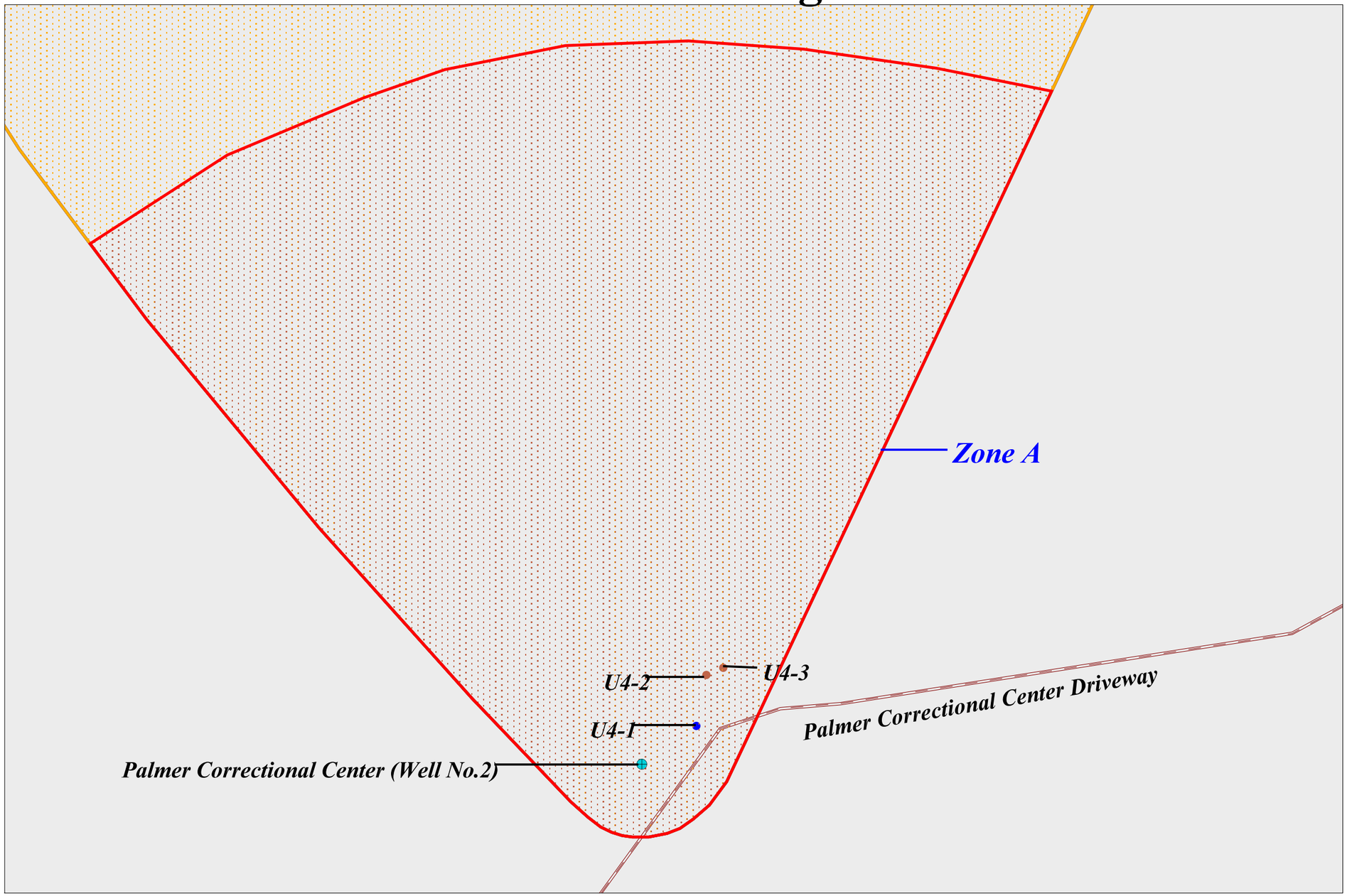
N
W E
S

0 6000 Feet

PWSID 226240.003 (Well No. 2)

Map 4

Drinking Water Protection Area for Palmer Correctional Center Well No. 2 and Potential and Existing Sources of Contamination



Legend

- Palmer Correctional Center Well No. 2

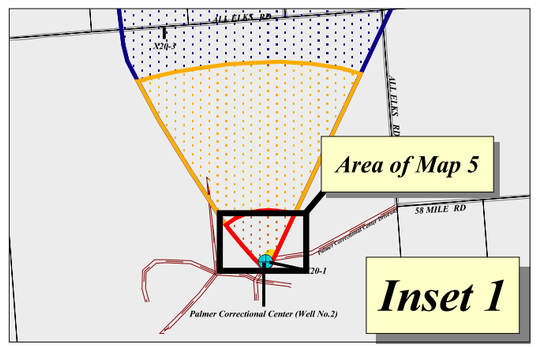
Zone A Protection Area
- Several Months Travel Time

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 and Exisiting Contaminant Sources
- Contaminated sites, DEC recognized, non-Superfund, non-RCRA
- Open Leaking Underground Fuel Storage Tank (LUST) Sites
- Septics (R2)
- Class V Injection Wells (D10)
- Residential Area (R1)
- Lakes and streams
- Rivers and Streams
- Mat-Su Borough Parcels
- Cropland (A02)
- Palmer Correctional Center Driveway
- Roads



N
W E
S

100 0 100 200 Feet

PWSID 226240.003 (Well No. 2)

Map 5

APPENDIX D

Vulnerability Analysis for Palmer Correctional Center Public Drinking Water Source

Chart 1. Susceptibility of the wellhead - Palmer Correctional Center Well No. 1

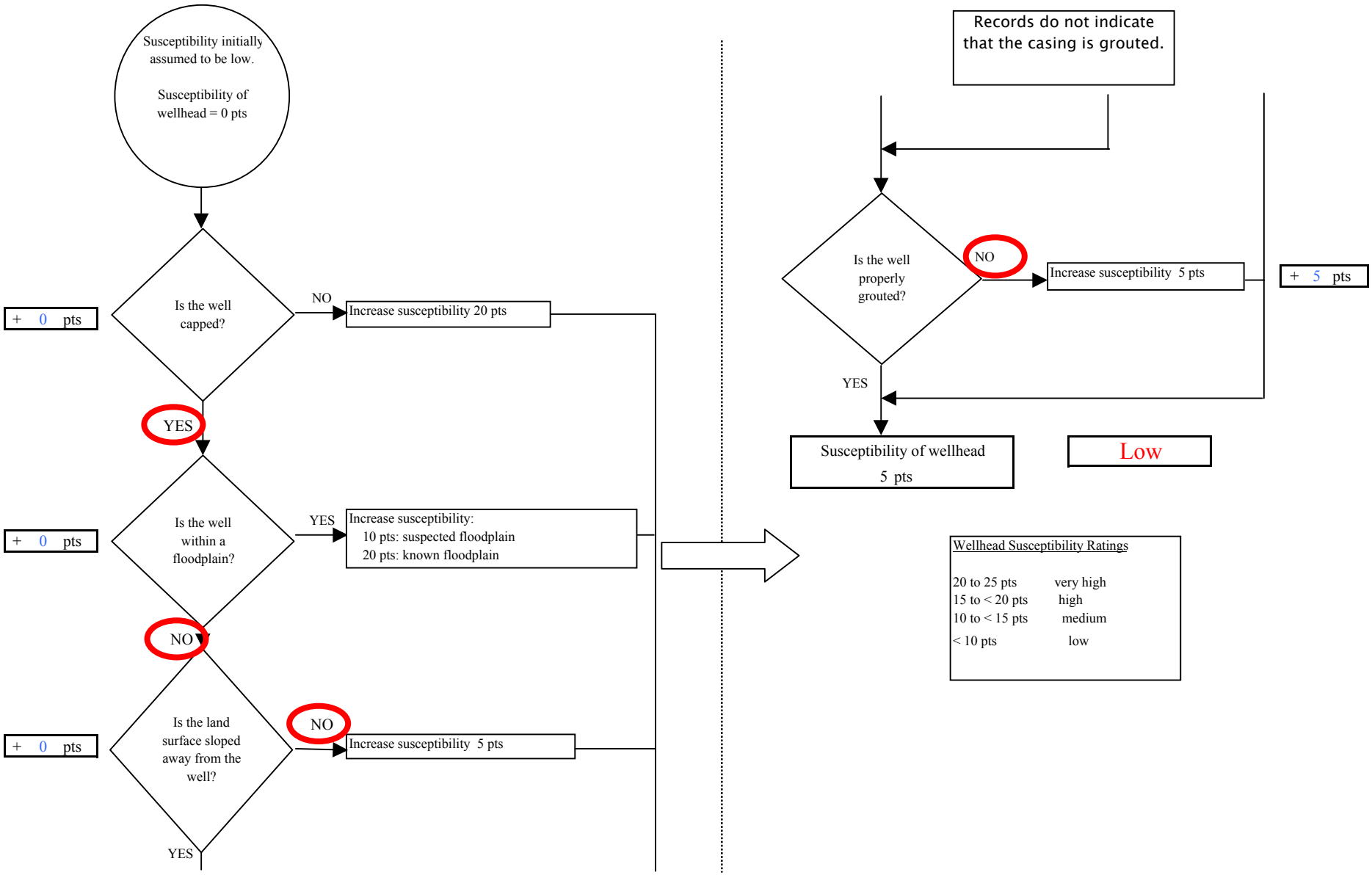


Chart 2. Susceptibility of the aquifer -Palmer Correctional Center Well No. 1

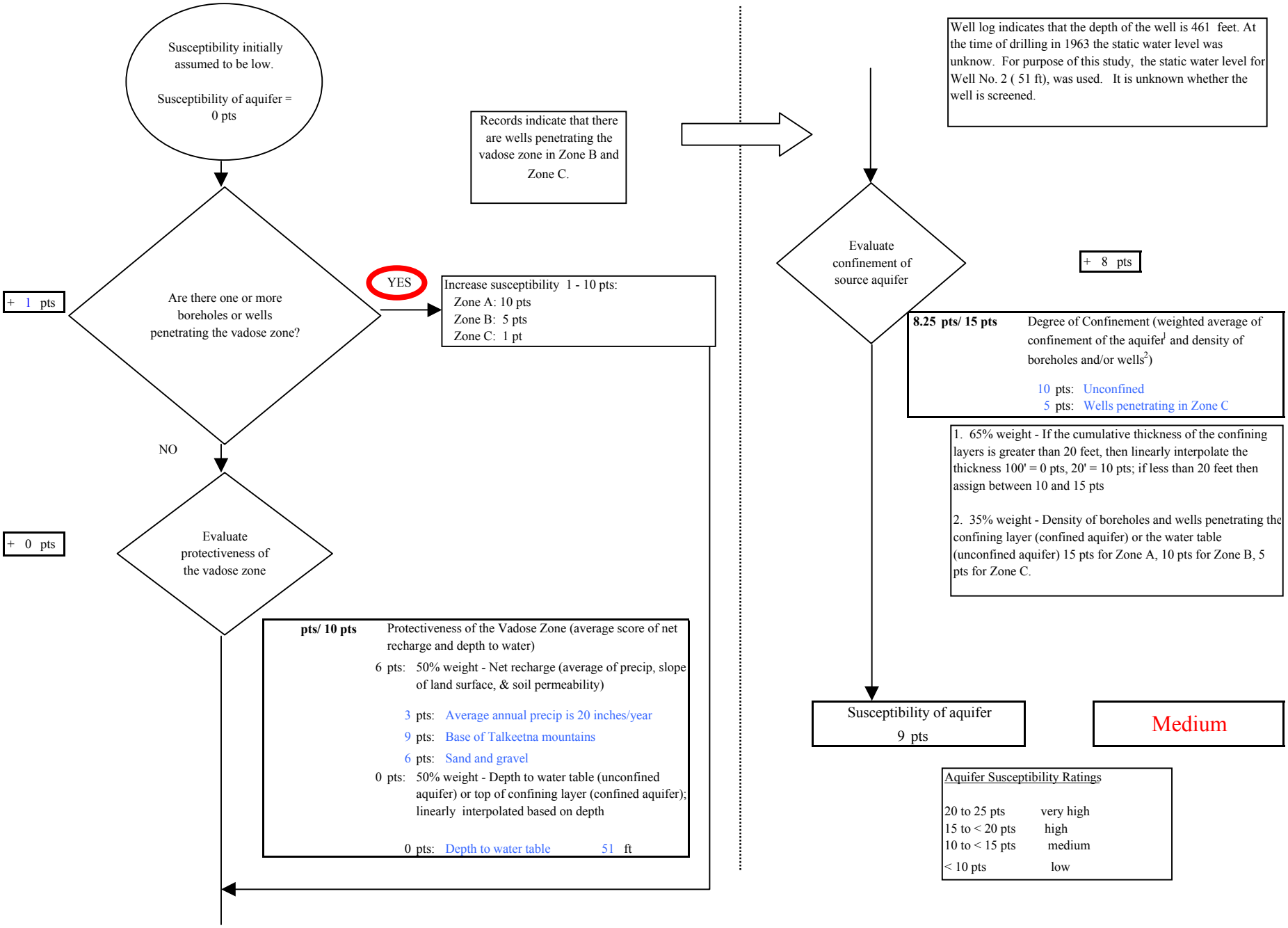
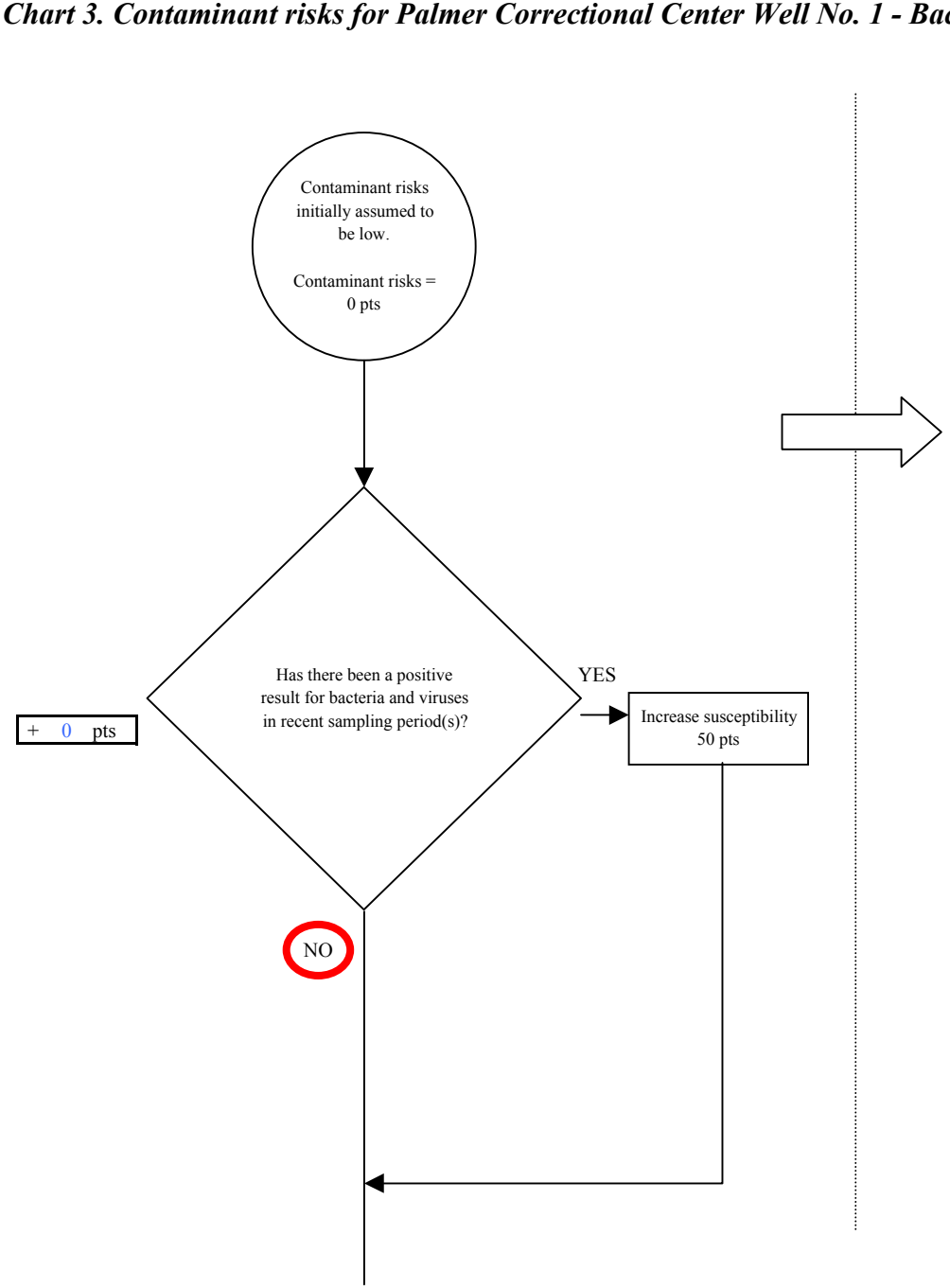
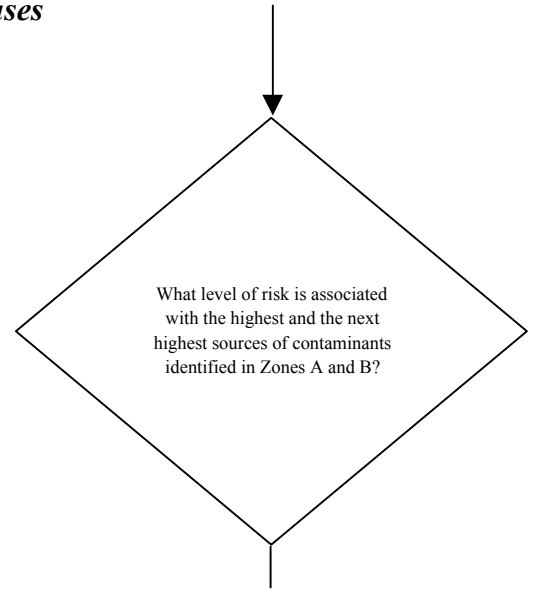


Chart 3. Contaminant risks for Palmer Correctional Center Well No. 1 - Bacteria & Viruses





+ 10 pts

Risk Rankings for Contaminant Sources Identified in Zones A and B

	Zone A	Zone B	Total
Very Highs(s)	0	0	0
High(s)	0	0	0
Medium(s)	0	0	0
Low(s)	1	0	1

	LOW 10 pts	**MEDIUM** 20 pts	**HIGH** 30 pts	**VERY HIGH** 40 pts
LOW	≥ 10 sources + 10 pts	≥ 10 sources + 5 pts	≥ 20 sources + 5 pts	----
MEDIUM	----	≥ 2 sources + 5 pts	≥ 5 sources + 5 pts	≥ 10 sources + 5 pts
HIGH	----	----	≥ 1 source + 10 pts	≥ 2 sources + 10 pts
VERY HIGH	----	----	----	≥ 1 source + 10 pts

Matrix Score 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 Palmer Correctional Center Well No. 1 - Bacteria & Viruses

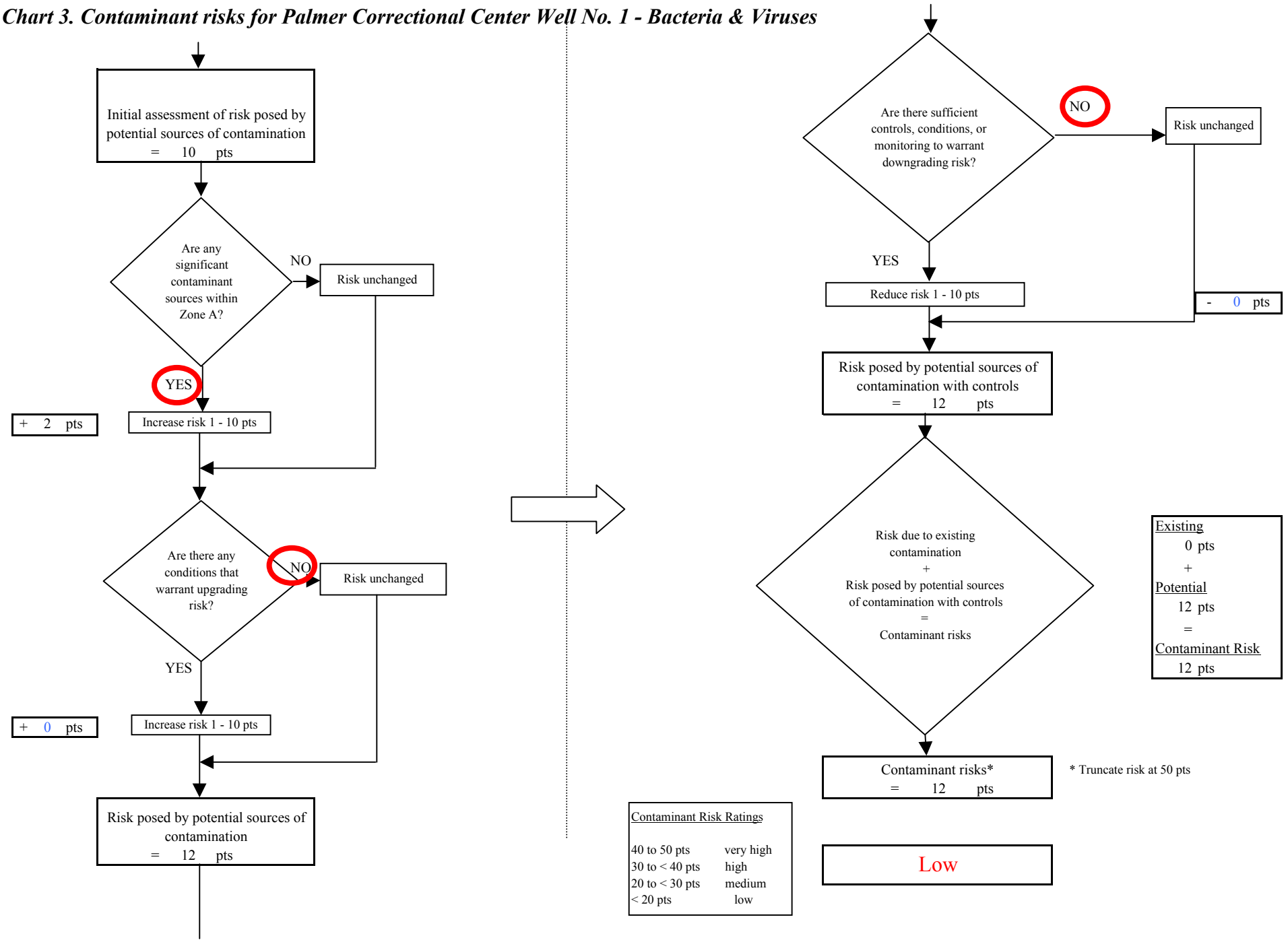


Chart 4. Vulnerability analysis for Palmer Correctional Center Well No. 1 - Bacteria & Viruses

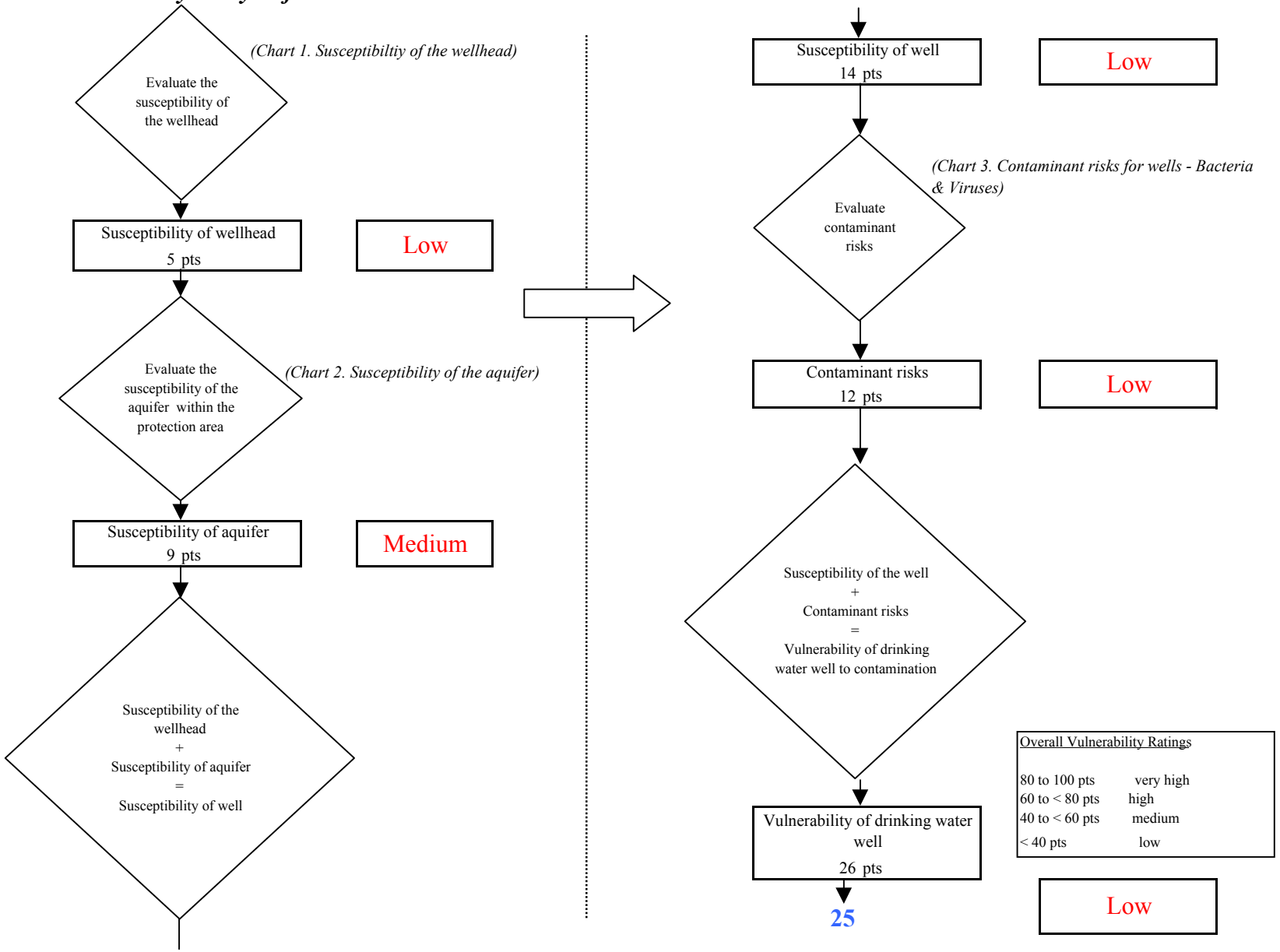


Chart 5. Contaminant risks for Palmer Correctional Center Well No. 1 - Nitrates and Nitrites

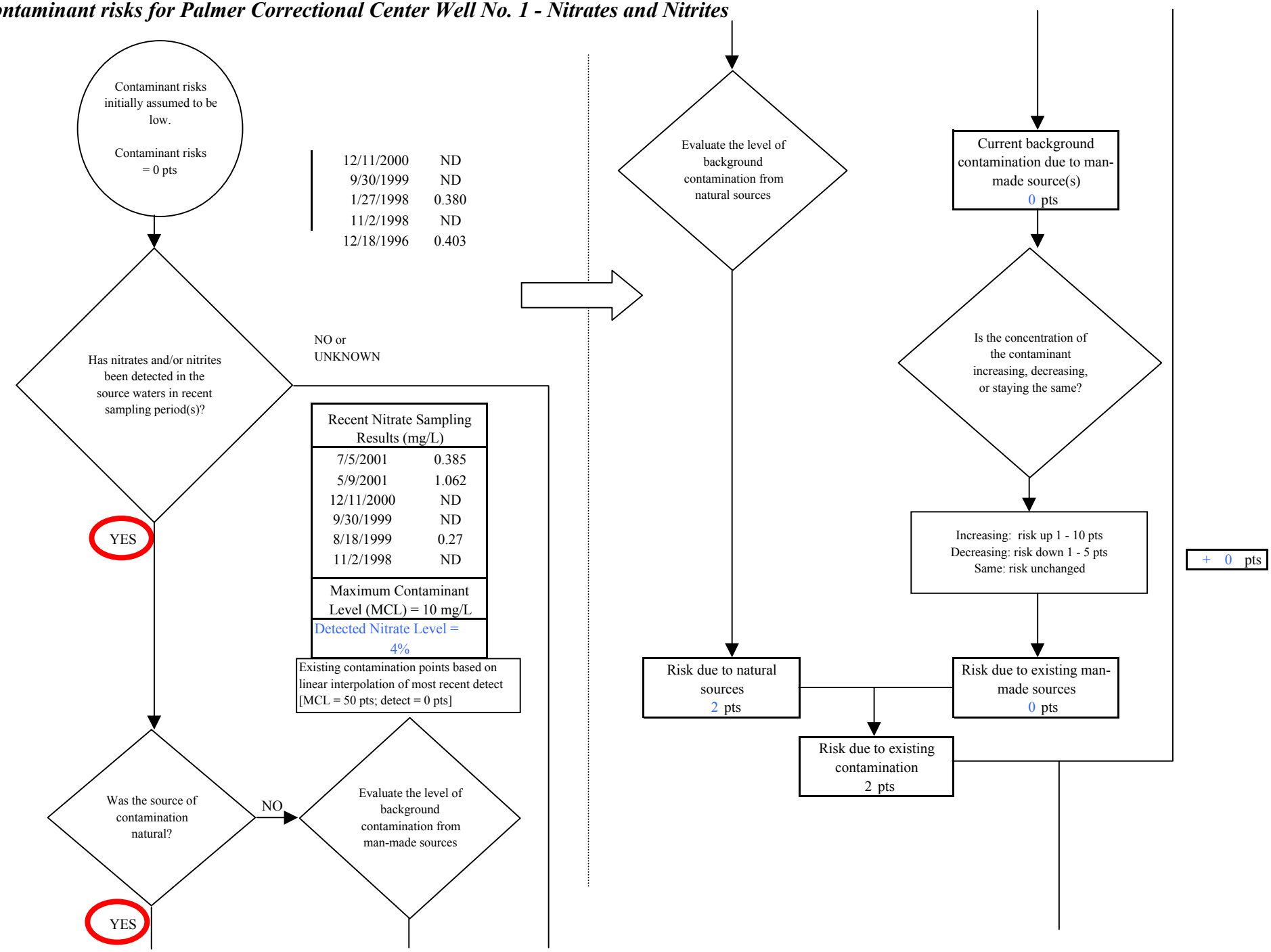
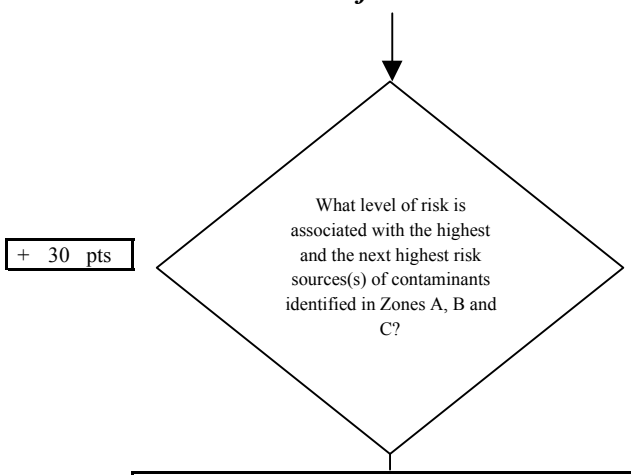


Chart 5. Contaminant risks for Palmer Correctional Center Well No. 1 - Nitrates and Nitrites



+ 30 pts

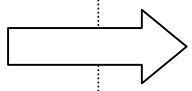
Risk Levels for Contaminant Sources identified in Zones A, B and C

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

	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.



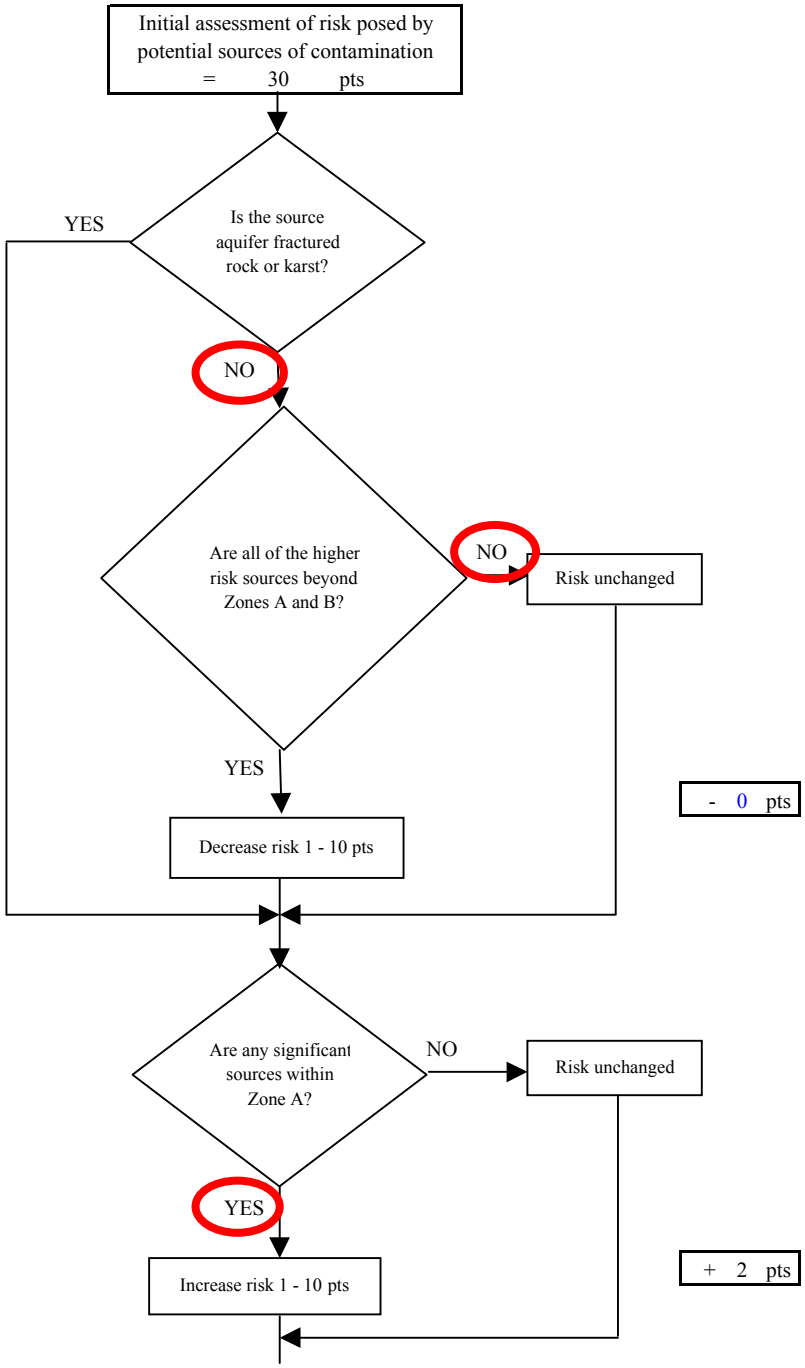


Chart 5. Contaminant risks for Palmer Correctional Center Well No. 1 - Nitrates and Nitrites

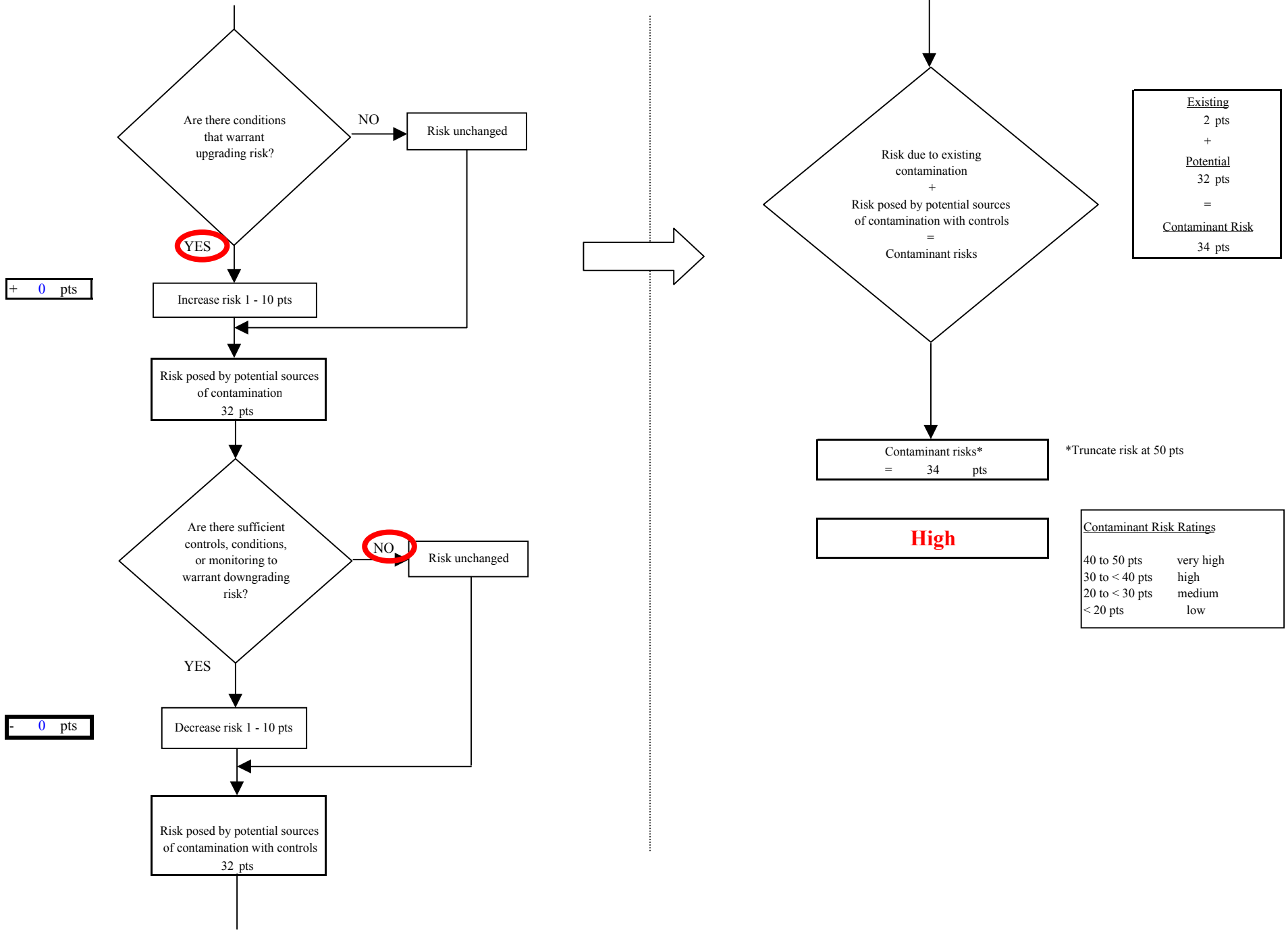


Chart 6. Vulnerability analysis for Palmer Correctional Center Well No. 1 - Nitrates and Nitrites

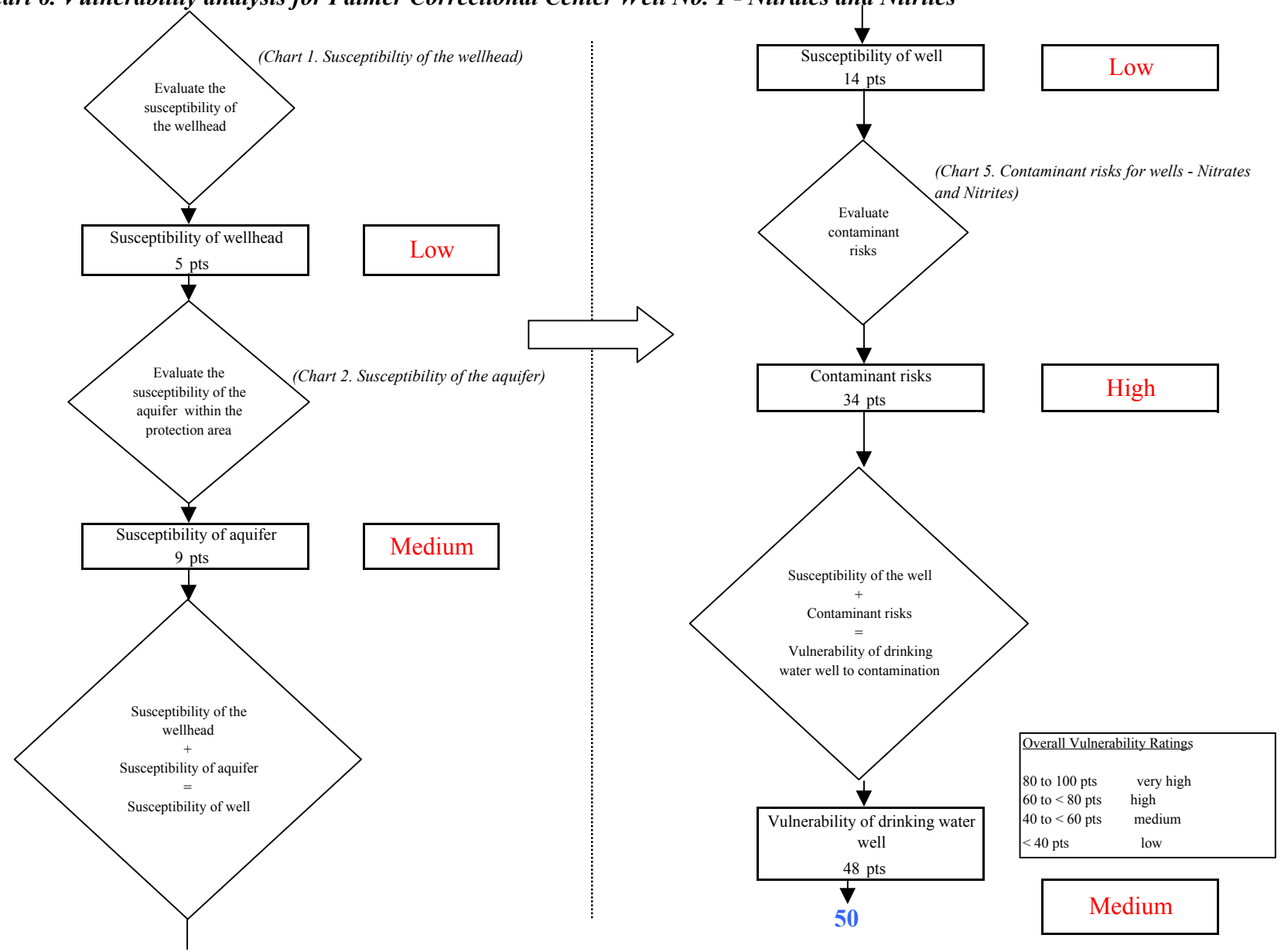


Chart 7. Contaminant risks for Palmer Correctional Center Well No. 1 - Volatile Organic Chemicals

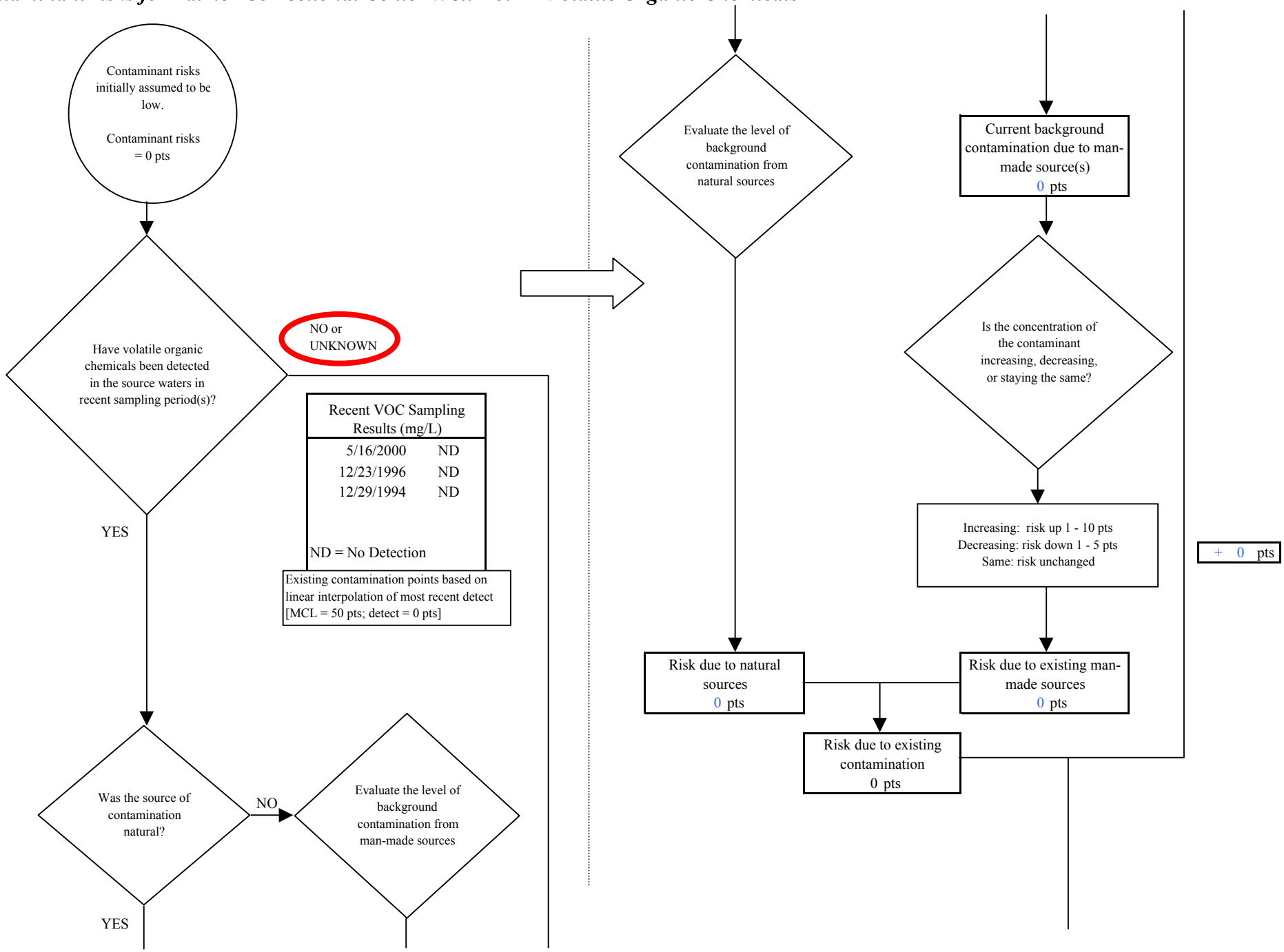


Chart 7. Contaminant risks for Palmer Correctional Center Well No. 1 - Volatile Organic Chemicals

+ 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	3	3
Medium(s)	0	7	7
Low(s)	1	6	7

	LOW 10 pts	**MEDIUM** 20 pts	**HIGH** 30 pts	**VERY HIGH** 40 pts
LOW	≥ 10 sources + 10 pts	≥ 10 sources + 5 pts	≥ 20 sources + 5 pts	----
MEDIUM	----	≥ 2 sources + 5 pts	≥ 5 sources + 5 pts	≥ 10 sources + 5 pts
HIGH	----	----	≥ 1 source + 10 pts	≥ 2 sources + 10 pts
VERY HIGH	----	----	----	≥ 1 source + 10 pts

Matrix Score 40

Note: Septic systems, sewerlines, and roads are each assigned a risk ranking for each 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

Increase risk 1 - 10 pts

+ 2 pts

Chart 7. Contaminant risks for Palmer Correctional Center Well No. 1 - Volatile Organic Chemicals

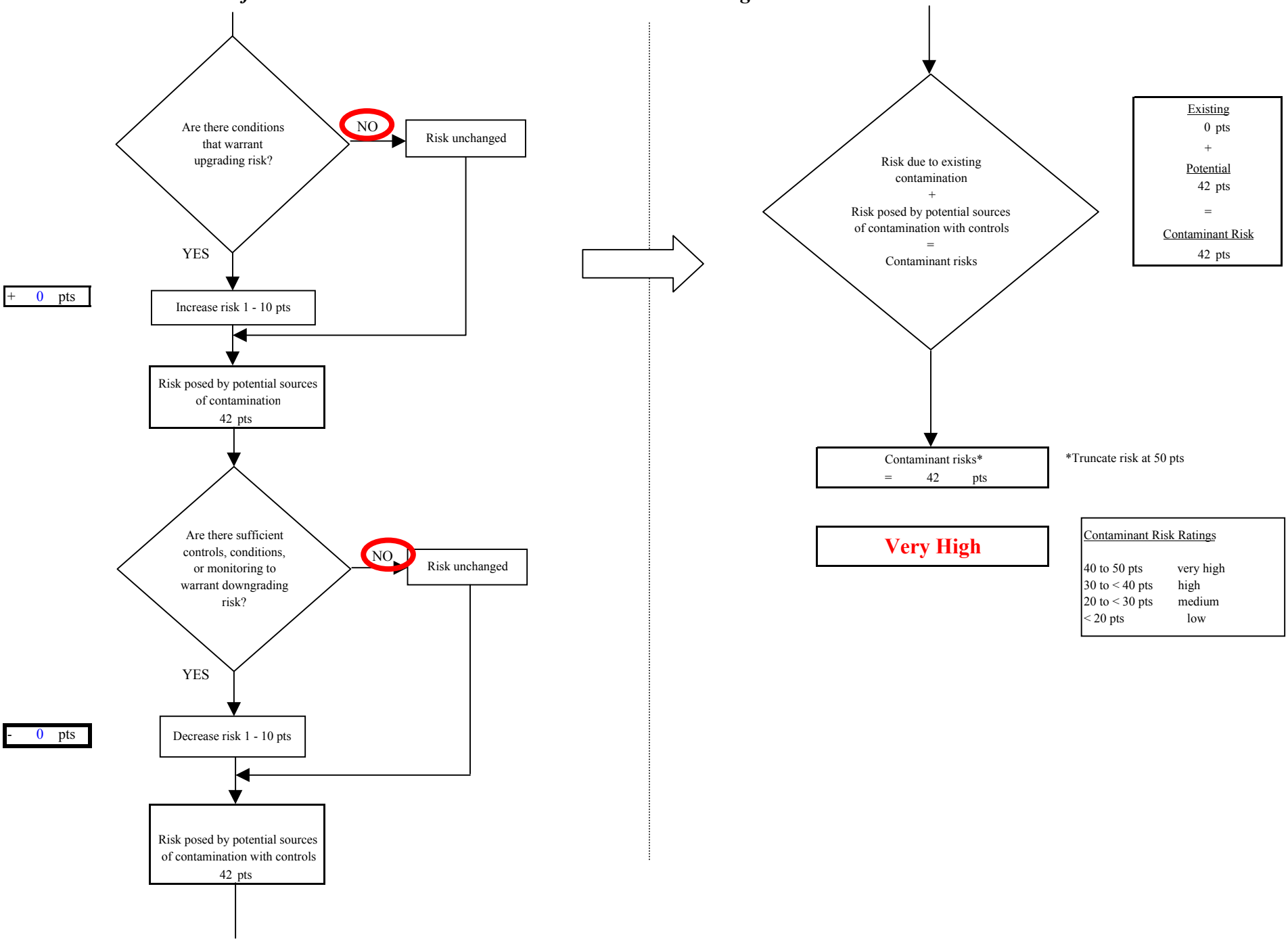


Chart 8. Vulnerability analysis for Palmer Correctional Center Well No. 1 - Volatile Organic Chemicals

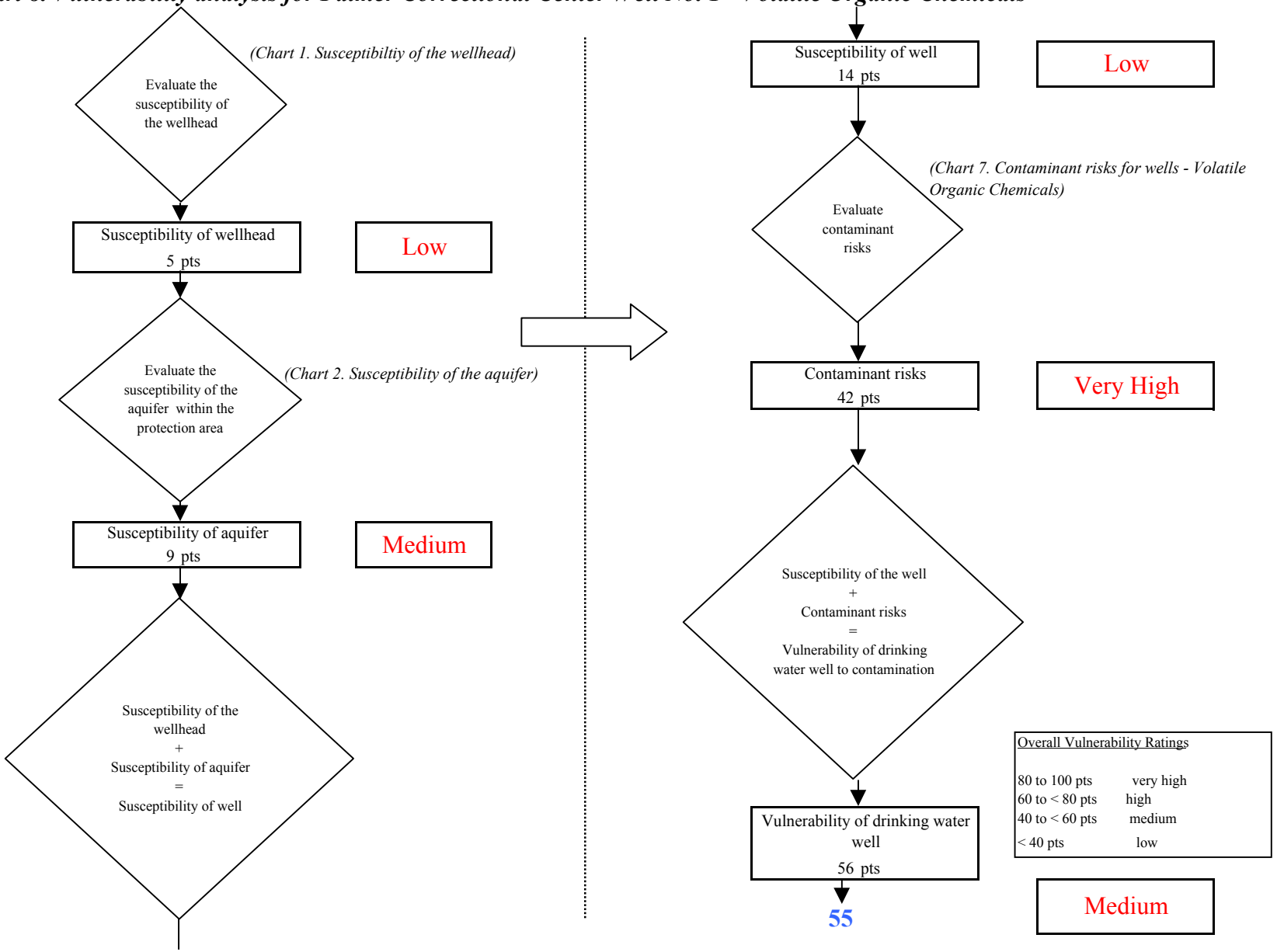


Chart 9. Contaminant risks for Palmer Correctional Center Well No. 1 - Heavy Metals, Cyanide and Other Inorganic Chemicals

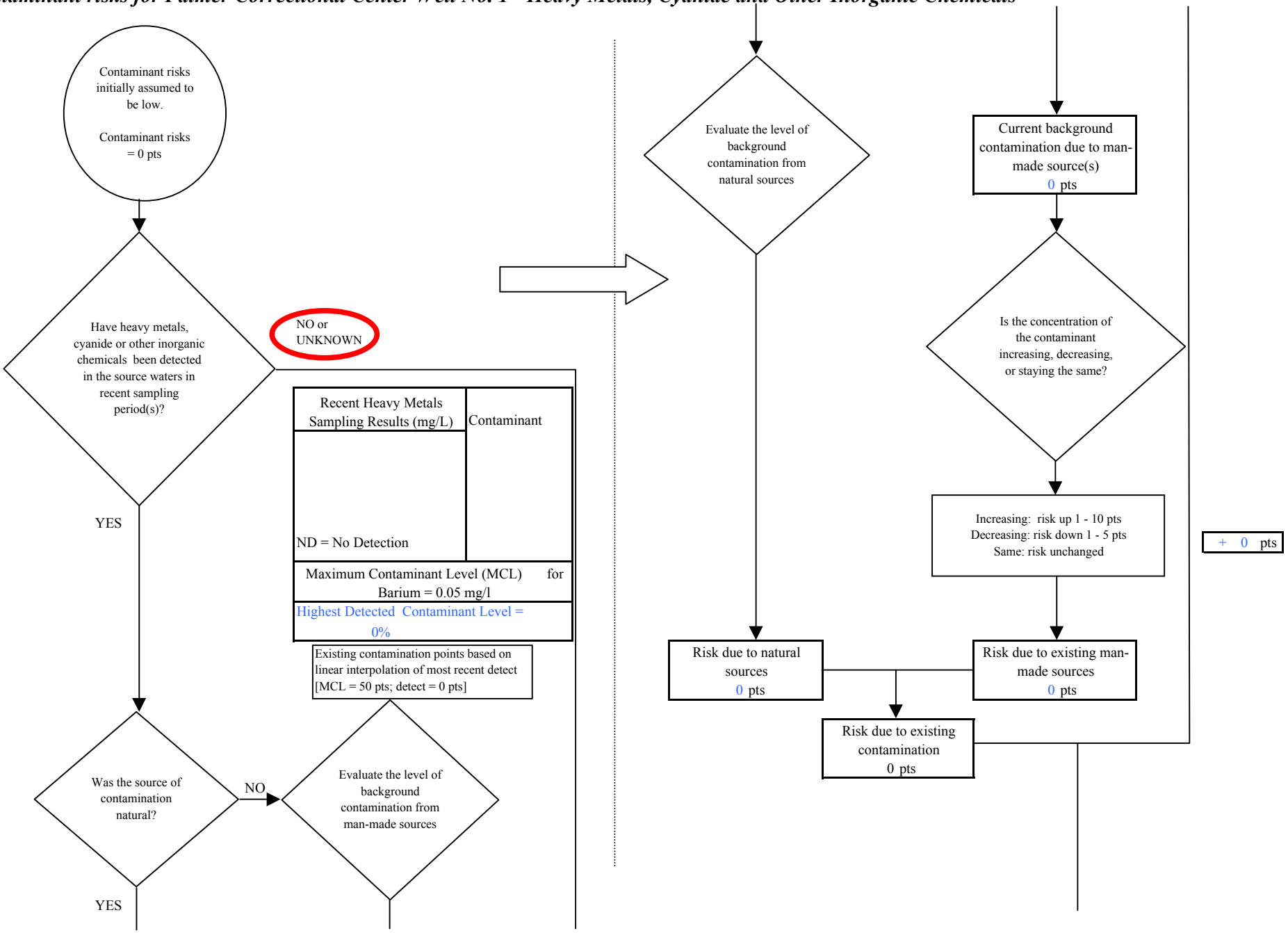


Chart 9. Contaminant risks for Palmer Correctional Center Well No. 1 - Heavy Metals, Cyanide and Other Inorganic Chemicals

+ 25 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	0	0
Medium(s)	0	3	3
Low(s)	1	5	6

	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.

Initial assessment of risk posed by potential sources of contamination = 25 pts

Is the source aquifer fractured rock or karst?

YES

NO

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

NO → Risk unchanged

YES

Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO → Risk unchanged

YES

Increase risk 1 - 10 pts

+ 2 pts

Chart 9. Contaminant risks for Palmer Correctional Center Well No. 1 - Heavy Metals, Cyanide and Other Inorganic Chemicals

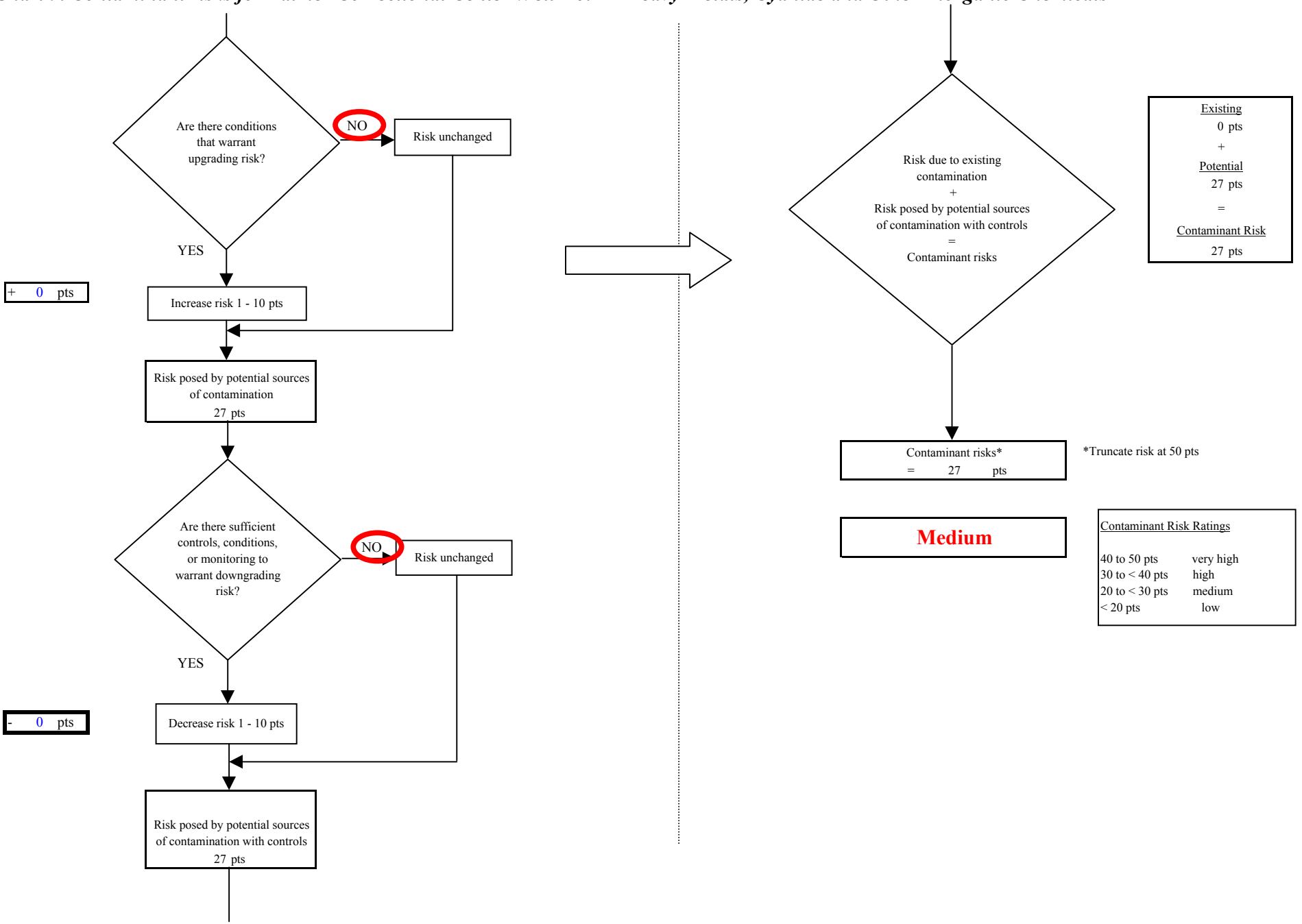


Chart 10. Vulnerability analysis for Palmer Correctional Center Well No. 1 - Heavy Metals, Cyanide and Other Inorganic Chemicals

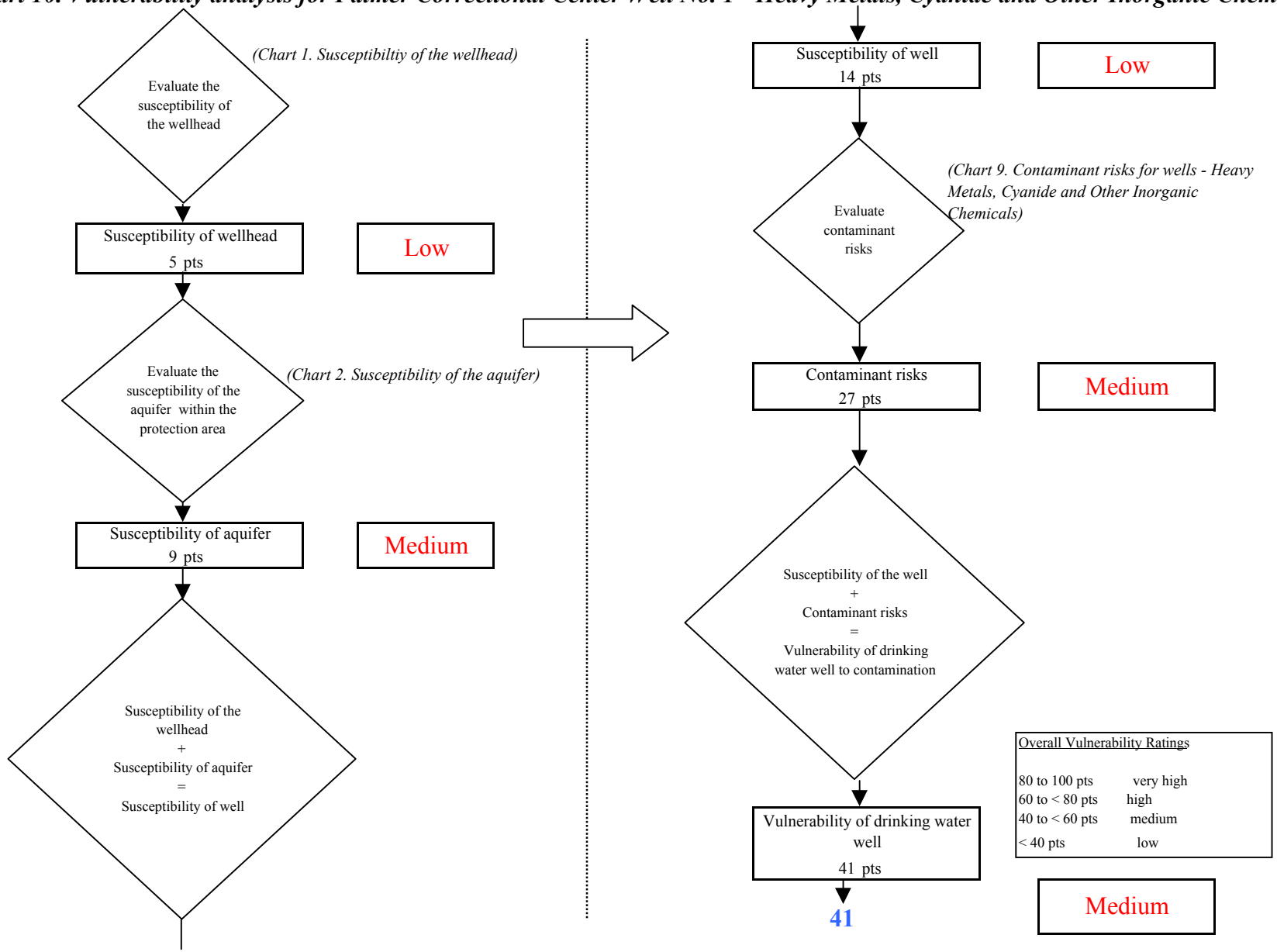


Chart 11. Contaminant risks for Palmer Correctional Center Well No. 1 - Synthetic Organic Chemicals

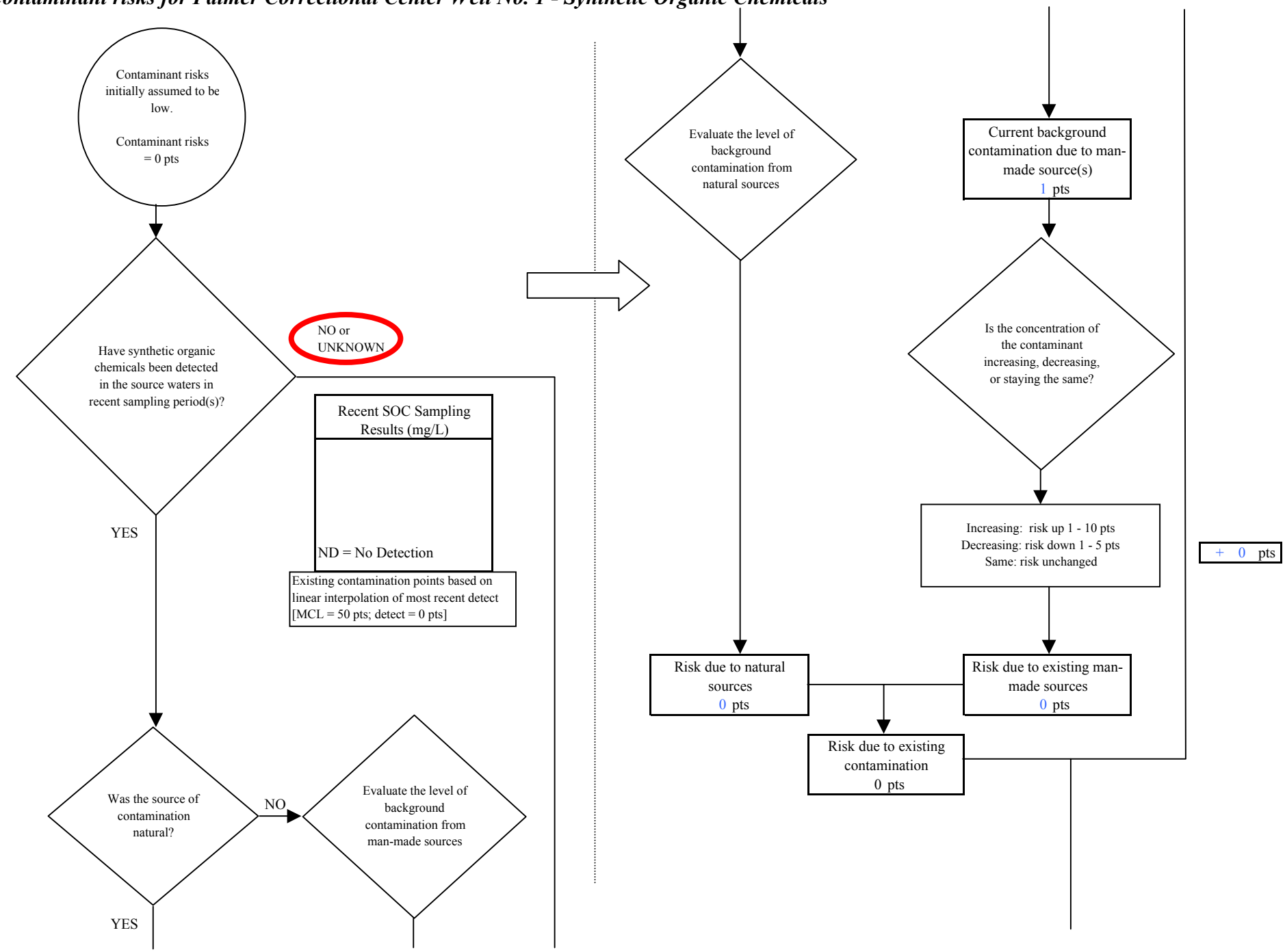
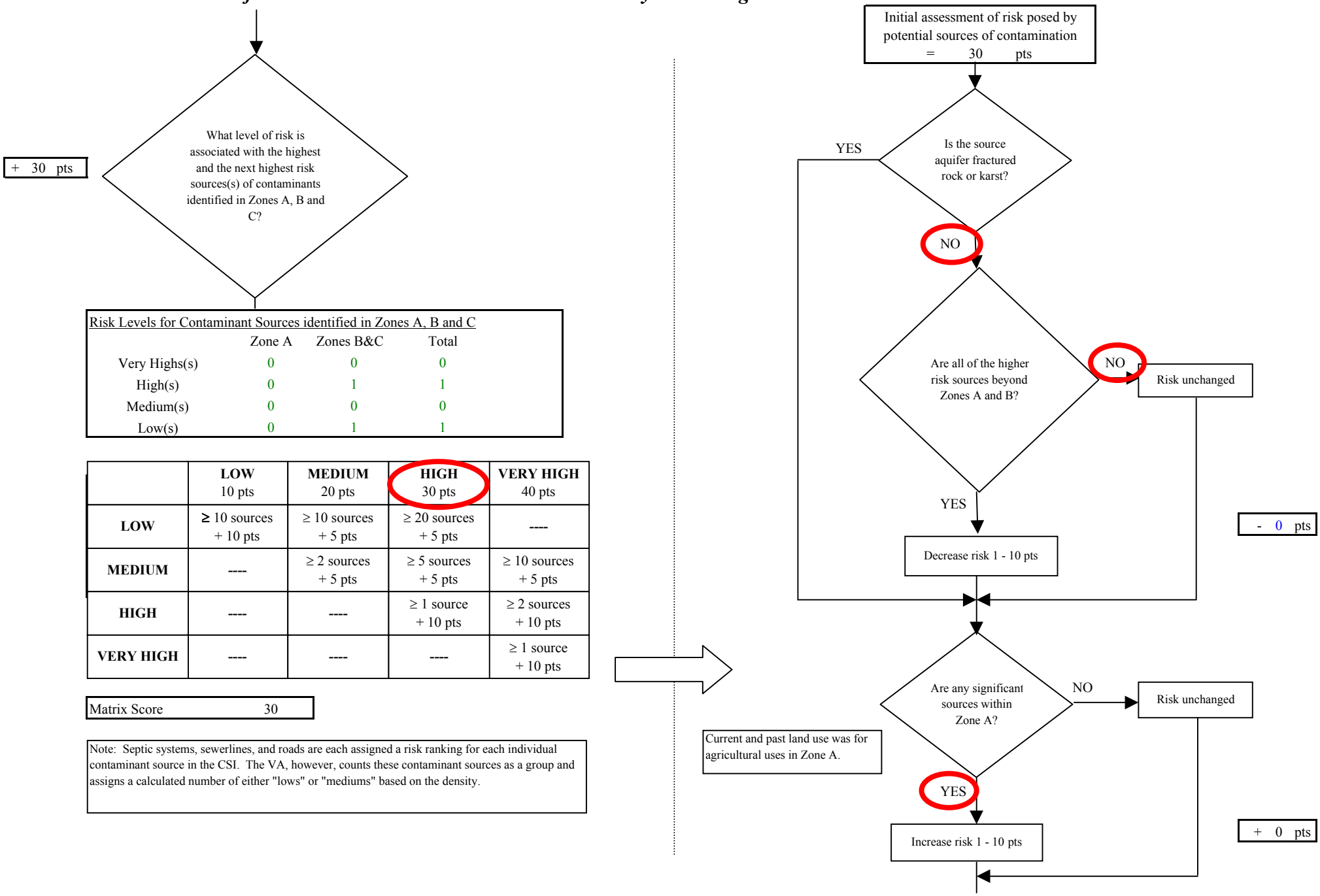


Chart 11. Contaminant risks for Palmer Correctional Center Well No. 1 - Synthetic Organic Chemicals



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)	0	0	0
Low(s)	0	1	1

	LOW 10 pts	**MEDIUM** 20 pts	**HIGH** 30 pts	**VERY HIGH** 40 pts
LOW	≥ 10 sources + 10 pts	≥ 10 sources + 5 pts	≥ 20 sources + 5 pts	----
MEDIUM	----	≥ 2 sources + 5 pts	≥ 5 sources + 5 pts	≥ 10 sources + 5 pts
HIGH	----	----	≥ 1 source + 10 pts	≥ 2 sources + 10 pts
VERY HIGH	----	----	----	≥ 1 source + 10 pts

Matrix Score 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 11. Contaminant risks for Palmer Correctional Center Well No. 1 - Synthetic Organic Chemicals

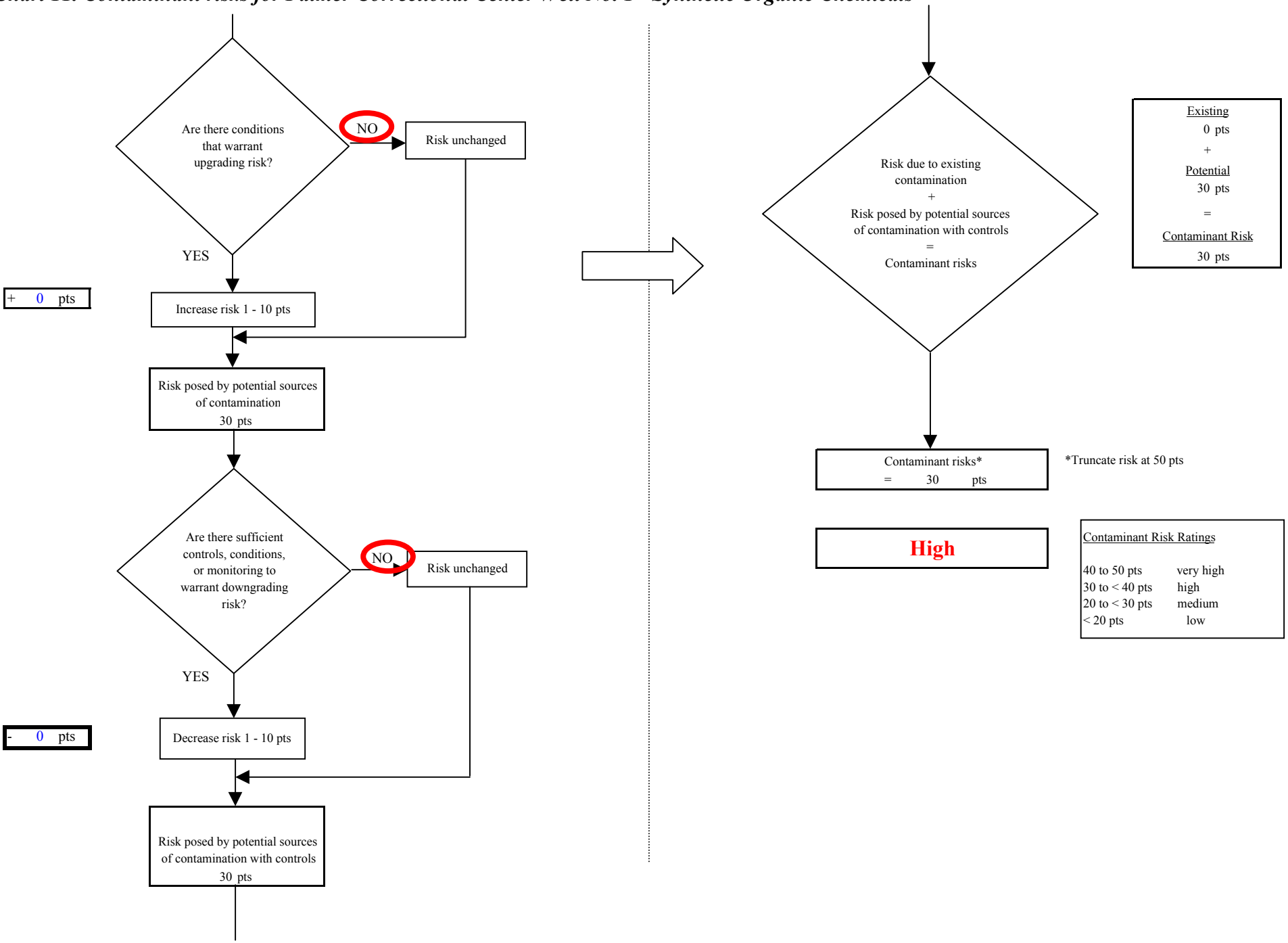


Chart 12. Vulnerability analysis for Palmer Correctional Center Well No. 1 - Synthetic Organic Chemicals

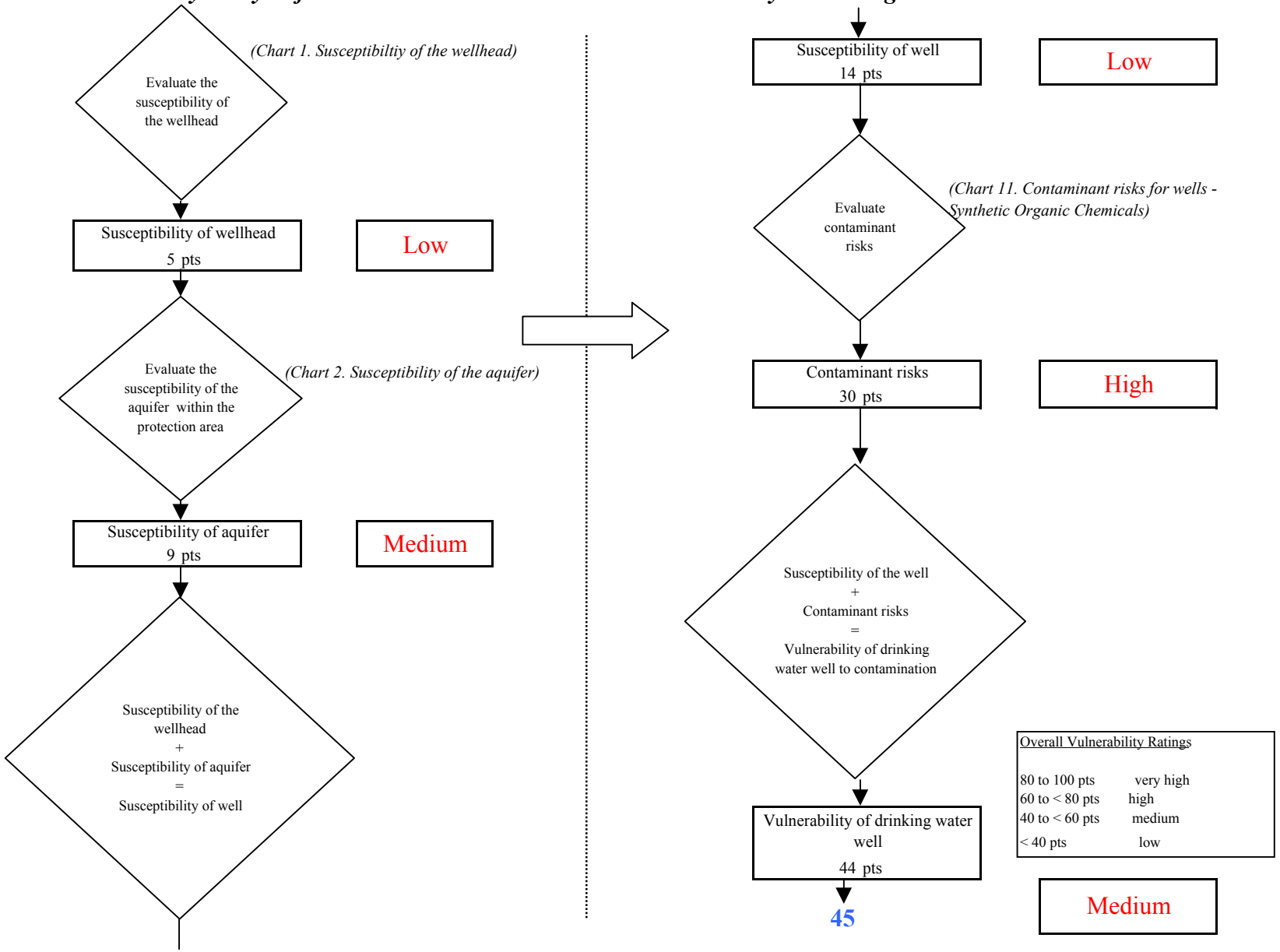


Chart 13. Contaminant risks for Palmer Correctional Center Well No. 1 - Other Organic Chemicals

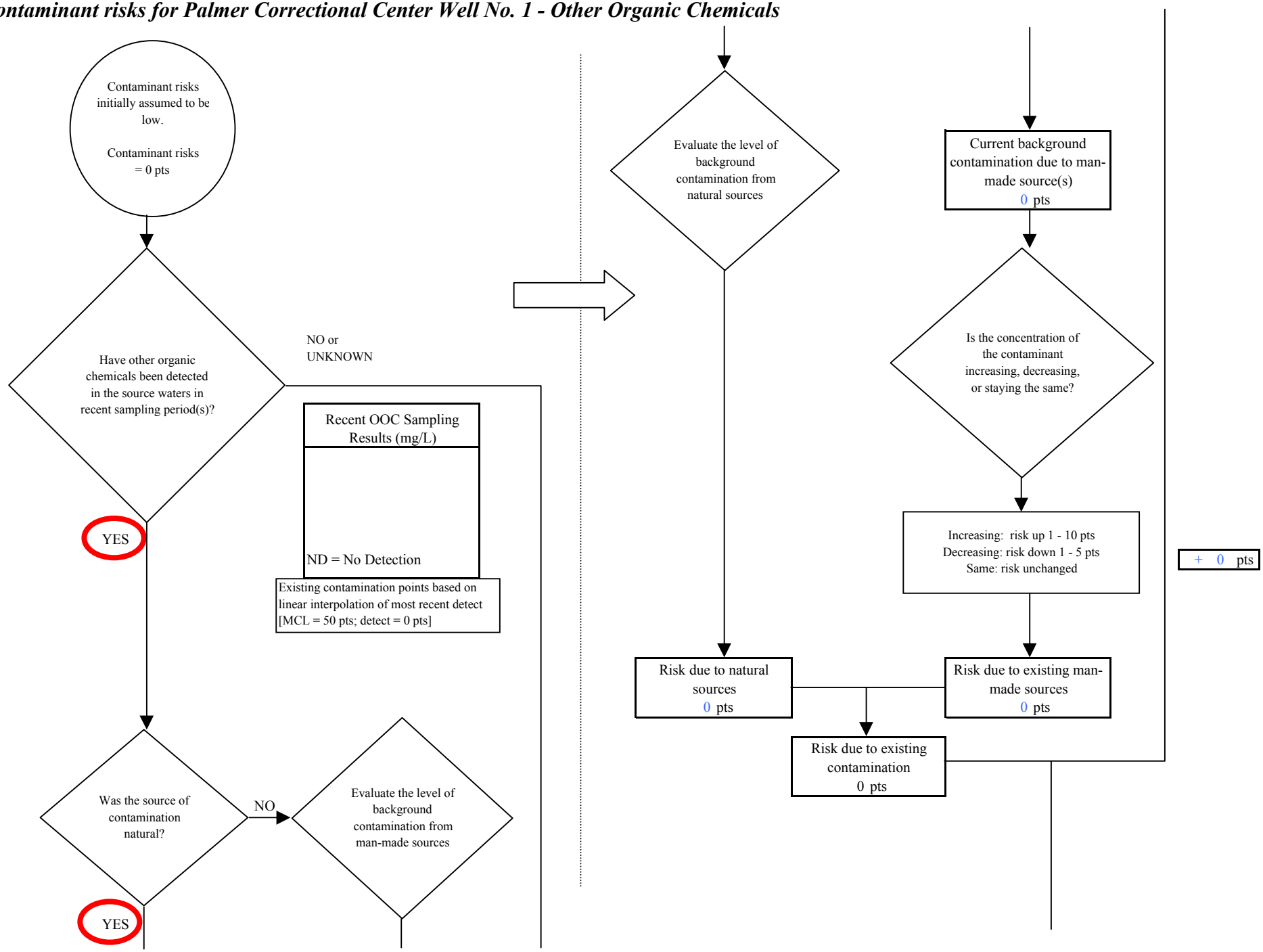


Chart 13. Contaminant risks for Palmer Correctional Center Well No. 1 - Other Organic Chemicals

+ 20 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	0	0
Medium(s)	0	1	1
Low(s)	1	2	3

	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 20

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 = 20 pts

Is the source aquifer fractured rock or karst?

YES

NO

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

NO

Risk unchanged

YES

Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO

Risk unchanged

YES

Increase risk 1 - 10 pts

+ 2 pts

Chart 13. Contaminant risks for Palmer Correctional Center Well No. 1 - Other Organic Chemicals

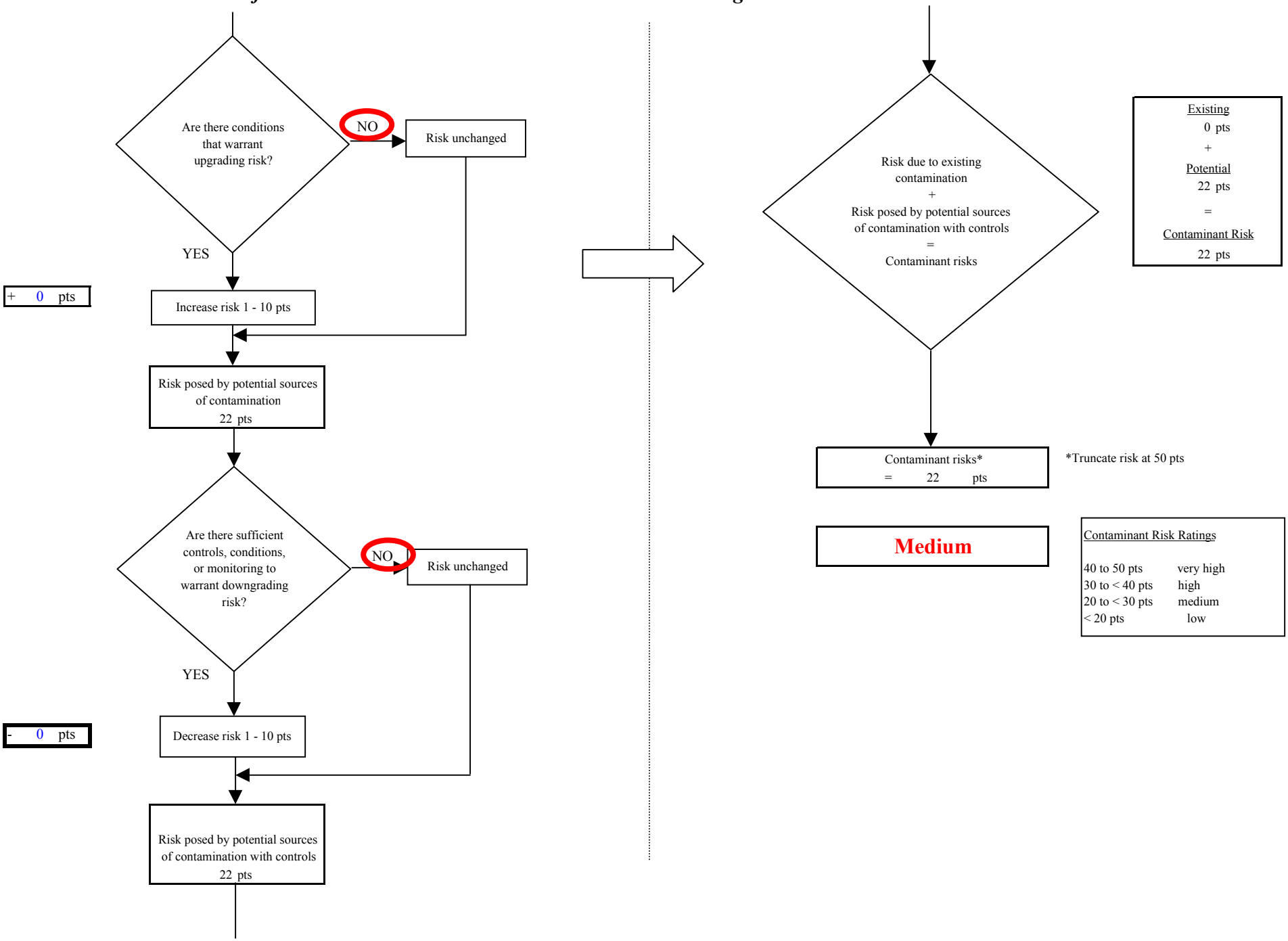


Chart 14. Vulnerability analysis forPalmer Correctional Center Well No. 1 - Other Organic Chemicals

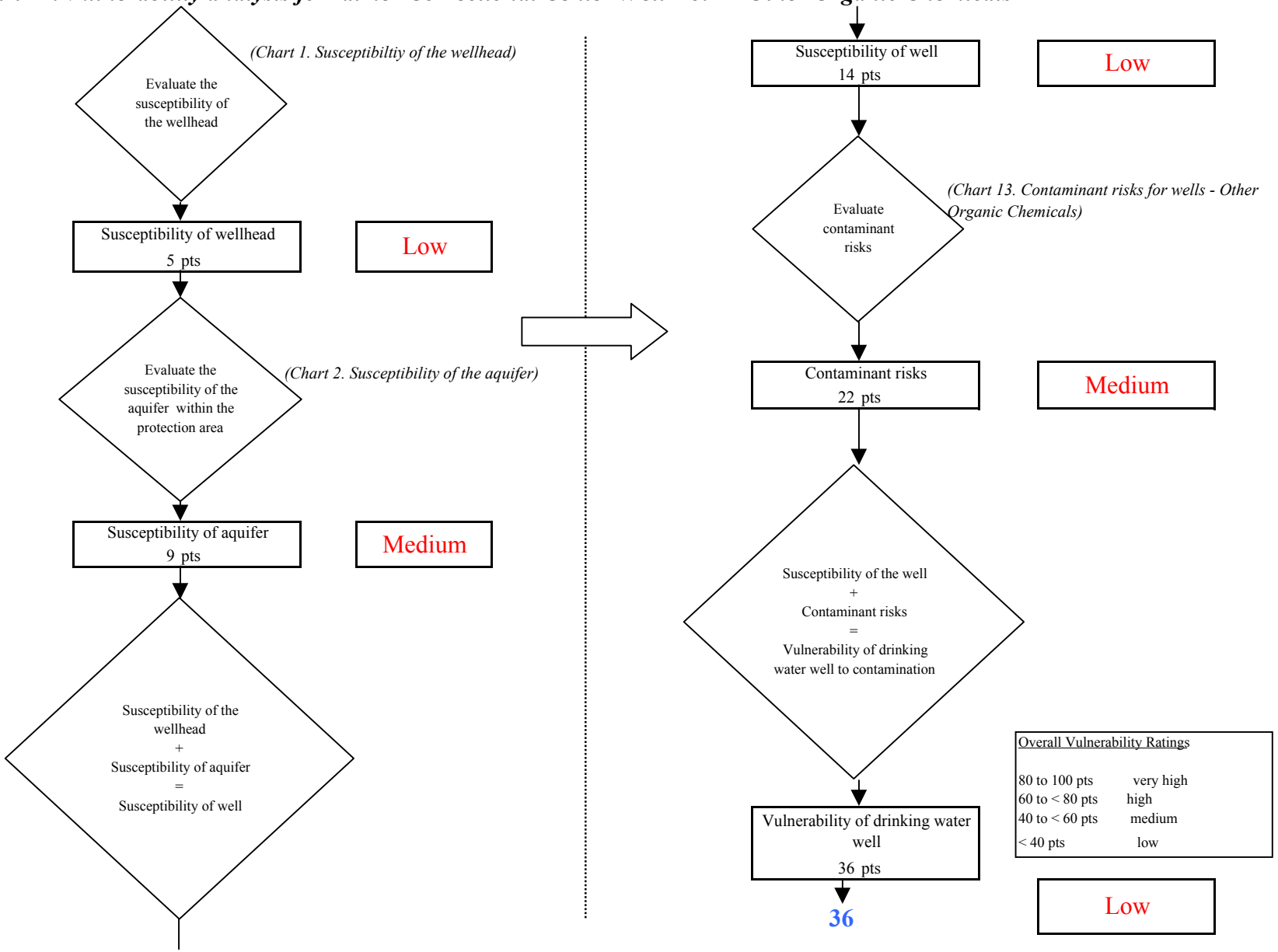


Chart 1. Susceptibility of the wellhead - Palmer Correctional Center Well No. 2

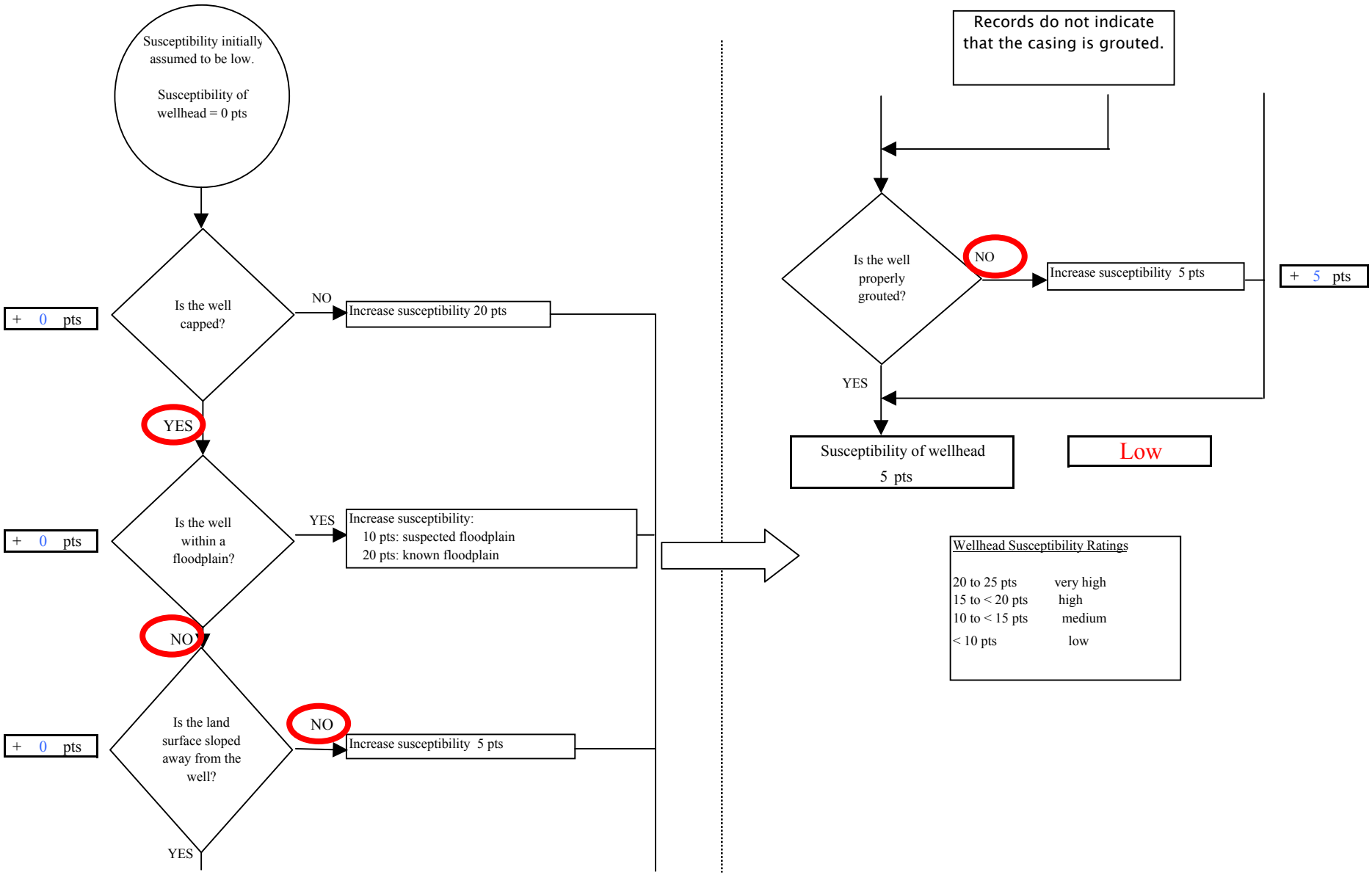


Chart 2. Susceptibility of the aquifer -Palmer Correctional Center Well No. 2

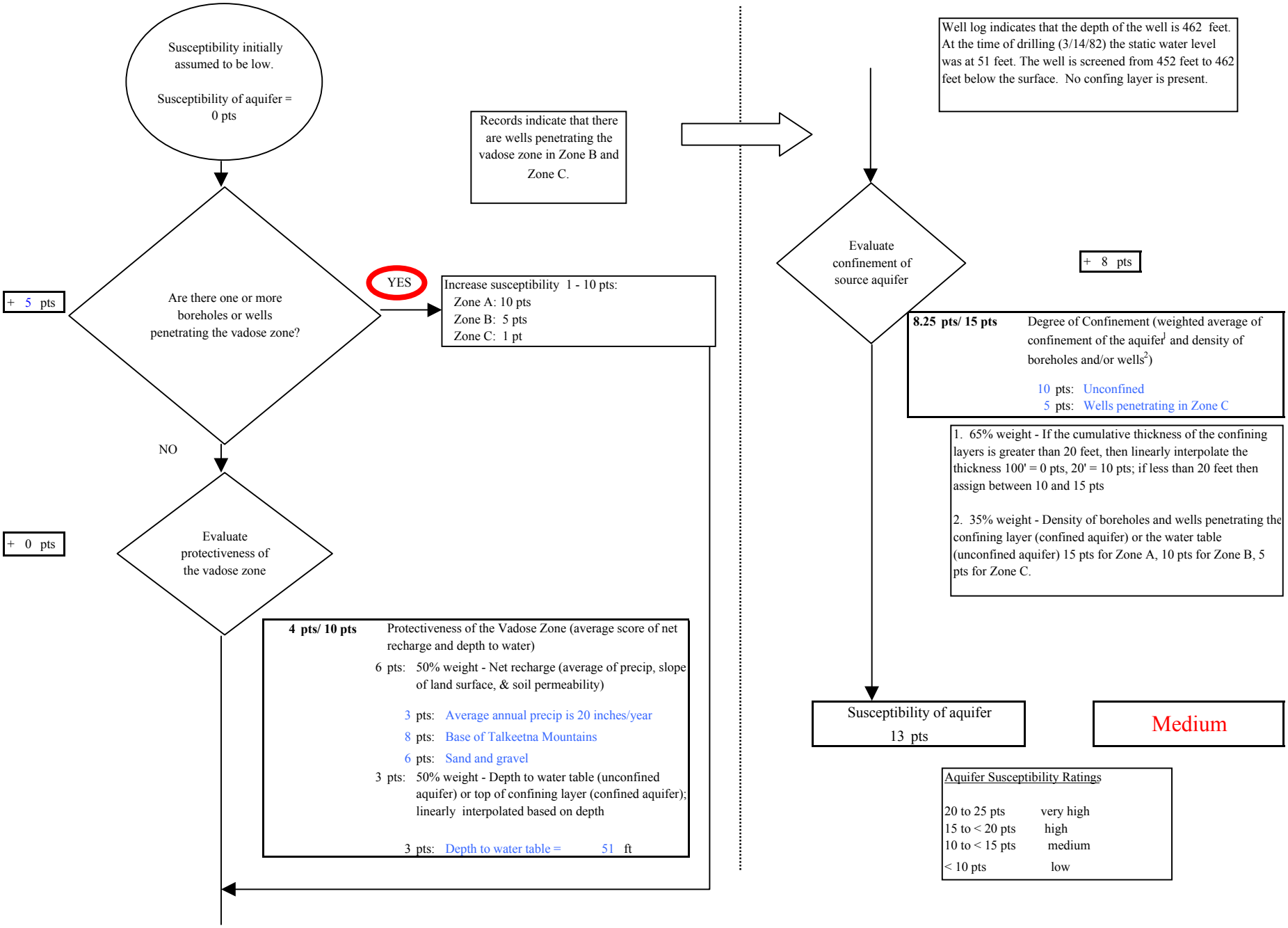
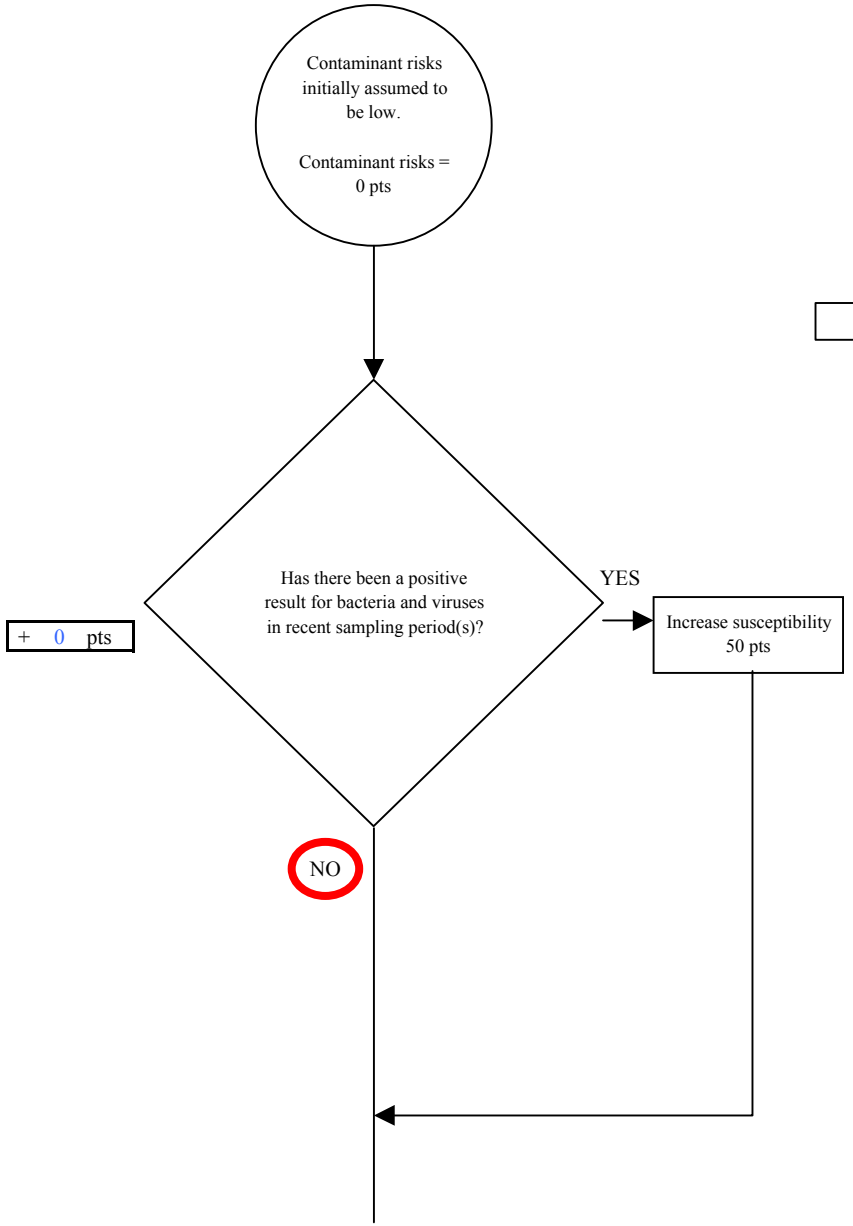
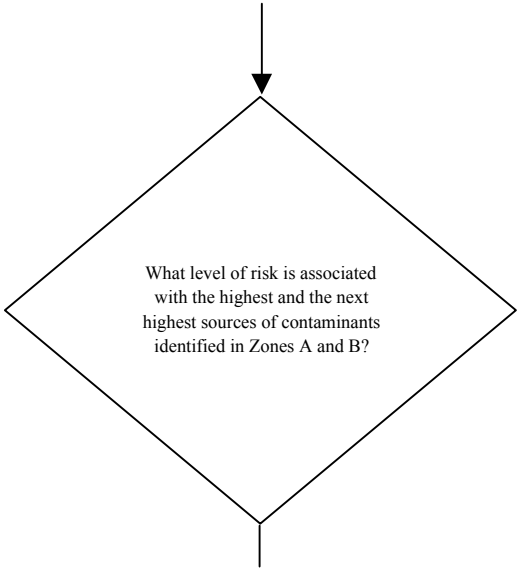


Chart 3. Contaminant risks for Palmer Correctional Center Well No. 2 - Bacteria & Viruses





+ 10 pts

Risk Rankings for Contaminant Sources Identified in Zones A and B

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

	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 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 Palmer Correctional Center Well No. 2 - Bacteria & Viruses

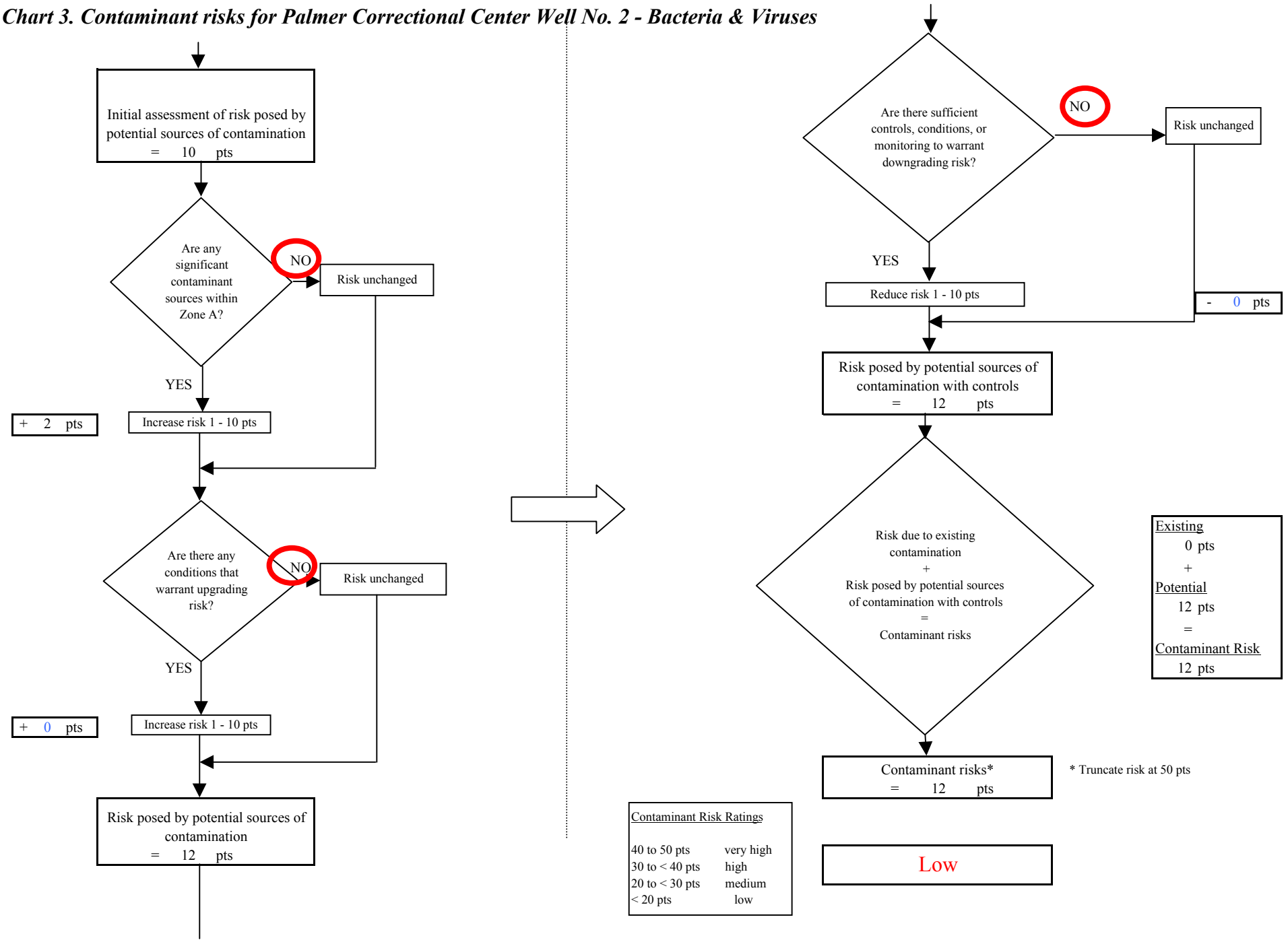


Chart 4. Vulnerability analysis for Palmer Correctional Center Well No. 2 - Bacteria & Viruses

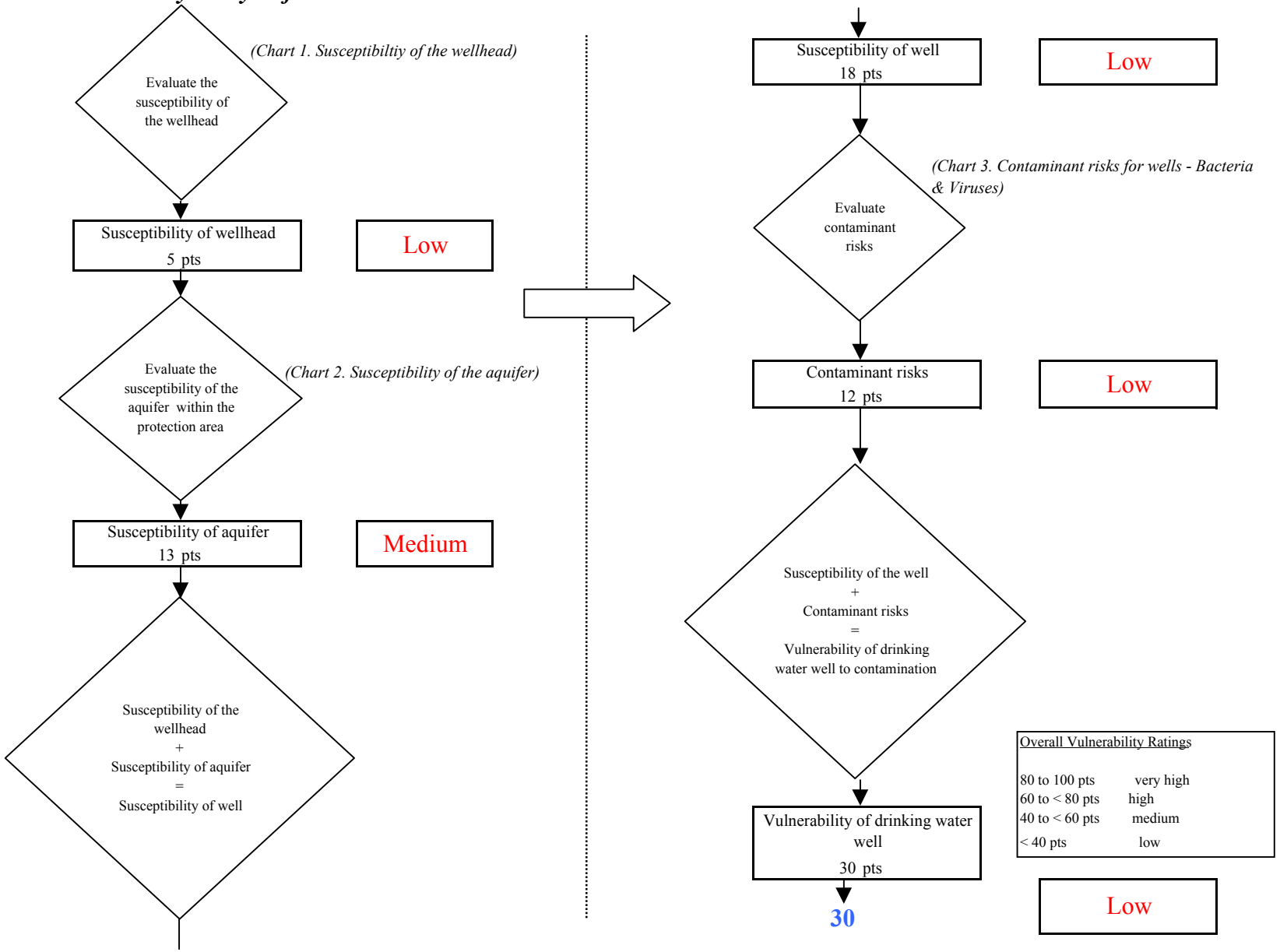


Chart 5. Contaminant risks for Palmer Correctional Center Well No. 2 - Nitrates and Nitrites

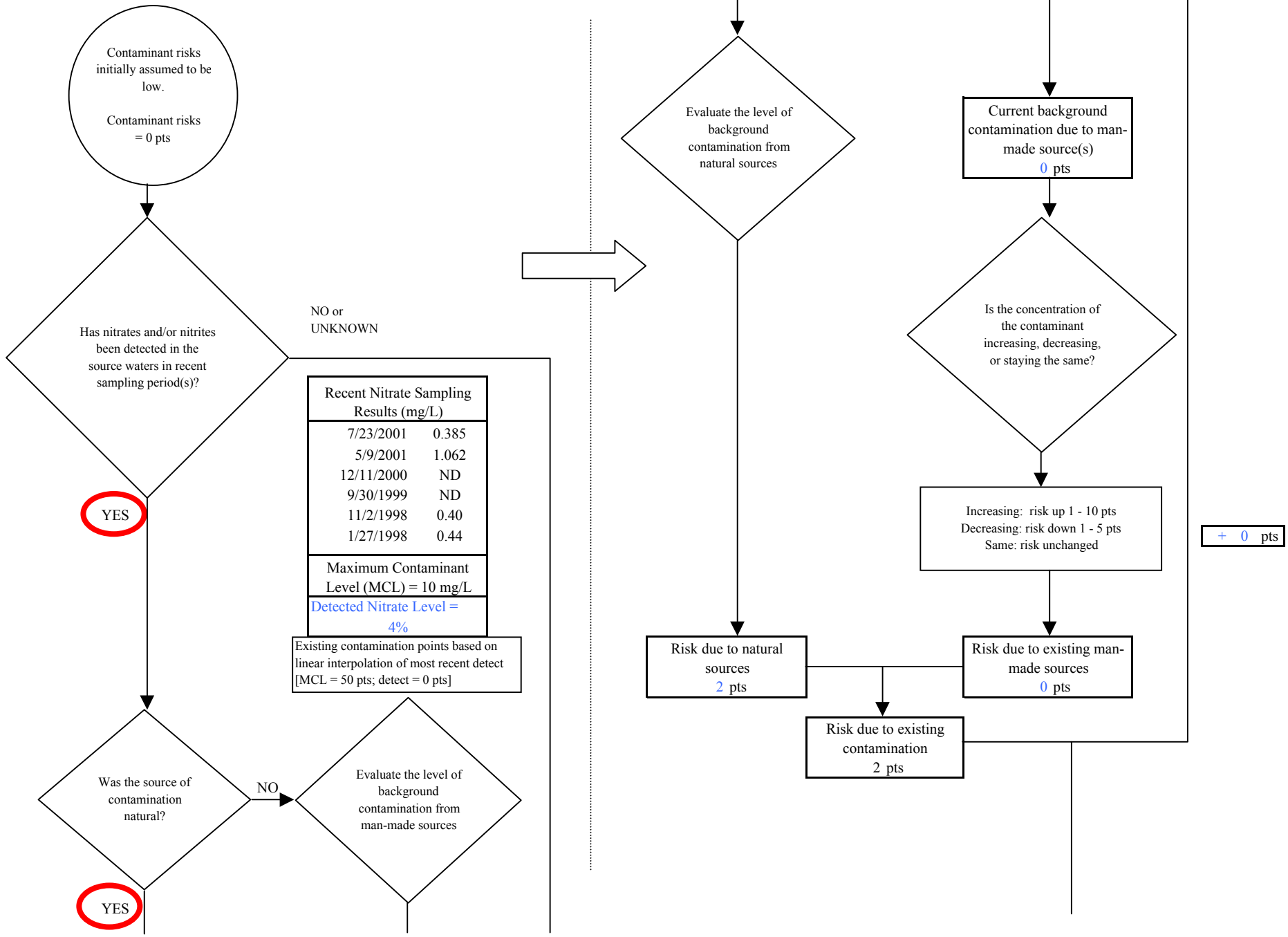
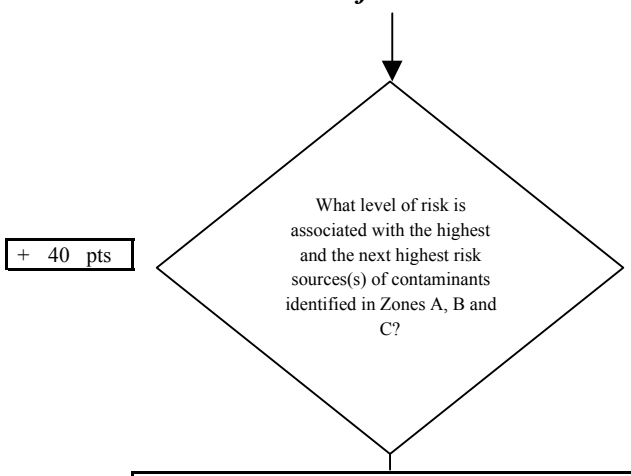


Chart 5. Contaminant risks for Palmer Correctional Center Well No. 2 - Nitrates and Nitrites

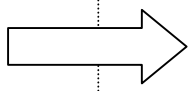


Risk Levels for Contaminant Sources identified in Zones A, B and C			
	Zone A	Zones B&C	Total
Very Highs(s)	0	0	0
High(s)	0	5	5
Medium(s)	0	0	0
Low(s)	1	3	4

	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 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.



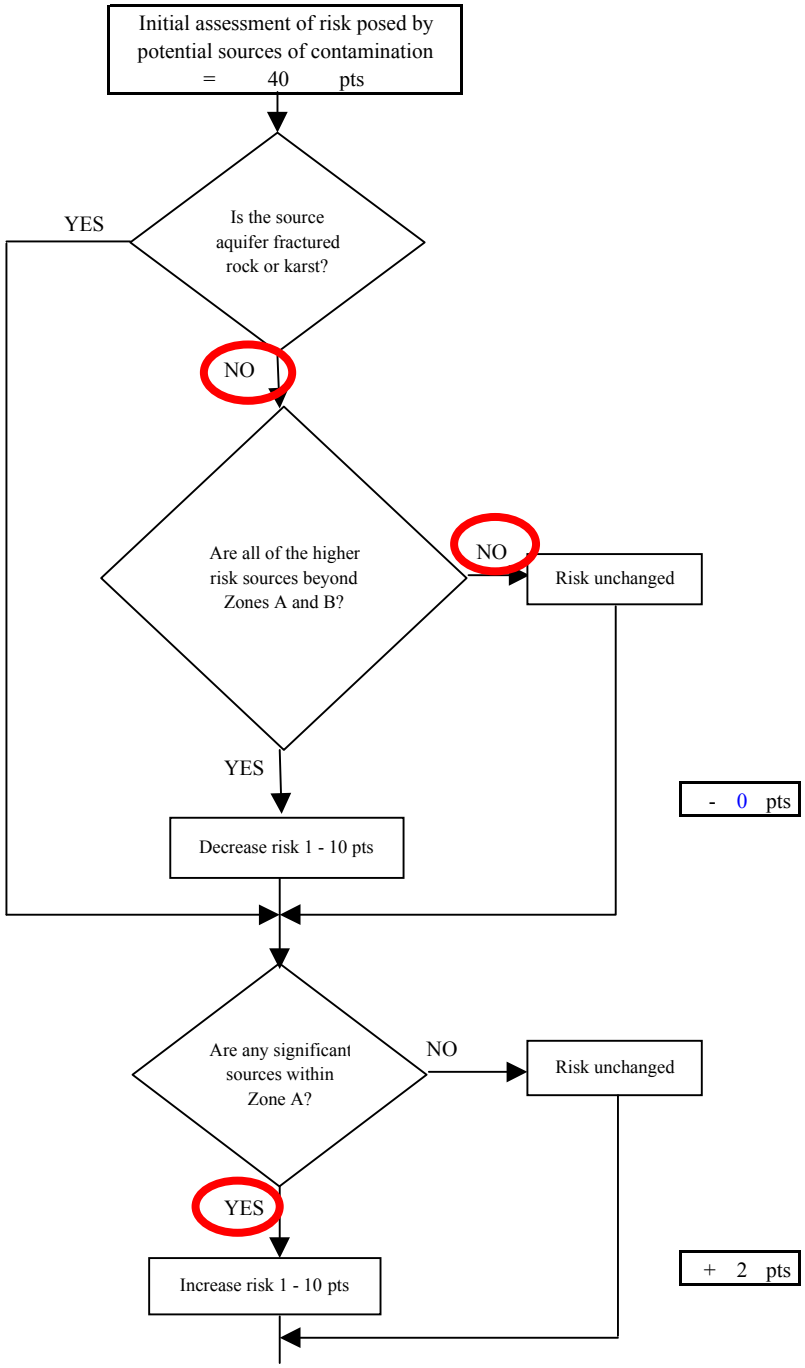


Chart 5. Contaminant risks for Palmer Correctional Center Well No. 2 - Nitrates and Nitrites

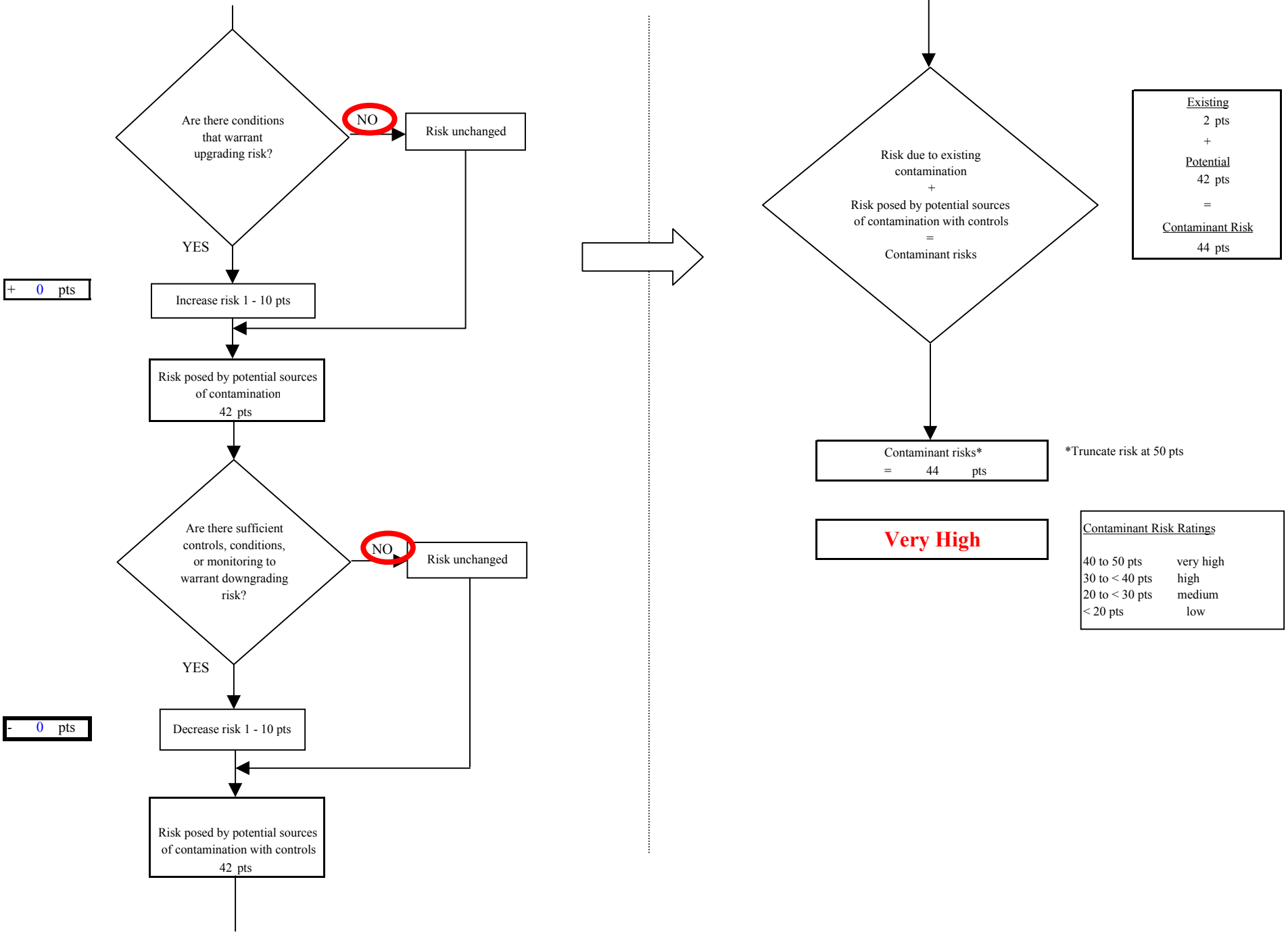


Chart 6. Vulnerability analysis for Palmer Correctional Center Well No. 2 - Nitrates and Nitrites

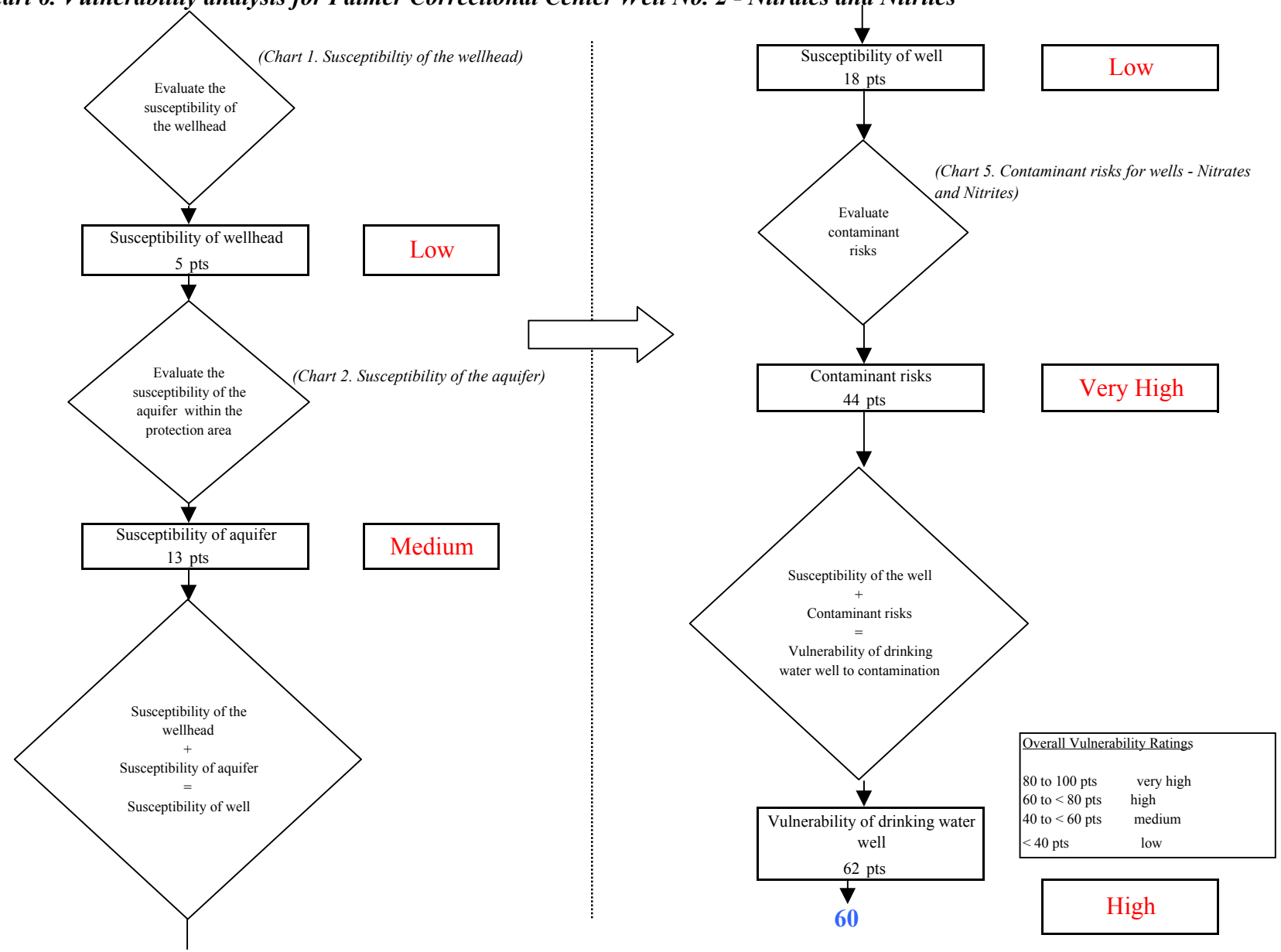


Chart 7. Contaminant risks for Palmer Correctional Center Well No. 2 - Volatile Organic Chemicals

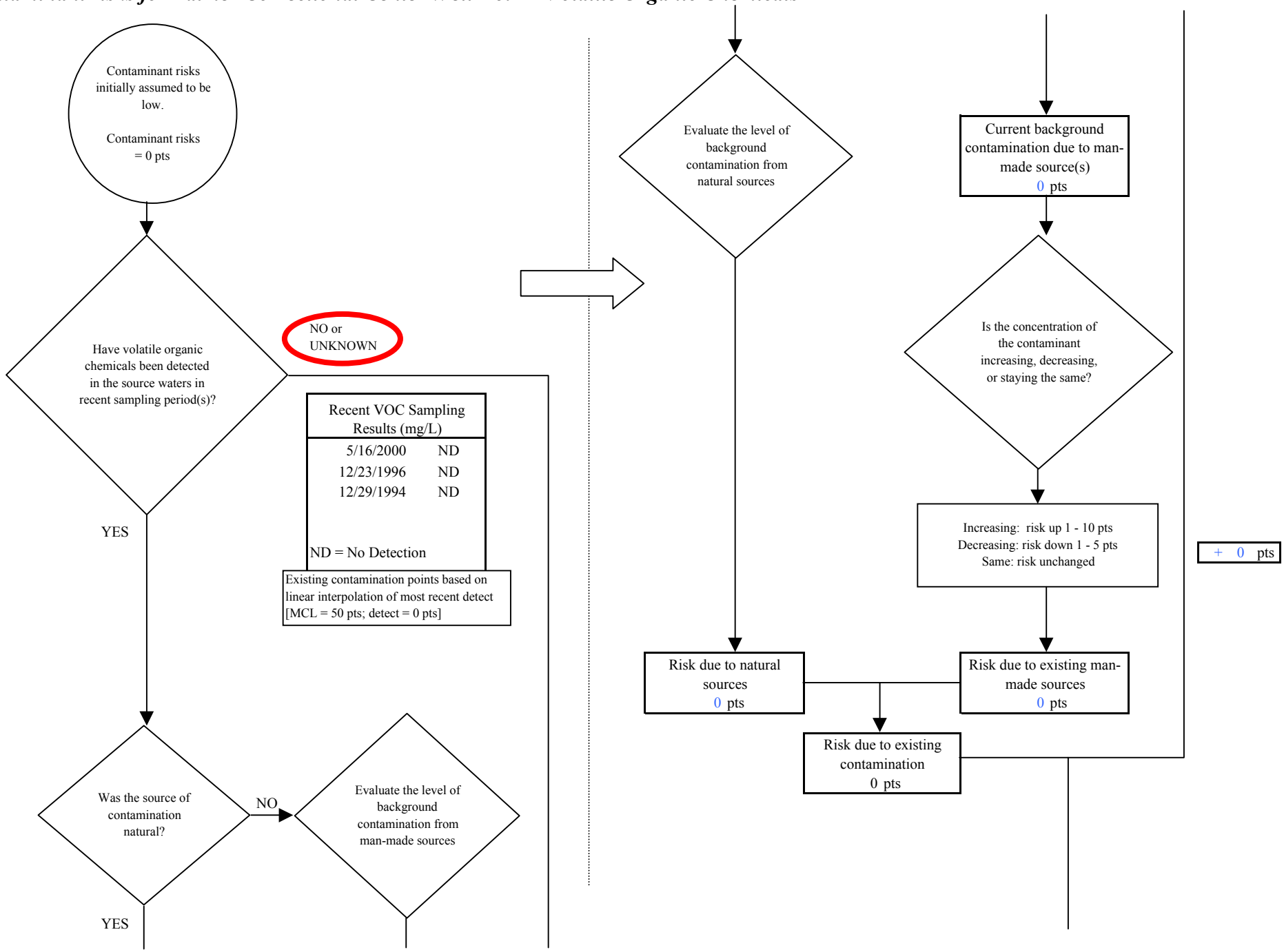
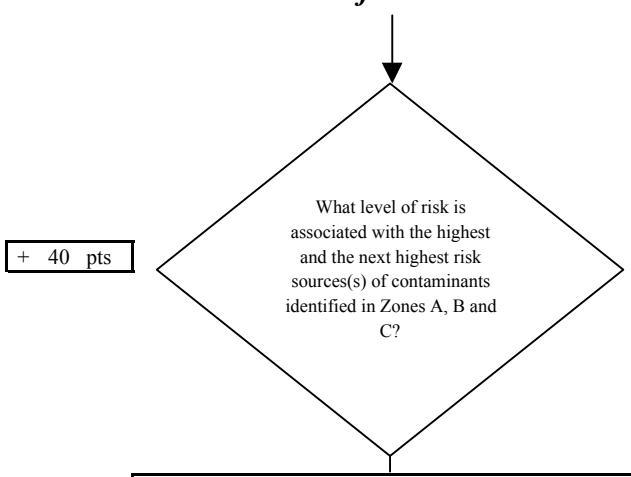


Chart 7. Contaminant risks for Palmer Correctional Center Well No. 2 - Volatile Organic Chemicals



+ 40 pts

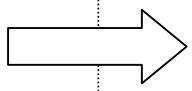
Risk Levels for Contaminant Sources identified in Zones A, B and C

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



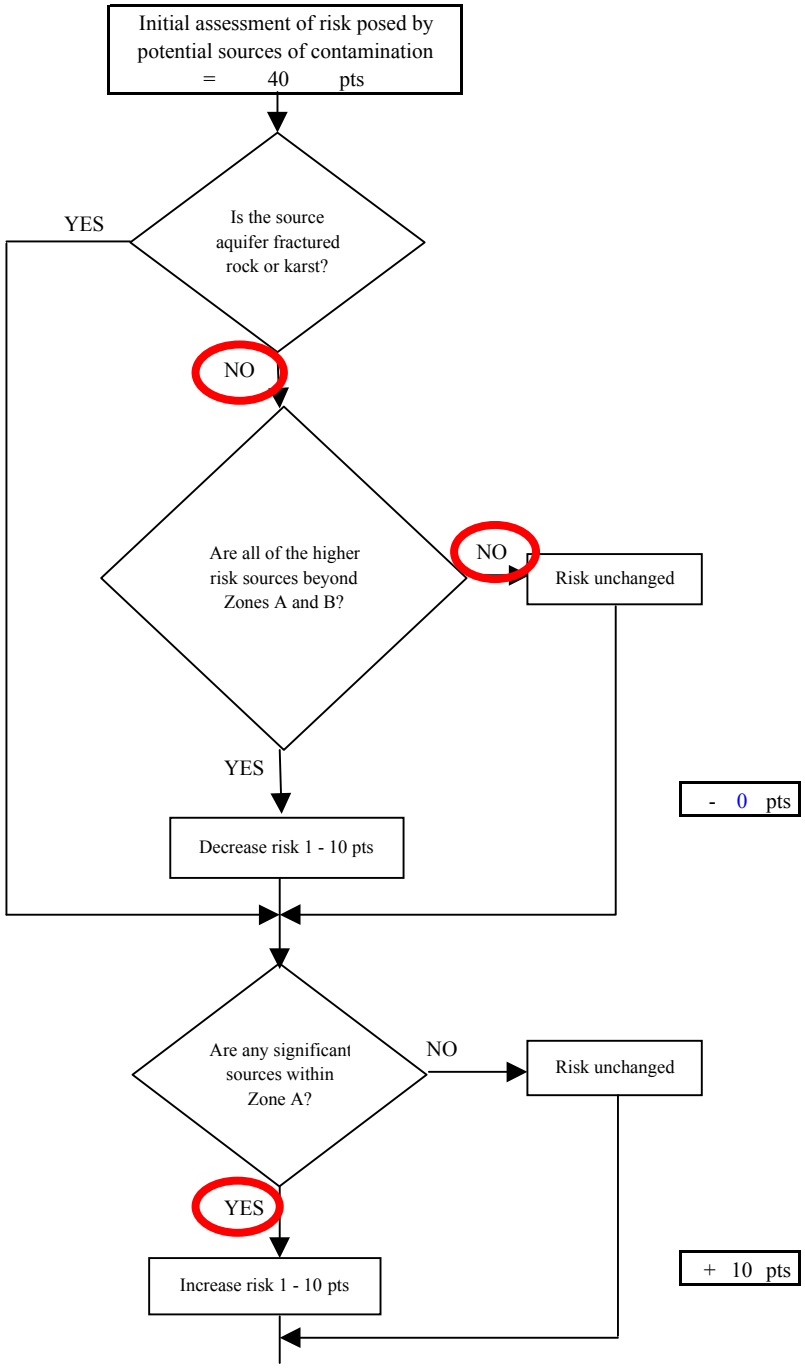


Chart 7. Contaminant risks for Palmer Correctional Center Well No. 2 - Volatile Organic Chemicals

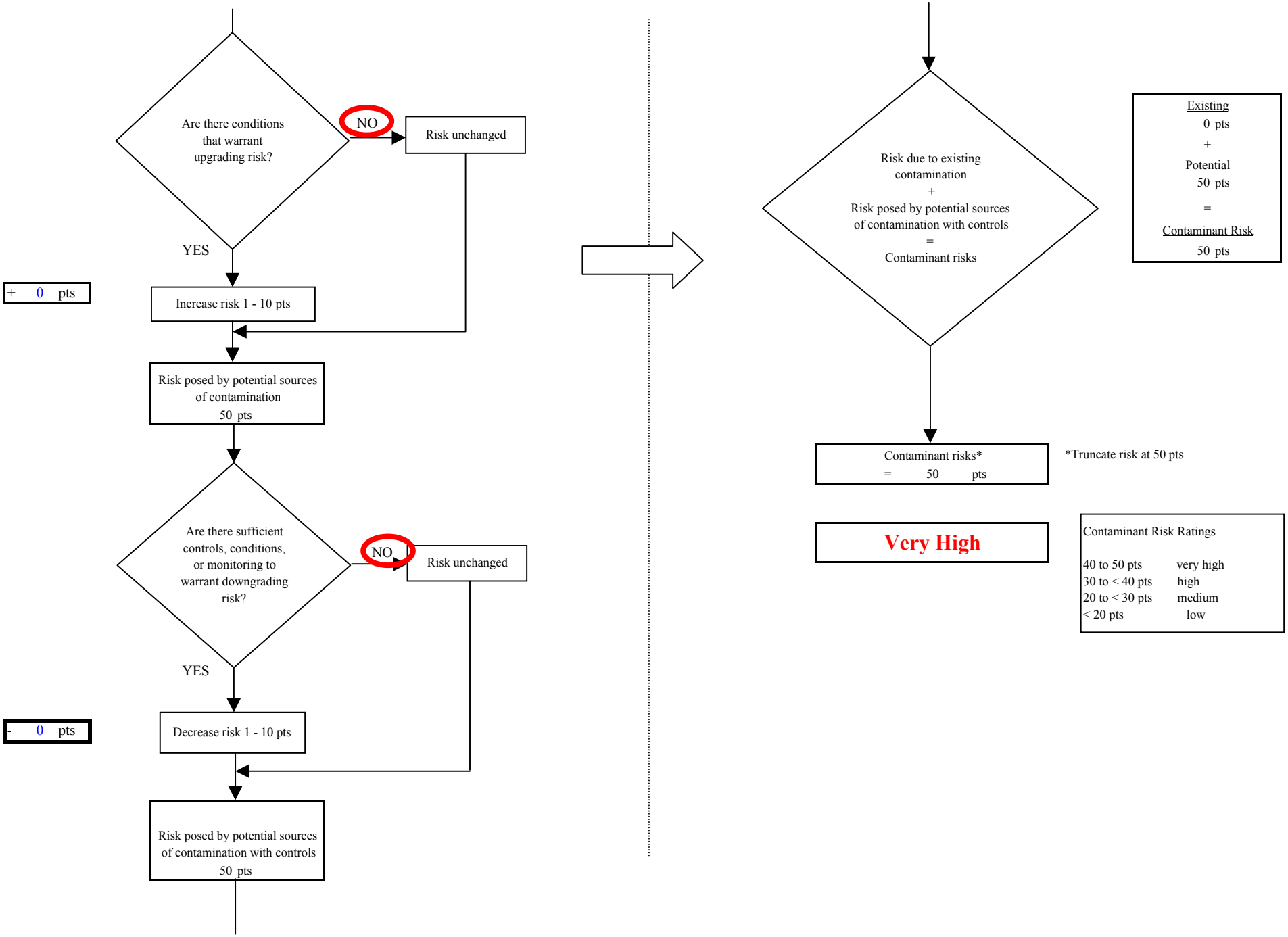


Chart 8. Vulnerability analysis for Palmer Correctional Center Well No. 2 - Volatile Organic Chemicals

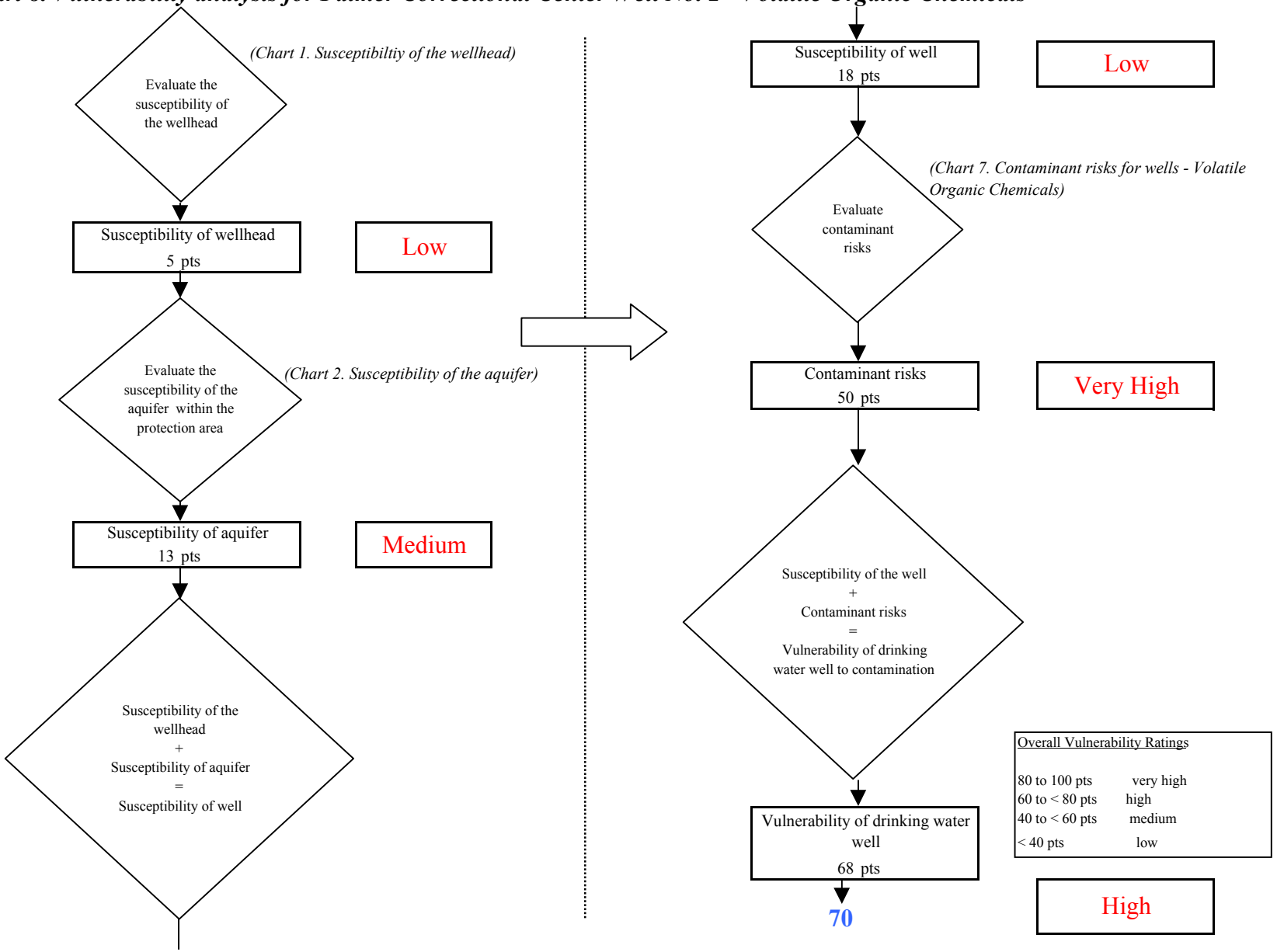


Chart 9. Contaminant risks for Palmer Correctional Center Well No. 2 - Heavy Metals, Cyanide and Other Inorganic Chemicals

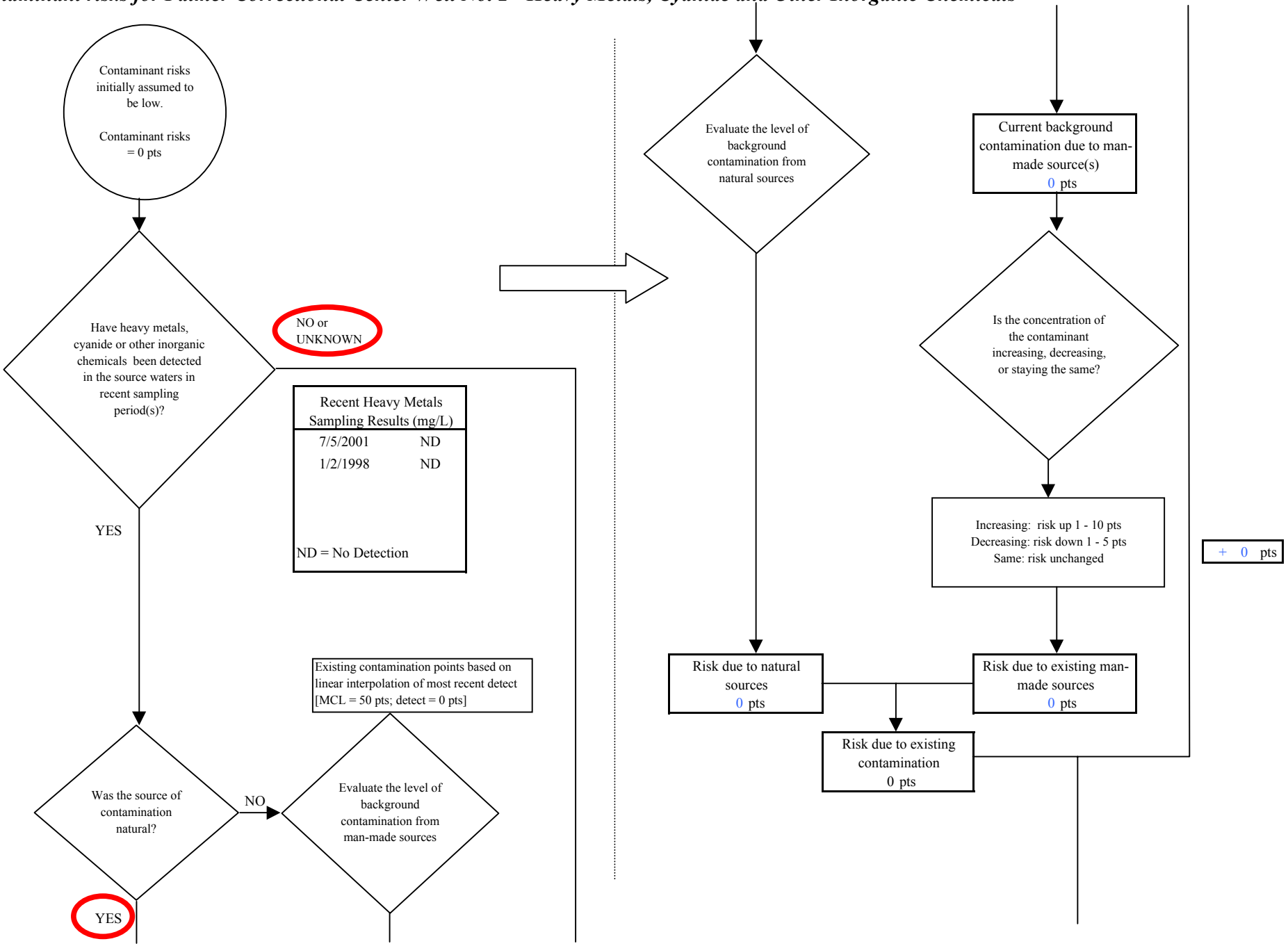


Chart 9. Contaminant risks for Palmer Correctional Center Well No. 2 - Heavy Metals, Cyanide and Other Inorganic Chemicals

+ 20 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	0	0
Medium(s)	0	1	1
Low(s)	1	7	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 20

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 = 20 pts

Is the source aquifer fractured rock or karst?

YES

NO

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

NO → Risk unchanged

YES → Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO → Risk unchanged

YES → Increase risk 1 - 10 pts

+ 2 pts

Chart 9. Contaminant risks for Palmer Correctional Center Well No. 2 - Heavy Metals, Cyanide and Other Inorganic Chemicals

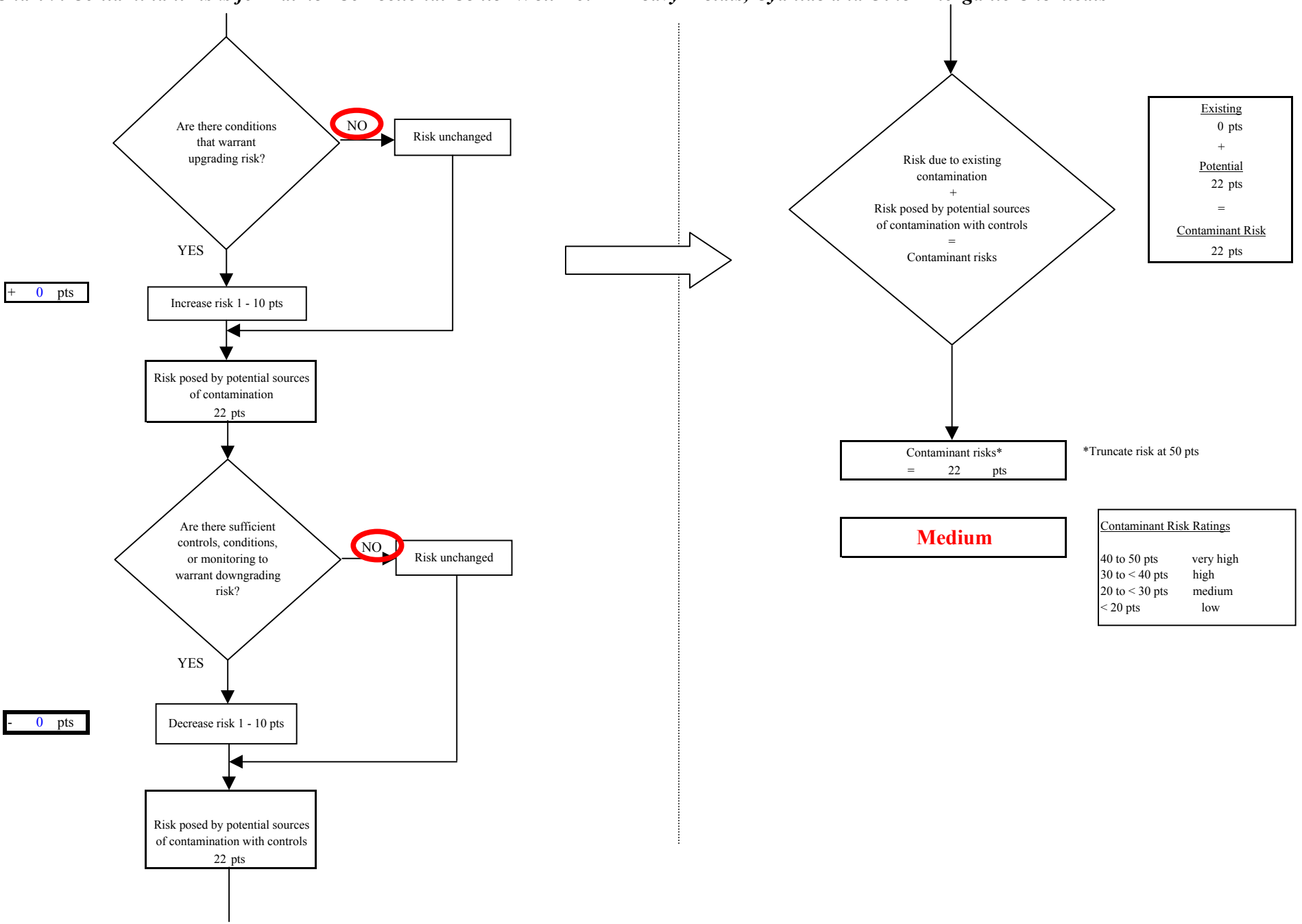


Chart 10. Vulnerability analysis for Palmer Correctional Center Well No. 2 - Heavy Metals, Cyanide and Other Inorganic Chemicals

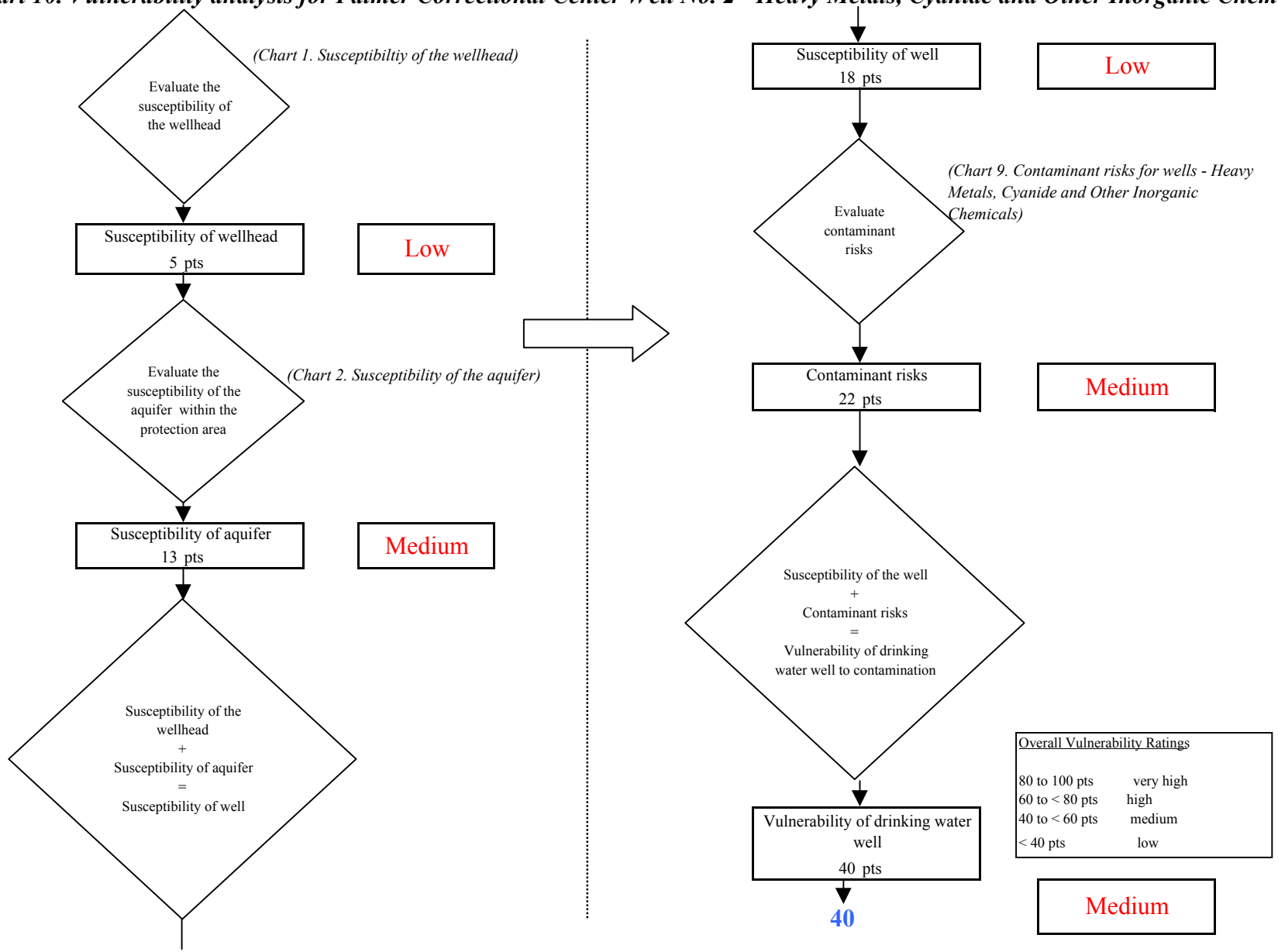


Chart 11. Contaminant risks for Palmer Correctional Center Well No. 2 - Synthetic Organic Chemicals

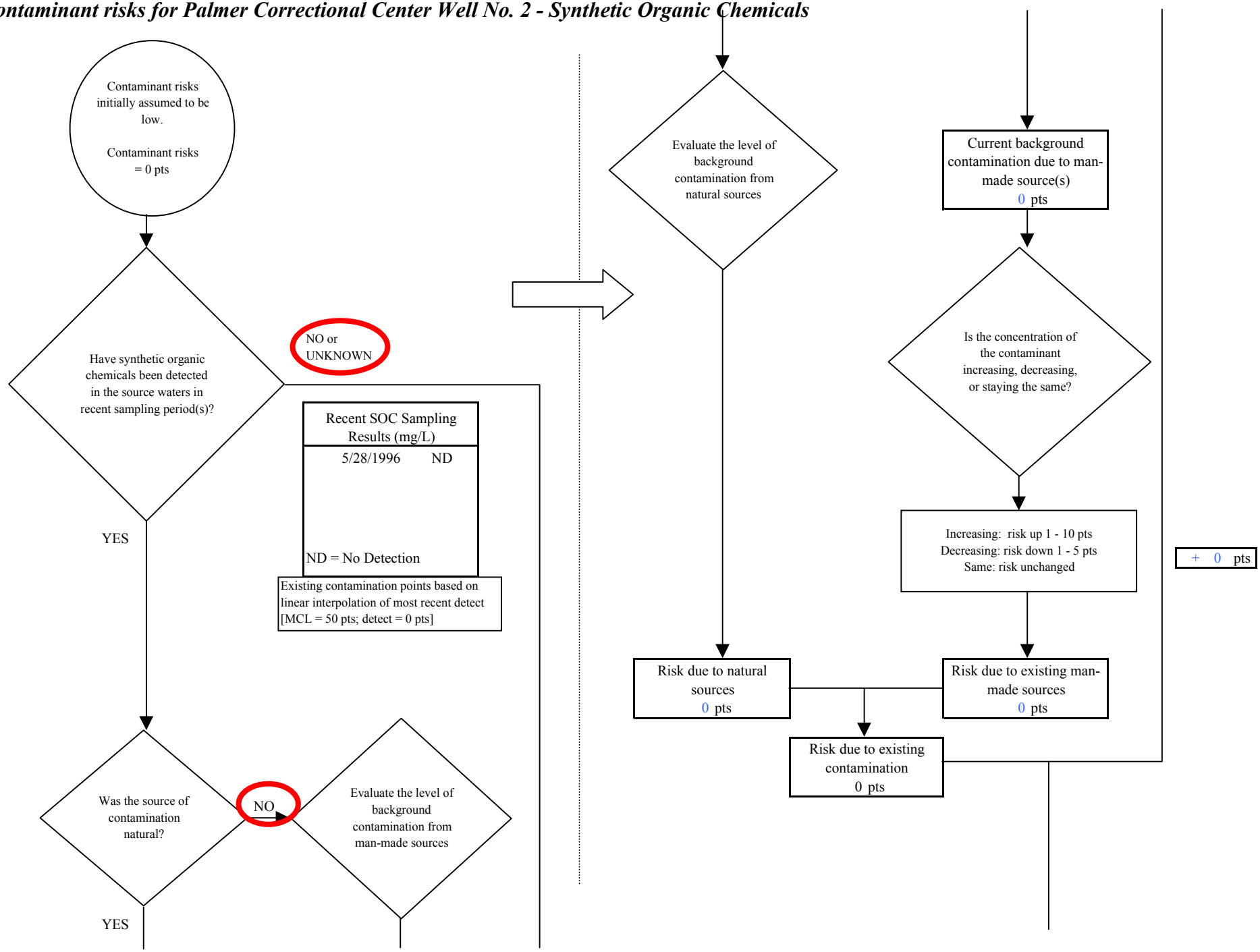
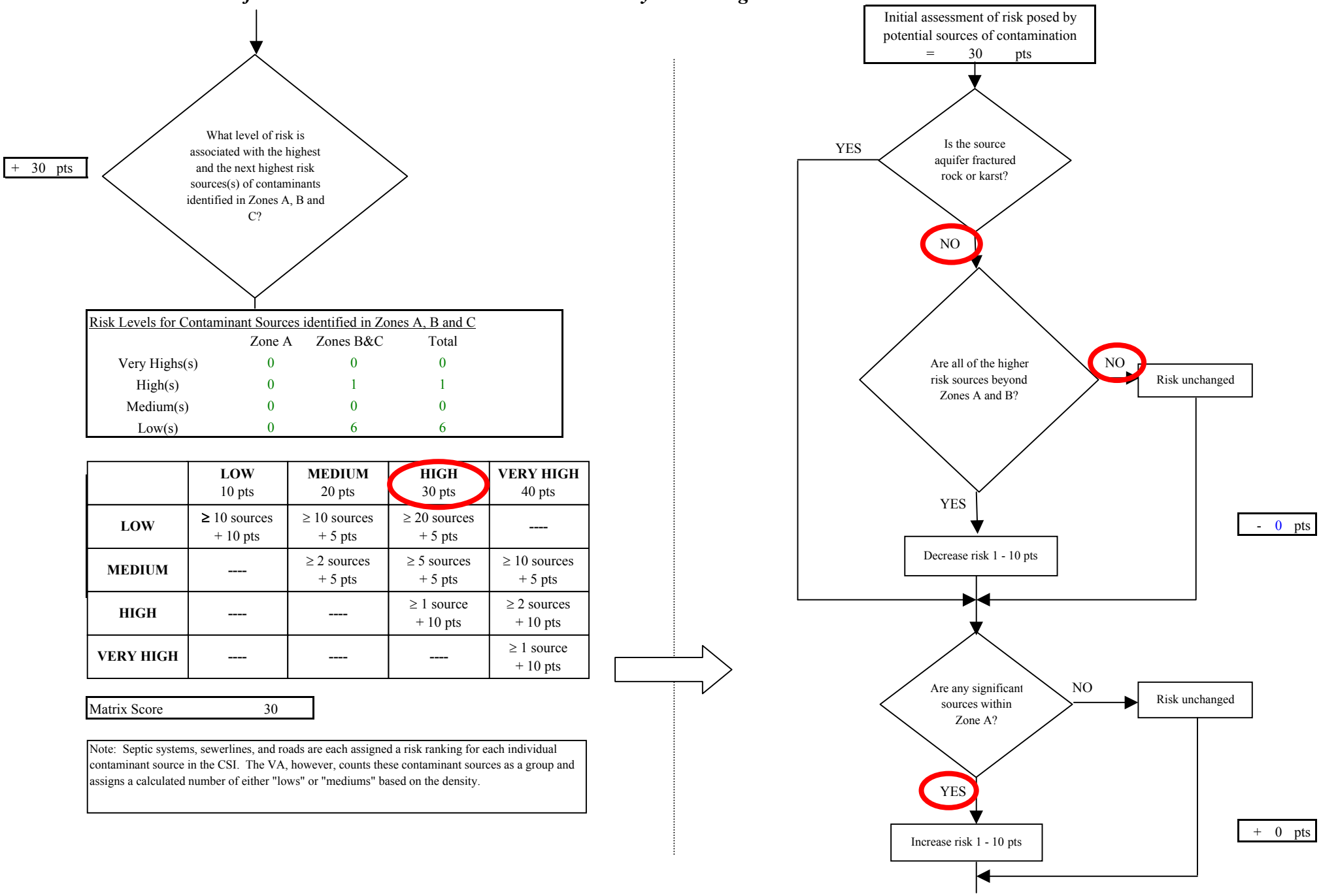


Chart 11. Contaminant risks for Palmer Correctional Center Well No. 2 - Synthetic Organic Chemicals



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)	0	0	0
Low(s)	0	6	6

	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 11. Contaminant risks for Palmer Correctional Center Well No. 2 - Synthetic Organic Chemicals

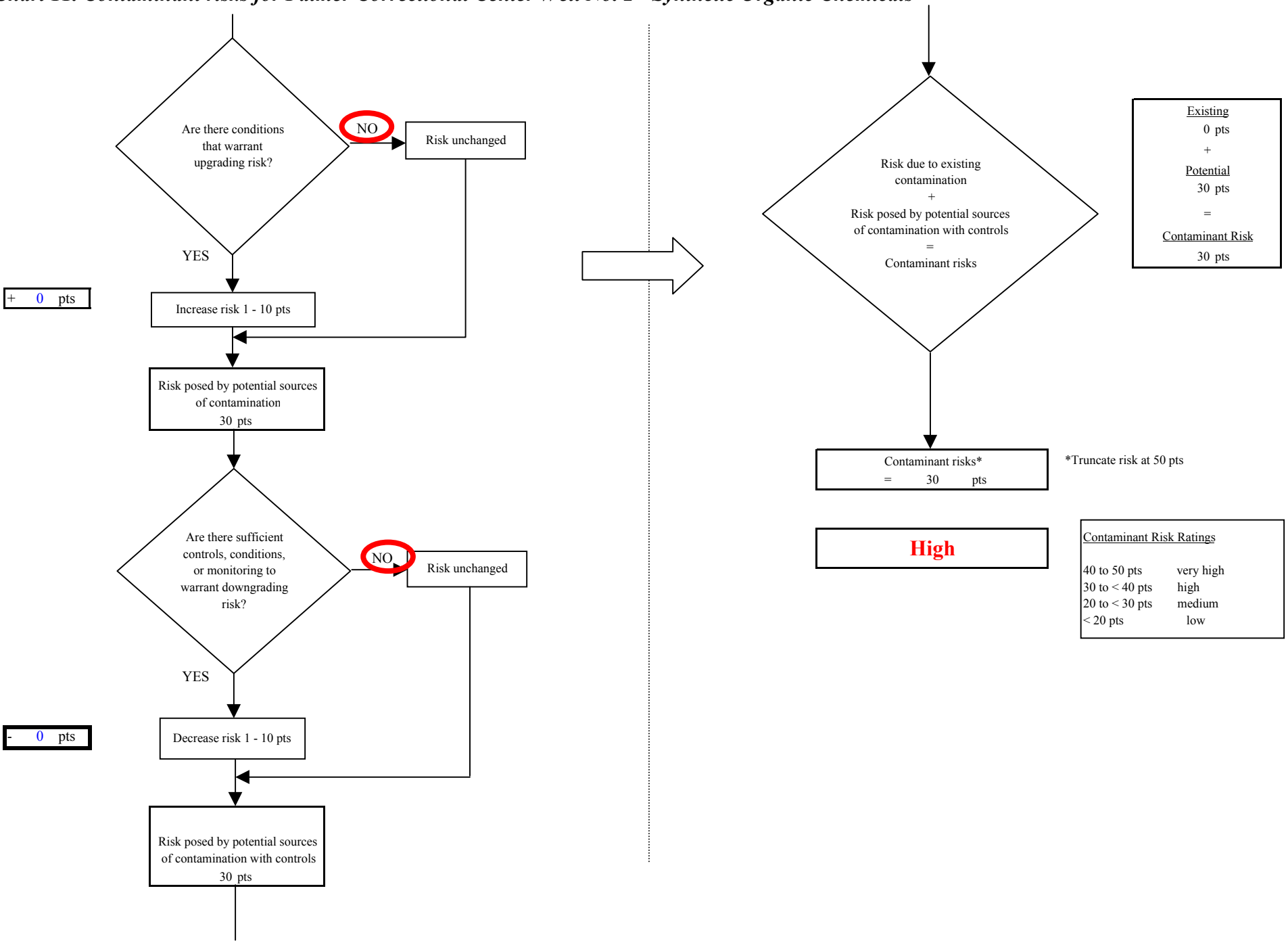


Chart 12. Vulnerability analysis for Palmer Correctional Center Well No. 2 - Synthetic Organic Chemicals

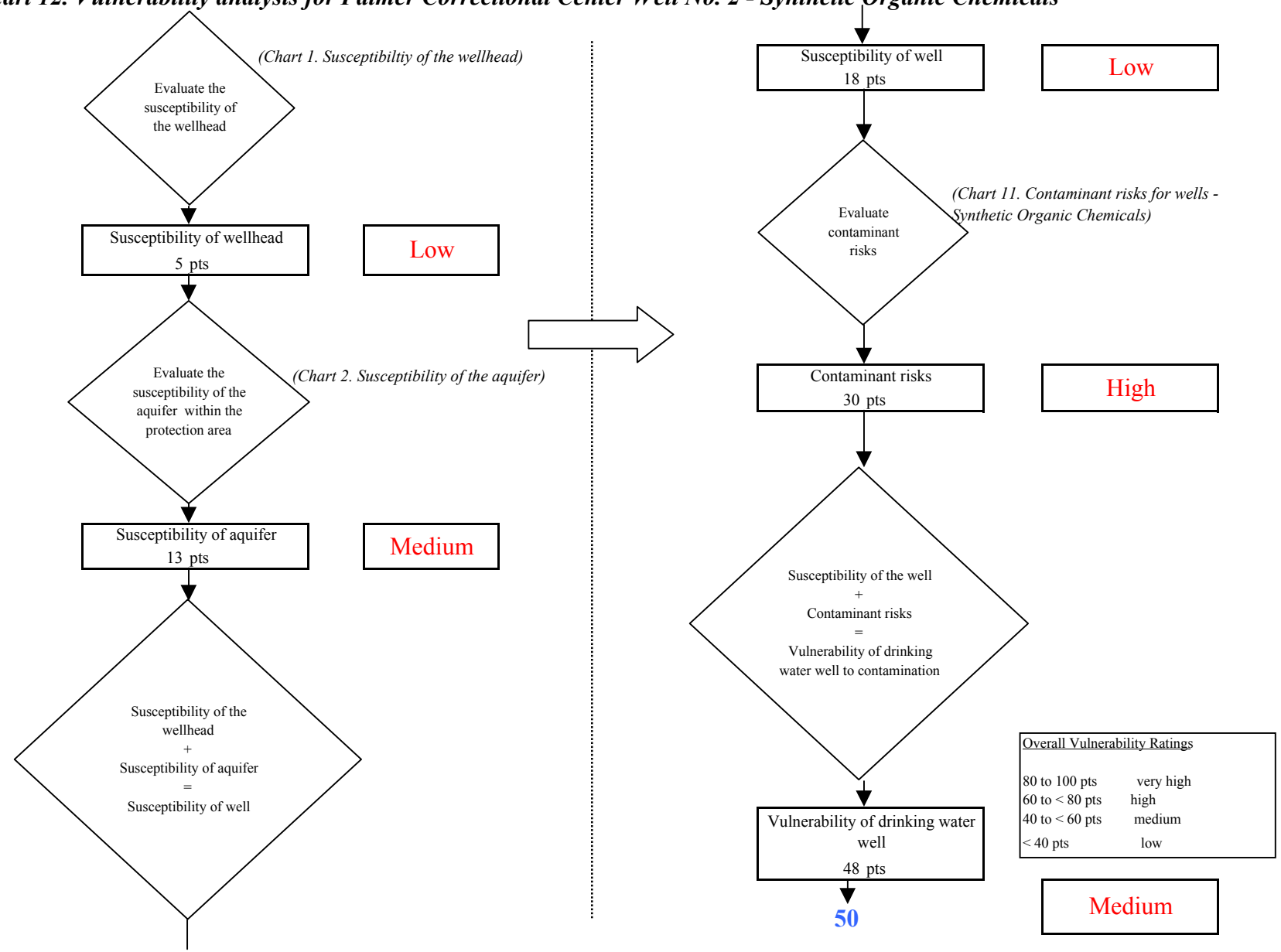


Chart 13. Contaminant risks for Palmer Correctional Center Well No. 2 - Other Organic Chemicals

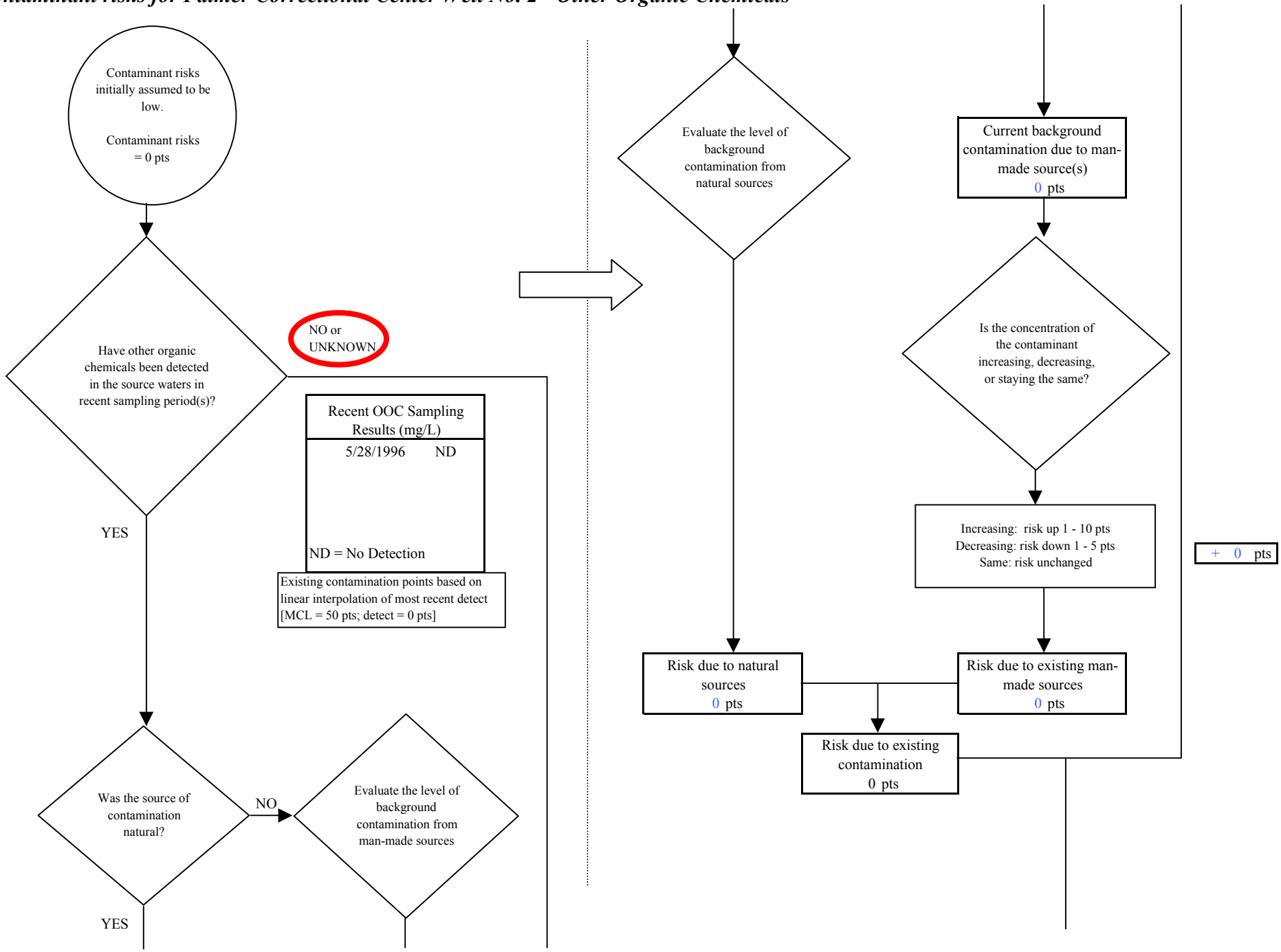


Chart 13. Contaminant risks for Palmer Correctional Center Well No. 2 - Other Organic Chemicals

+ 10 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	0	0
Medium(s)	0	0	0
Low(s)	1	7	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 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.

Initial assessment of risk posed by potential sources of contamination = 10 pts

Is the source aquifer fractured rock or karst?

YES

NO

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

NO

Risk unchanged

YES

Decrease risk 1 - 10 pts

- 0 pts

Are any significant sources within Zone A?

NO

Risk unchanged

YES

Increase risk 1 - 10 pts

+ 2 pts

Chart 13. Contaminant risks for Palmer Correctional Center Well No. 2 - Other Organic Chemicals

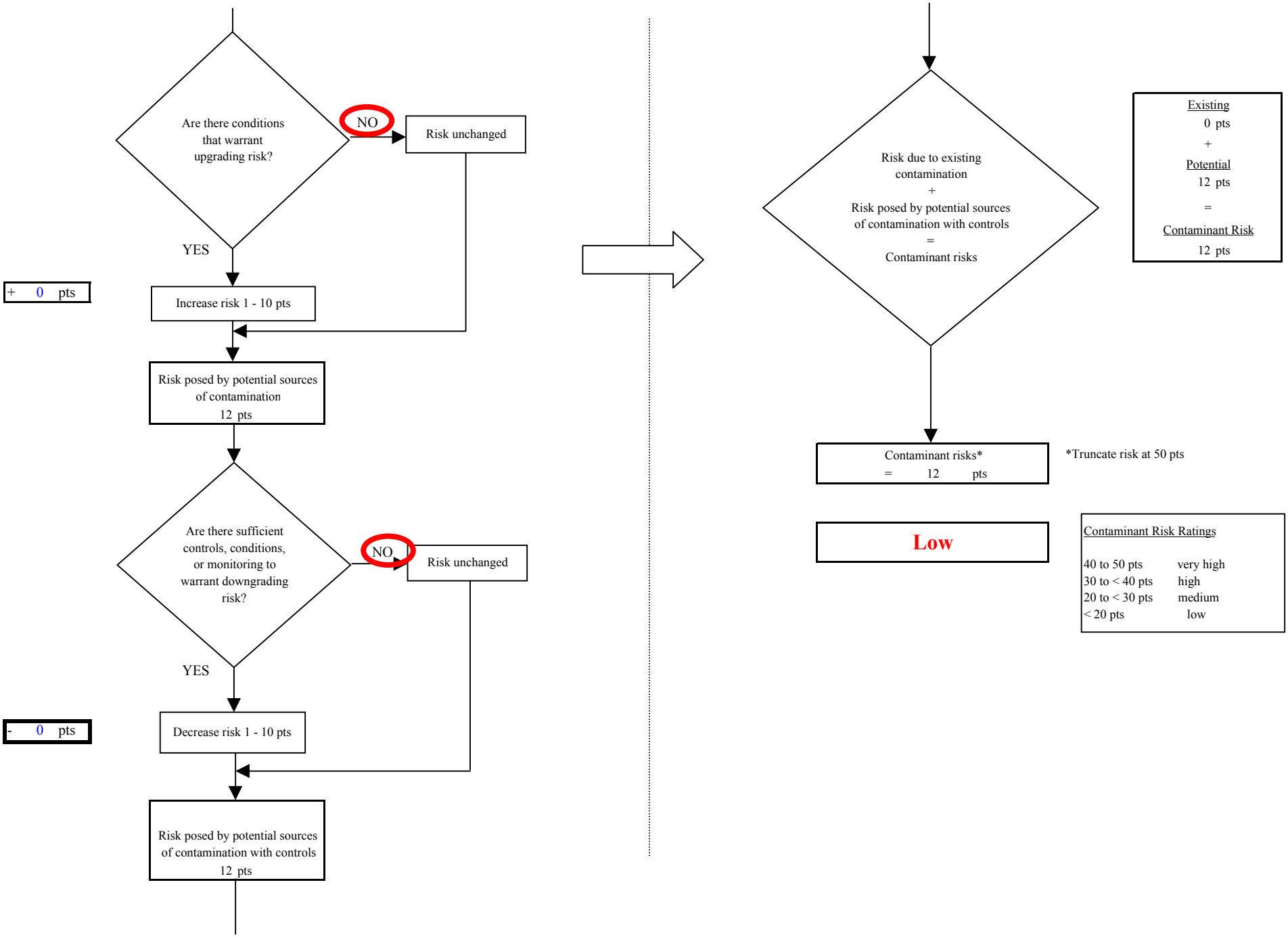


Chart 14. Vulnerability analysis forPalmer Correctional Center Well No. 2 - Other Organic Chemicals