Source Water Assessment

A Hydrogeologic Susceptibility and
Vulnerability Assessment for
Pederson Point- North Pacific Processors, Inc.
Drinking Water System,
Naknek, Alaska

PWSID # 261143.001

March 2004

DRINKING WATER PROTECTION PROGRAM REPORTS 1164
Alaska Department of Environmental Conservation

Source Water Assessment for Pederson Point- North Pacific Processors, Inc. Drinking Water System Naknek, Alaska

PWSID # 261143.001

DRINKING WATER PROTECTION PROGRAM REPORTS 1164

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

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

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Source Water Assessment for Pederson Point - North Pacific Processors, Inc. Source of Public Drinking Water, Naknek, Alaska

Drinking Water Protection Program
Alaska Department of Environmental Conservation

EXECUTIVE SUMMARY

Pederson Point - North Pacific Processors, Inc. has two Public Water System (PWS) wells. The well (PWSID 261143.001) is said to have been drilled in 1934, and it is assumed to have been used as a drinking water source since this time. This source water assessment report is exclusively limited to PWSID #261143.001.

The well is a Class B (transient/non-community) water system that is located near Kvichak Bay in Naknek, Alaska. The well is located approximately 150 feet from the bay. Available records indicate that this system operates from June to August and serves approximately 300 seasonal nonresidents through 19 service connections. Water from the well is filtered and chlorinated before use. Based on available information, treated water is assumed to be stored in a two storage tanks located near the well. The storages tanks have a combined volume of 5,000 gallons. The wellhead received a susceptibility rating of **Low** and the aquifer received a susceptibility rating of **Very High**. Combining these two ratings produce a **Medium** rating for the natural susceptibility of the wells. Identified potential and current sources of contaminants for the primary public drinking water source include: seafood processing, paint sales/service, aboveground fuel tanks, boatyard and marinas, electric power generation, water supply wells, and an airport. These identified potential and existing sources of contamination are considered as sources of bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals. Overall, the water well received vulnerability rating of **Medium** for the bacteria and viruses, a vulnerability rating of **Low** for nitrates and nitrites, and a vulnerability rating of **High** for volatile organic chemicals contaminant categories.

PEDERSON POINT-NORTH PACIFIC PROCESSORS, INC. PUBLIC DRINKING WATER SYSTEM

The Pederson Point – North Pacific Processors, Inc. water well is a Class B (transient/non-community) public water system. The system consists of two wells. PWSID #261143.001 is located approximately 150 feet from Kvichak Bay in Naknek, Alaska (Sec. 3, T17S, R47W, Seward Meridian; see Map A of Appendix A).

Naknek is the primary fishery center in Bristol Bay, located about 12 miles northwest of King Salmon and 300 miles southwest of Anchorage. The community has a population of 642 (ADCED, 2003). Average annual precipitation in Naknek is 20 inches, including approximately 45 inches of snowfall. Temperatures range from 42 to 63°F in summer and -4 to 16°F in winter. Temperatures can be as extreme as -46 to 88°F.

The community of Naknek gets most of their water supply from individual wells. Most households are served by the piped sewage collection system operated by the Borough and the remaining households have individual septic tanks (ADCED, 2003). Naknek receives electrical power from the Naknek Electric Association operated by the REA Cooperative. Power generating facilities are fueled by diesel. Refuse is collected by the Patterson Sanitation Company and trucked to the Borough operated landfill located five miles outside of the community (ADCED, 2003).

According to information supplied by ADEC for the Pederson Point - North Pacific Processors, Inc. PWS, the depth of the water well is 60 feet below the ground surface. Based on available construction details, the well is likely screened in an unconfined aquifer. In comparison to confined aquifers, unconfined aquifers are likely more susceptible to groundwater impacts resulting from the downward migration of surface contaminants. Based on available data for PWSID's in the local area, the well is assumed to be screened in sandy material. The wells are not located in a floodplain.

Information acquired from a June 1999 sanitary survey for the public water system indicated that the land surface was sloped away from the wells. Generally, land surfaces that slope away from the wellhead promote surface water drainage, which

reduces potential of contaminant migration down the well casing annulus. The well is grouted according to ADEC regulations. Proper grouting provides added protection against contaminants traveling along the well casing annulus and into source waters.

Naknek is located in an area that has been mapped as being underlain by isolated masses of permafrost; predominantly fine-grained deposits. Permafrost is usually found either at a considerable depth as relict permafrost or near the surface as thin lenses of small extent where ground insulation is high or low. The terrain in this area consists of low hills with many shallow lakes. The lakes resulted from the delayed melting of buried ice blocks (ADOT&PF, 1982).

PEDERSON POINT – NORTH PACIFIC PROCESSORS, INC. DRINKING WATER PROTECTION AREA

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

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

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

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

Table 1. Definition of Zones

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

The DWPA for the Pederson Point – North Pacific Processors, Inc. PWS was determined using an analytical calculation and includes Zones A, B, C and D (See Map A of Appendix A).

INVENTORY OF POTENTIAL AND EXISTING CONTAMINANT SOURCES

The Drinking Water Protection Program has completed an inventory of potential and existing sources of contamination within the Pederson Point – North Pacific Processors, Inc. DWPA. This inventory was completed through a search of agency records and other publicly available information. Potential sources of contamination to the drinking water aquifer include a wide range of categories and types. Potential drinking water contaminants are found within agricultural, residential, commercial, and industrial areas, but can also occur within areas that have little or no development.

For the basis of all Class B public water system assessments, three categories of drinking water contaminants were inventoried. They include:

- Bacteria and viruses,
- Nitrates and/or nitrites,
- Volatile organic chemicals.

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

RANKING OF CONTAMINANT RISKS

Once the potential and existing sources of contamination have been identified, they are assigned a ranking according to what type and level of risk they represent. Ranking of contaminant risks for a "potential" or "existing" source of contamination is a function of toxicity and volumes of specific contaminants associated with that source. Rankings include:

- Low,

- Medium,
- High, and
- Very High.

The time-of-travel for contaminants within the water varies and is dependent on the physical and chemical characteristics of each contaminant. Bacteria and Viruses are only inventoried in Zones A and B because of their short life span. Only "Very High" and "High" rankings are inventoried within the outer Zone D due to the probability of contaminant dilution by the time the contaminants get to the well.

Tables 2 through 4 in Appendix B contain the ranking of potential and existing sources of contamination with respect to bacteria and viruses, nitrates and/or nitrites, and volatile organic chemicals.

VULNERABILITY OF PEDERSON POINT – NORTH PACIFIC PROCESSORS, INC. DRINKING WATER SYSTEM

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

- Natural susceptibility, and
- Contaminant risks.

Appendix D contains eight charts, which together form the 'Vulnerability Analysis' for a source water assessment for a public drinking water source. Chart 1 analyzes the 'Susceptibility of the Wellhead' to contamination by looking at the construction of the well and its surrounding area. Chart 2 analyzes the 'Susceptibility of the Aquifer' to contamination by looking at the 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 8 contain the Contaminant Risks and Vulnerability Analyses for nitrates and nitrites and volatile organic chemicals, respectively.

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

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

+

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

=

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

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

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

The Pederson Point – North Pacific Processors, Inc. water well is in an unconfined aquifer. Unconfined aquifers are more susceptible to potential groundwater quality impacts posed by the migration of surface water contaminants downward from the surface. Table 2 shows the Susceptibility scores and ratings for both wells in this PWS.

Table 2. Susceptibility

	Score	Rating
Susceptibility of the Wellhead	0	Low
Susceptibility of the Aquifer	25	Very High
Natural Susceptibility	25	Medium

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

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

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

Table 3. Contaminant Risks

Category	Score	Rating
Bacteria and Viruses	25	Medium
Nitrates and/or Nitrites	10	Low
Volatile Organic Chemicals	45	Very High

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

Natural Susceptibility (0 – 50 points)

+

Contaminant Risks (0 – 50 points)

=

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

Again, rankings are assigned according to a point score:

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

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

Table 4. Overall Vulnerability

Category	Score	Rating
Bacteria and Viruses	50	Medium
Nitrates and Nitrites	35	Low
Volatile Organic Chemicals	70	High

Bacteria and Viruses

The contaminant risk for bacteria and viruses is **Medium**. The risk is primarily attributed to the presence of the seafood processing in Zone A (See Chart 3 – Contaminant Risks for Bacteria and Viruses in Appendix D).

No positive bacteria counts were reported in recent (previous five years) sampling events. Only a small amount of bacteria and viruses are required to endanger public health.

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

Nitrates and Nitrites

The contaminant risk for nitrates and nitrites is **Low**. The risk to this source of public drinking water is attributed to seafood processing and the airport (See Chart 5 - Contaminant Risks for Nitrates and/or Nitrites in Appendix D).

Nitrates are very mobile, moving at approximately the same rate as water. The sampling history for this well indicates that no nitrates have been detected in the water. Nitrate concentrations in uncontaminated groundwater are typically less than 2 mg/L; therefore, nitrate concentrations above 2 mg/L may be indicative of man-made sources.

Nitrate levels are often derived from the decomposition of organic matter in soils. After combining the contaminant risk for nitrates and nitrites with the natural susceptibility of the well, the overall vulnerability of the well to nitrate and nitrite contamination remains **Low**.

Volatile Organic Chemicals

The contaminant risk for volatile organic chemicals is **Very High**. The risk is primarily attributed to the presence of the airport in Zone B and the numerous aboveground fuel tanks in Zone A (see Table 4 – Appendix B).

No recent sampling data was available in ADEC records for the Pederson Point (See Chart 7 – Contaminant Risks for Volatile Organic Chemicals in Appendix D).

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

Using the Source Water Assessment

This assessment of contaminant risks can be used as a foundation for local voluntary protection efforts as well as a basis for the continuous efforts on the part of Pederson Point – North Pacific Processors, Inc.

and the community of Naknek to protect public health. It is anticipated that Source Water Assessments will be updated every five years to reflect any changes in the vulnerability and/or susceptibility of the drinking water source.

REFERENCES

Alaska Department of Community and Economic Development (ADCED), 2003 [WWW document]. URL: http://www.dced.state.ak.us/cbd/commdb/CF_COMDB.htm

Alaska Department of Environmental Conservation, Contaminated Sites Database, 2003 [WWW database], URL http://www.state.ak.us/dec/dspar/csites/cs_search.htm

Alaska Department of Environmental Conservation, Leaking Underground Storage Tank Database, 2003 [WWW database], URL http://www.dec.state.ak.us/spar/stp/ust/search/fac_search.asp

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Freeze, R. A., and Cherry, J.A. 1979, Groundwater, Prentice-Hall, Englewood Cliffs, New Jersey

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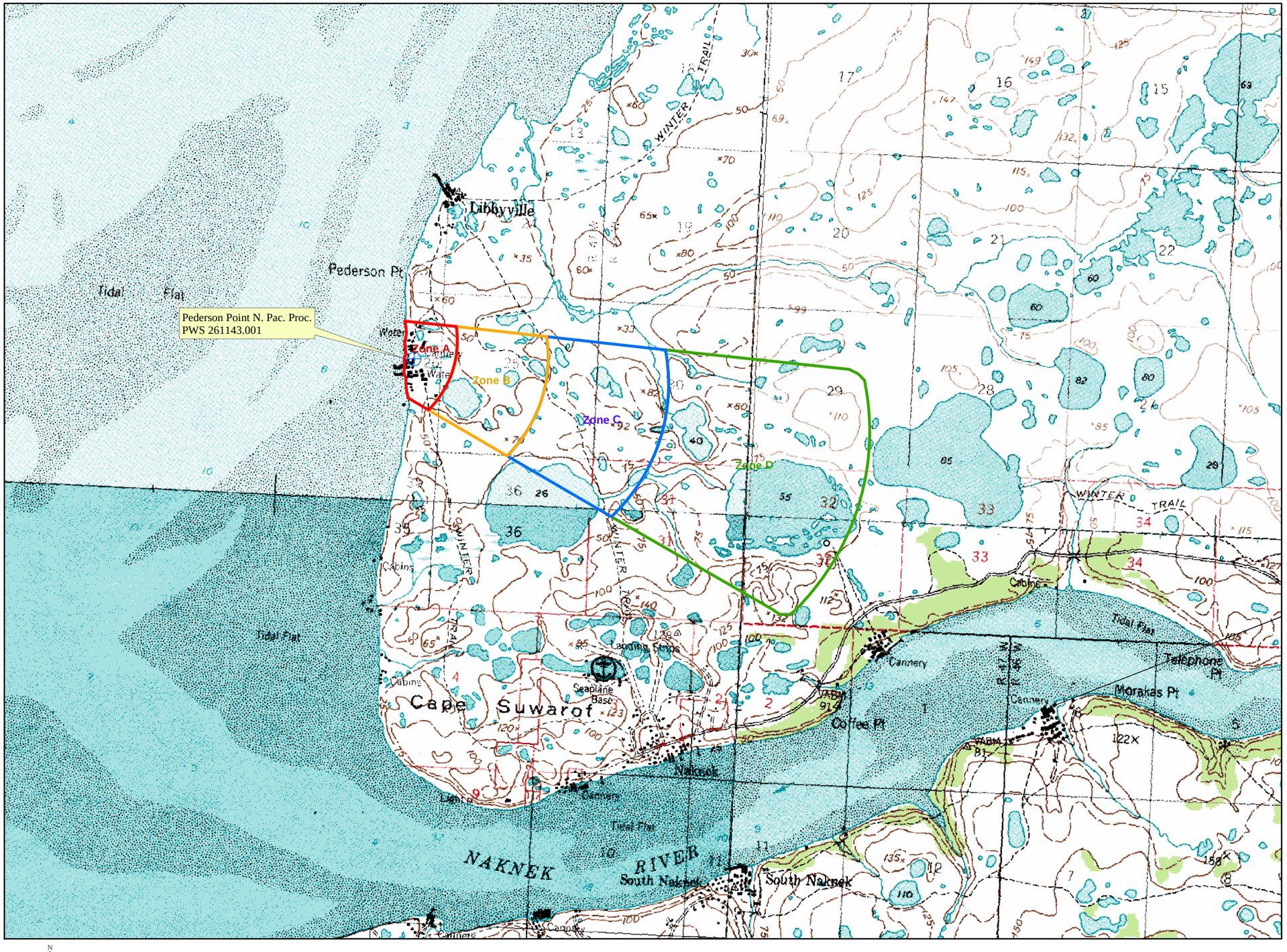
APPENDIX A

Drinking Water Protection Area Location Map
(Map A)

Public Water Well System for PWS #261143.001 Pederson Point N. Pac. Proc.



LEGEND

- Public Water System Well

Hydrography/Physical

- Parcels
- Stream
- Lake or Pond
- Contours (approx. 50 ft.)

Transportation

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

Groundwater Protection Zones

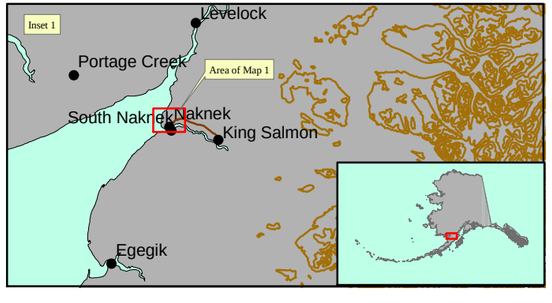
- Zone A Protection Area– Several Months Travel Time
- Zone B Protection Area– 2 Years Travel Time
- Zone C Protection Area– 5 Years Travel Time
- Zone D Protection Area– 10 Years Travel Time

Data Sources:
Contaminant Sources, Public Water System Wells, Contours
Alaska Department of Environmental Conservation (ADEC)

All other data:
United States Geological Survey (USGS)

Drinking Water Protection Areas based on "Alaska Drinking Water Protection Program - Guidance Manual for Class B Public Water Systems" published by ADEC

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



N W E S

0 0.25 0.5 1 1.5 2 Miles

Pederson Point N. Pac. Proc.
PWS 261143.001

Appendix A Map A

APPENDIX B

Contaminant Source Inventory and Risk Rankings (Tables 1-4)

Table 1

Contaminant Source Inventory for ***Pederson Point N. Pac. Proc.***

PWSID 261143.00

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Map Number*	*Comments*
Paint sales /service	C32	C32-01	A	C	
Seafood processing	N10	N10-01	A	C	
Tanks, diesel (above ground)	T06	T06-01	A	C	
Tanks, diesel (above ground)	T06	T06-02	A	C	
Tanks, diesel (above ground)	T06	T06-03	A	C	
Tanks, gasoline (above ground)	T10	T10-01	A	C	
Water supply wells	W09	W09-01	A	C	
Boat yards and marinas	X15	X15-01	A	C	
Electric power generation (fossil fuels)	X36	X36-01	A	C	
Airports	X14	X14-01	B	C	

Table 2

Contaminant Source Inventory and Risk Ranking for Pederson Point N. Pac. Proc. Sources of Bacteria and Viruses

PWSID 261143.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Seafood processing	N10	N10-01	A	Medium	C	

Table 3

Contaminant Source Inventory and Risk Ranking for Pederson Point N. Pac. Proc. Sources of Nitrates/Nitrites

PWSID 261143.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Seafood processing	N10	N10-01	A	Low	C	
Airports	X14	X14-01	B	Low	C	

Table 4

Contaminant Source Inventory and Risk Ranking for Pederson Point N. Pac. Proc. Sources of Volatile Organic Chemicals

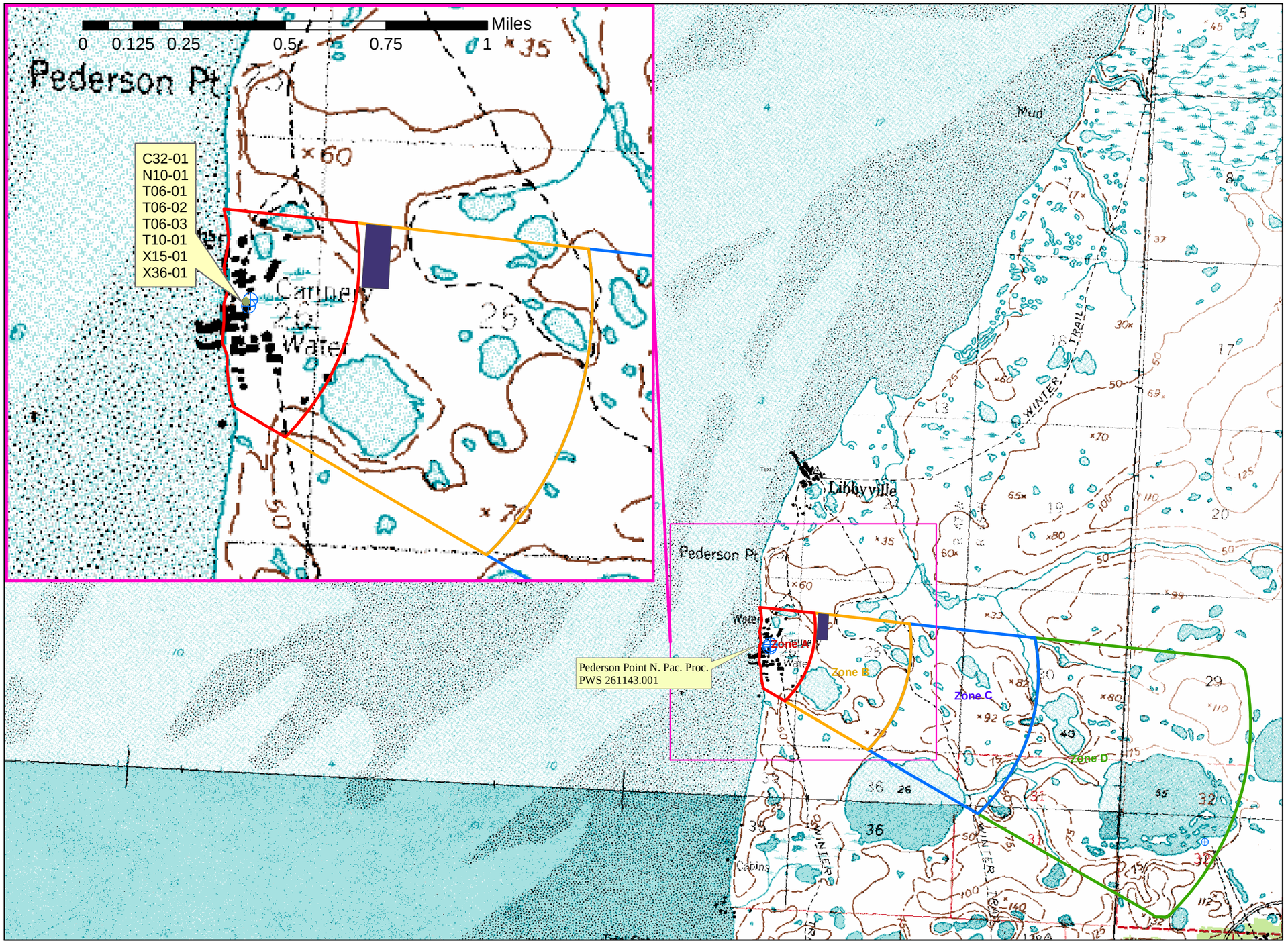
PWSID 261143.001

Contaminant Source Type	*Contaminant Source ID*	*CS ID tag*	*Zone*	*Risk Ranking for Analysis*	*Map Number*	*Comments*
Paint sales /service	C32	C32-01	A	Medium	C	
Tanks, diesel (above ground)	T06	T06-01	A	Medium	C	
Tanks, diesel (above ground)	T06	T06-02	A	Medium	C	
Tanks, diesel (above ground)	T06	T06-03	A	Medium	C	
Tanks, gasoline (above ground)	T10	T10-01	A	Medium	C	
Boat yards and marinas	X15	X15-01	A	Low	C	
Electric power generation (fossil fuels)	X36	X36-01	A	Medium	C	
Airports	X14	X14-01	B	High	C	

APPENDIX C

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

Public Water Well System for PWS #261143.001 Pederson Point N. Pac. Proc.
Showing Potential and Existing Sources of Contamination



LEGEND

- Public Water System Well

Hydrography/Physical

- Parcels
- Stream
- Lake or Pond
- Contours

Transportation

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

Groundwater Protection Zones

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

Existing or Potential Contaminant Sources

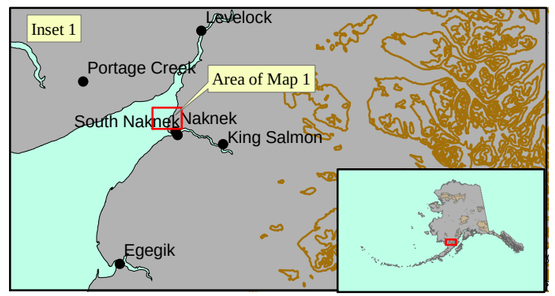
- Paint sales / service (C32)
- Seafood processing (N10)
- Tanks, diesel (above ground) (T06)
- Tanks, gasoline (above ground) (T10)
- Boatyards and marinas (X15)
- Electric power generation (fossil fuels) (X36)
- Airport/Landing Strip (X14)

Data Sources:
Contaminant Sources, Public Water System Wells, Contours
Alaska Department of Environmental Conservation (ADEC)

All other data:
United States Geological Survey (USGS)

Drinking Water Protection Areas based on "Alaska Drinking Water Protection Program - Guidance Manual for Class B Public Water Systems" published by ADEC

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



Pederson Point N. Pac. Proc.
PWS 261143.001

Appendix C Map C

APPENDIX D

Vulnerability Analysis for Public Drinking Water Source (Charts 1-8)

Chart 1. Susceptibility of the wellhead - Pederson Point N. Pac. Proc. (261143.001)

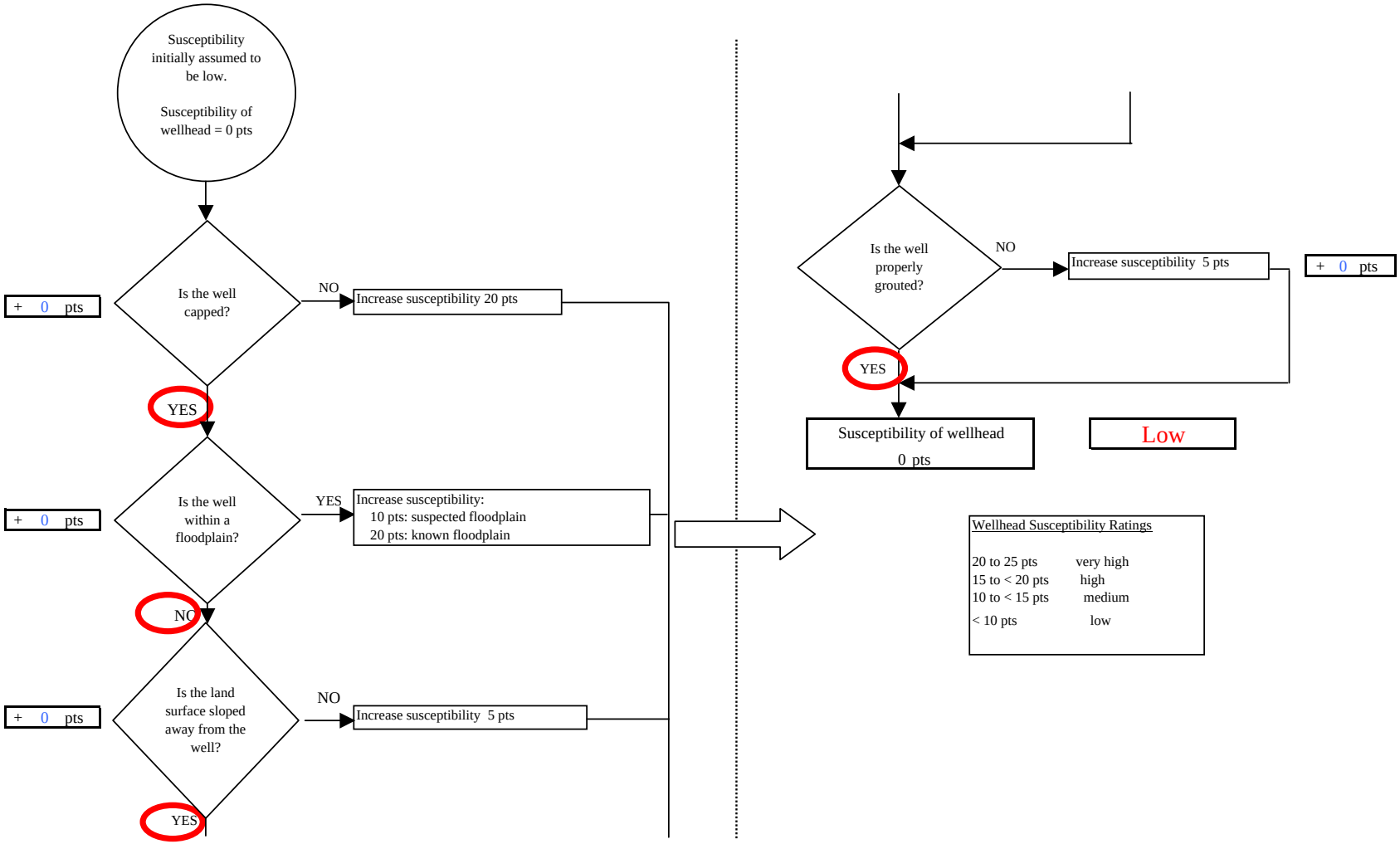


Chart 2. Susceptibility of the aquifer - Pederson Point N. Pac. Proc. (261143.001)

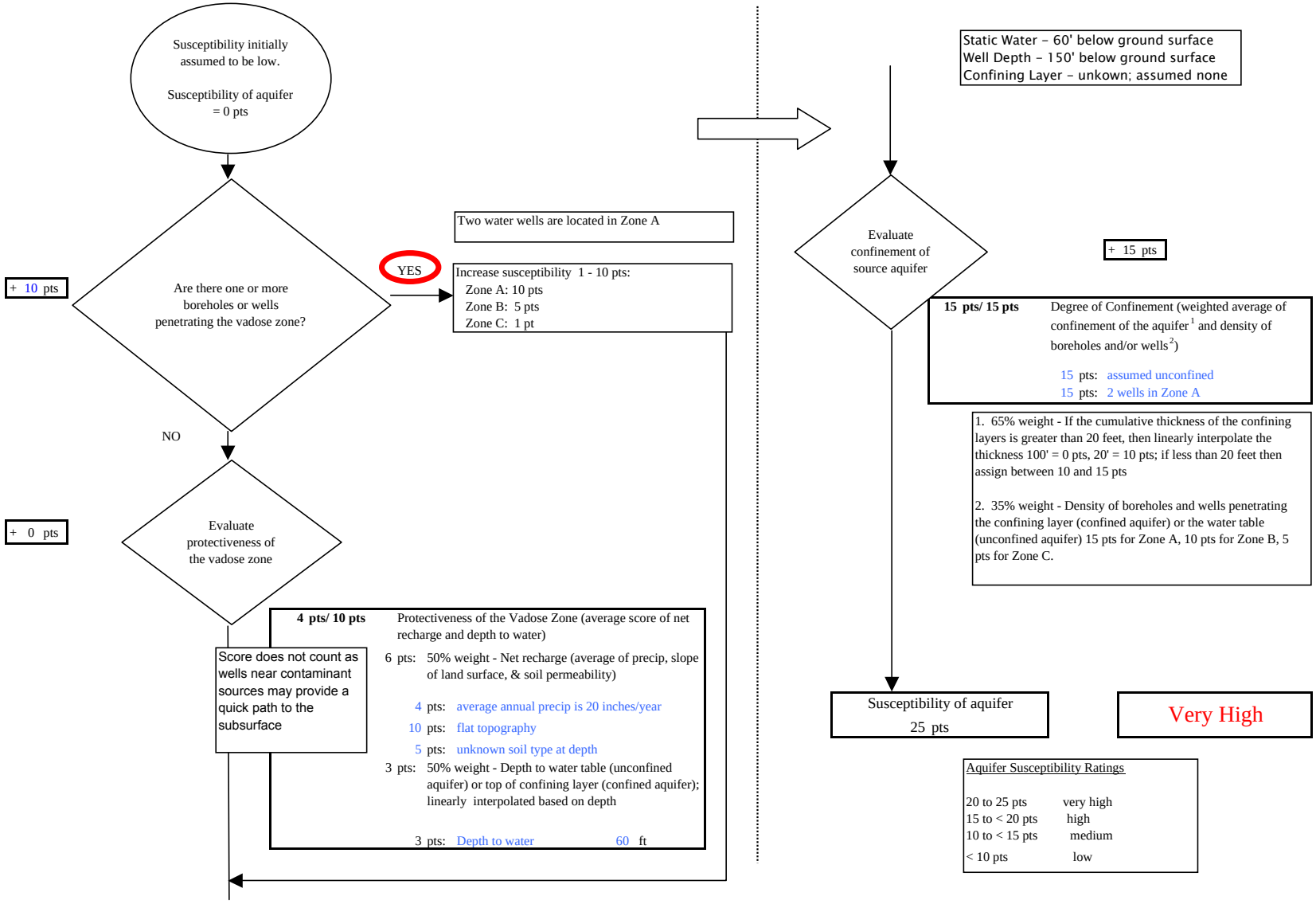
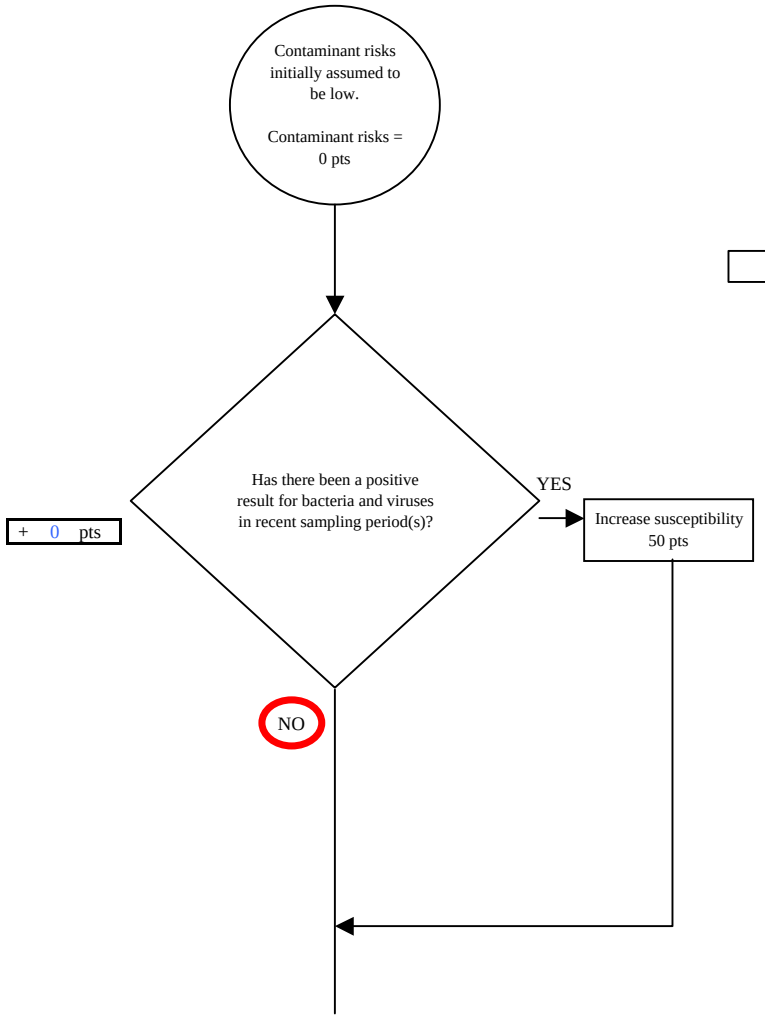
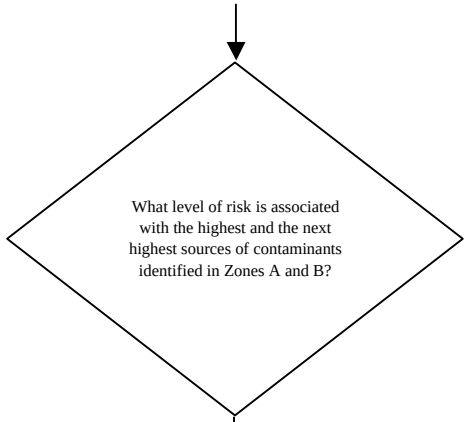


Chart 3. Contaminant risks for Pederson Point N. Pac. Proc. (261143.001) - Bacteria & Viruses





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

	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.

Chart 3. Contaminant risks for Pederson Point N. Pac. Proc. (261143.001) - Bacteria & Viruses

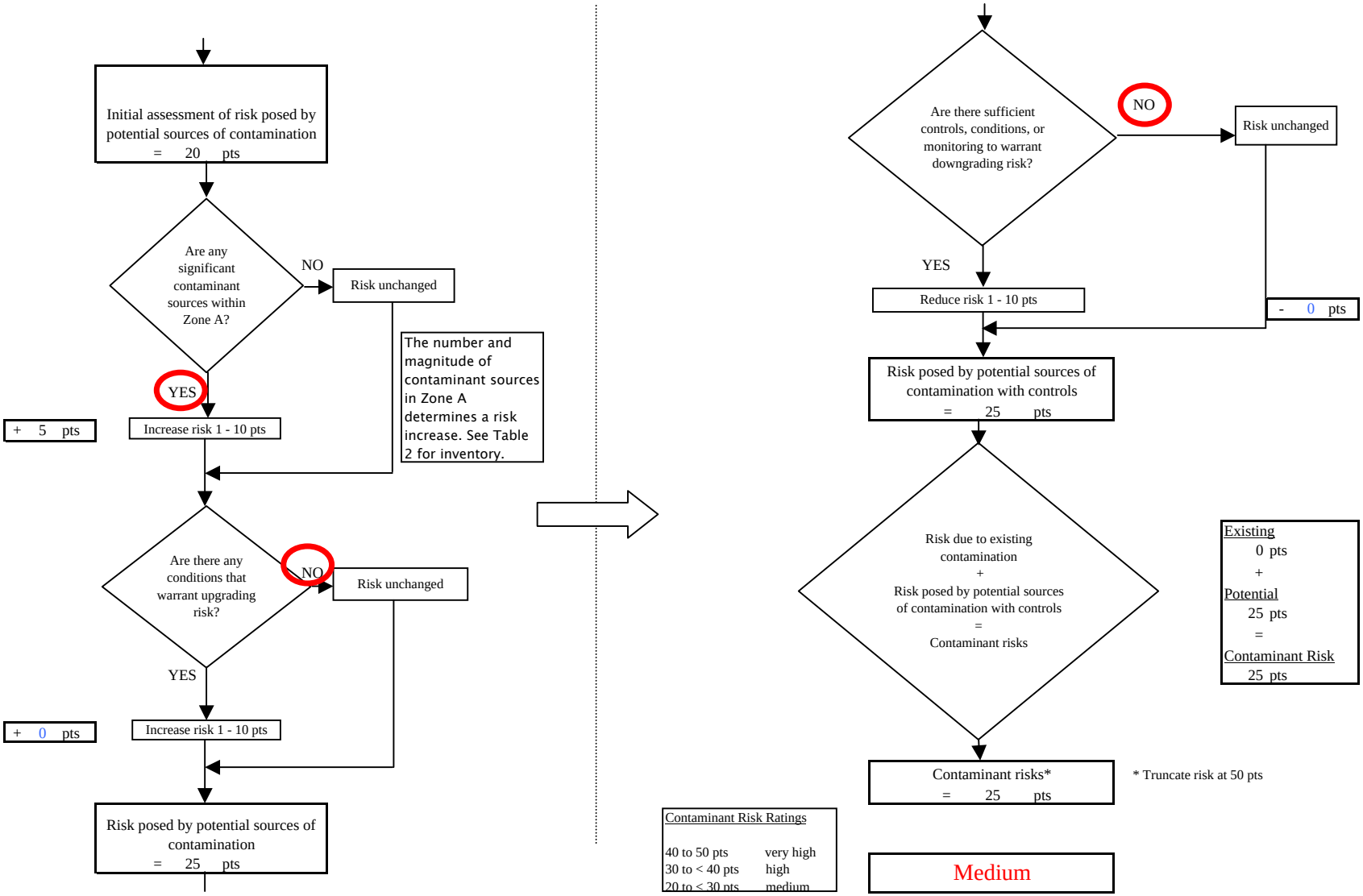


Chart 4. Vulnerability analysis for Pederson Point N. Pac. Proc. (261143.001) - Bacteria & Viruses

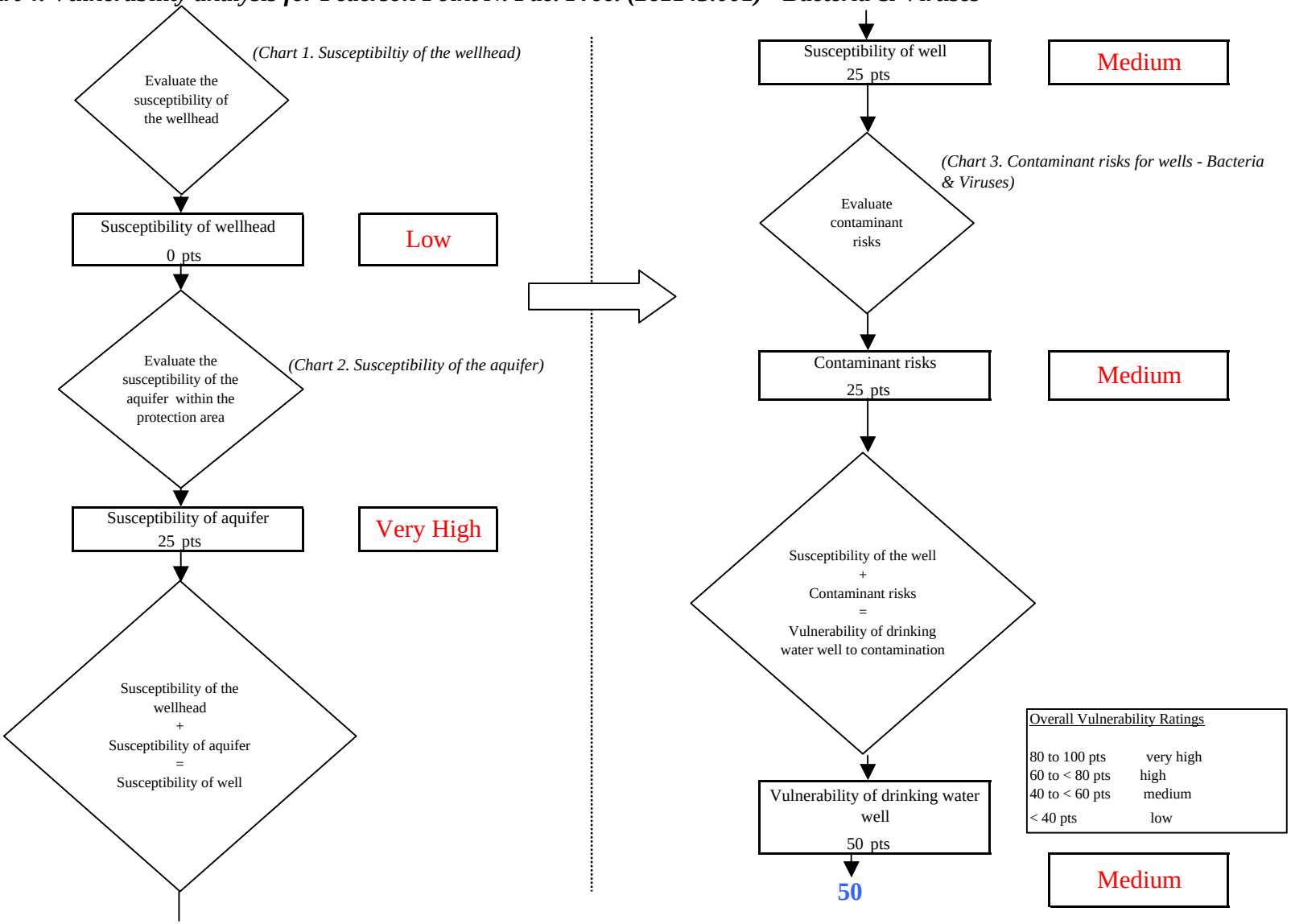


Chart 5. Contaminant risks for Pederson Point N. Pac. Proc. (261143.001) - Nitrates and Nitrites

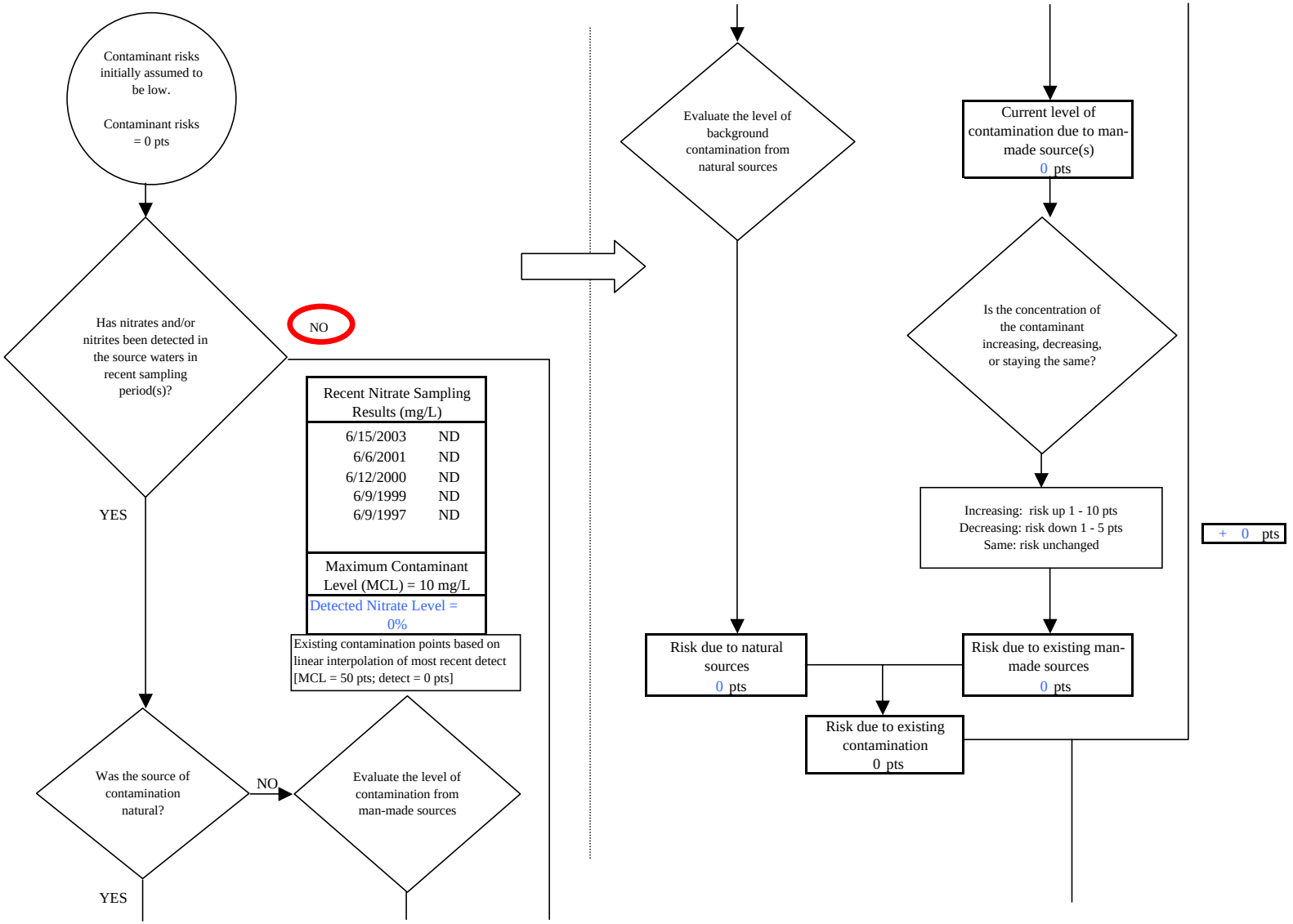


Chart 5. Contaminant risks for Pederson Point N. Pac. Proc. (261143.001) - Nitrates and Nitrites

+ 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	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.

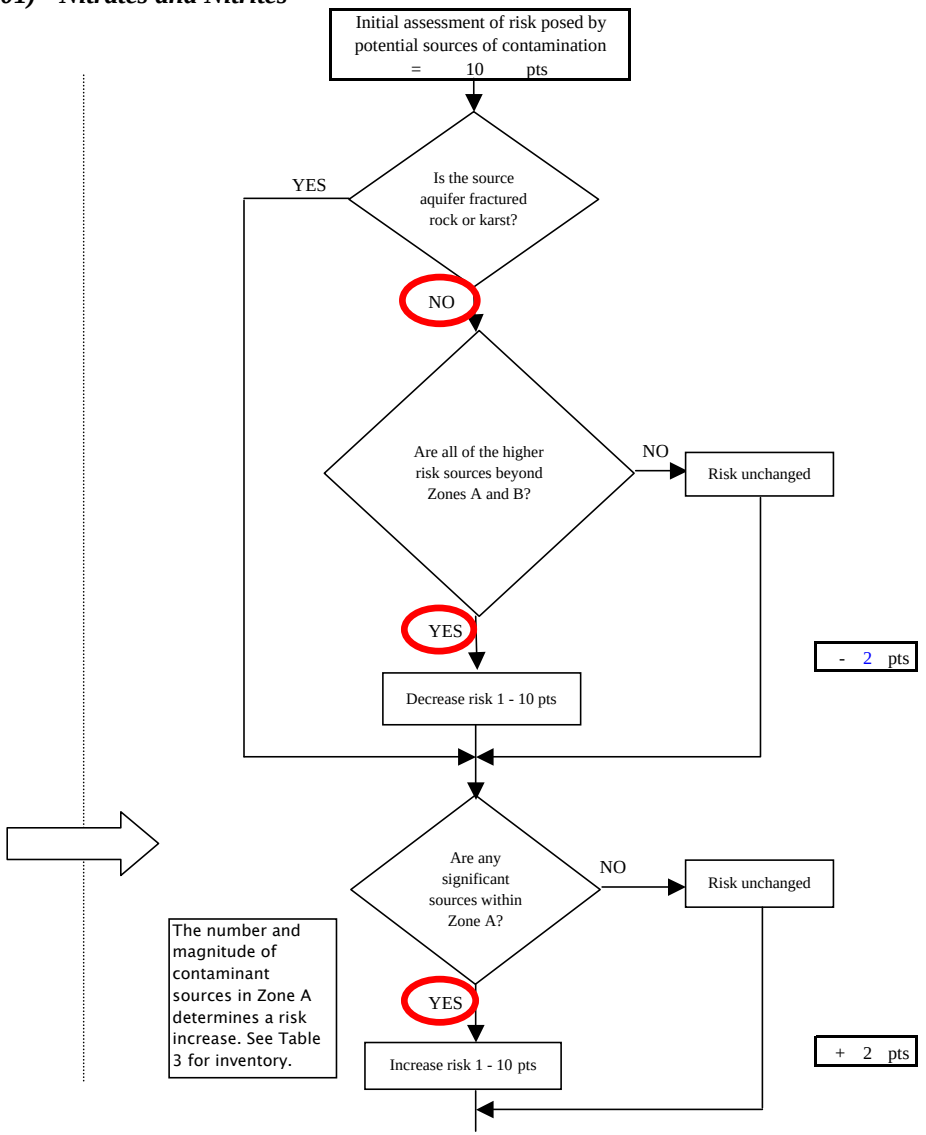


Chart 5. Contaminant risks for Pederson Point N. Pac. Proc. (261143.001) - Nitrates and Nitrites

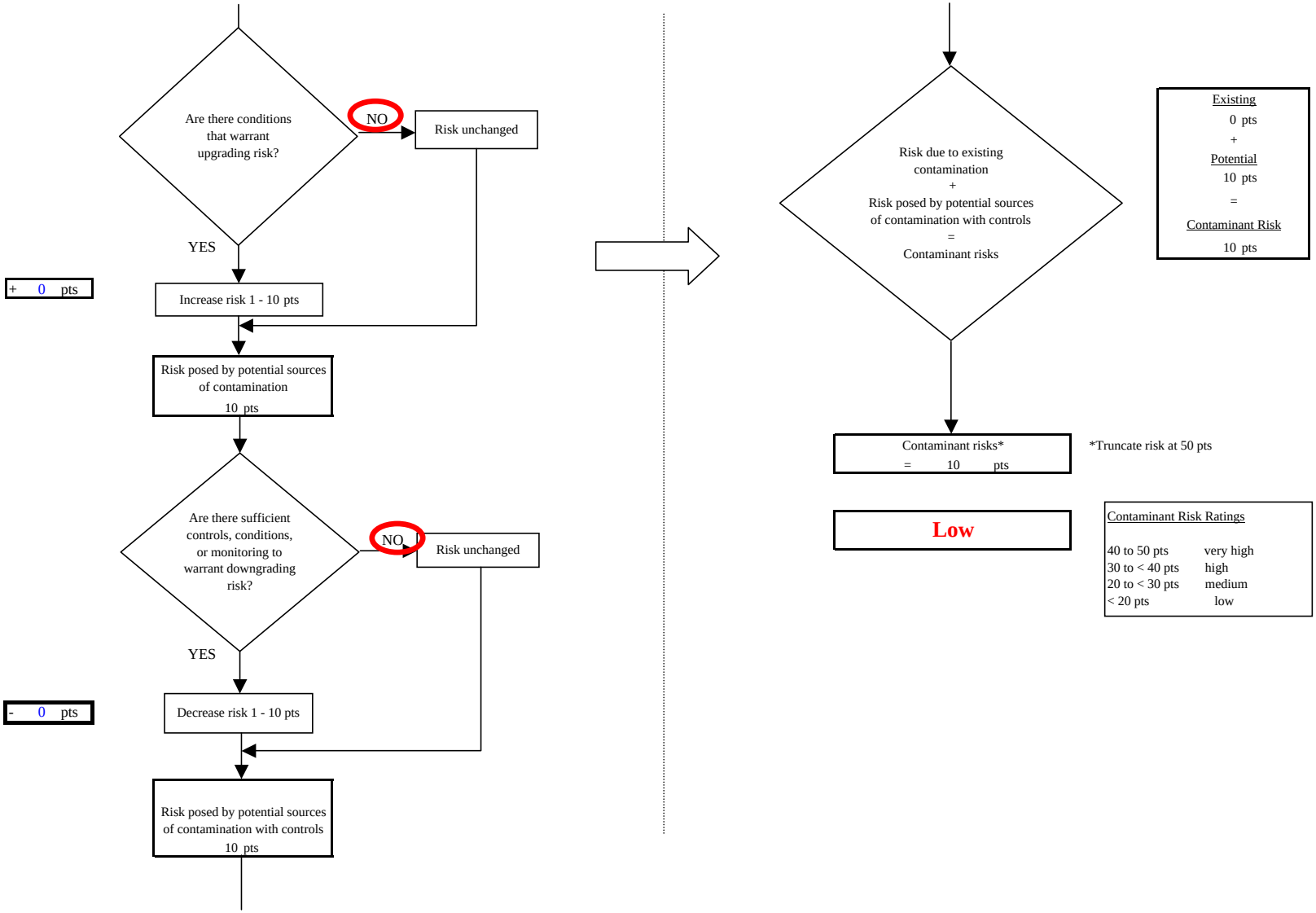


Chart 6. Vulnerability analysis for Pederson Point N. Pac. Proc. (261143.001) - Nitrates and Nitrites

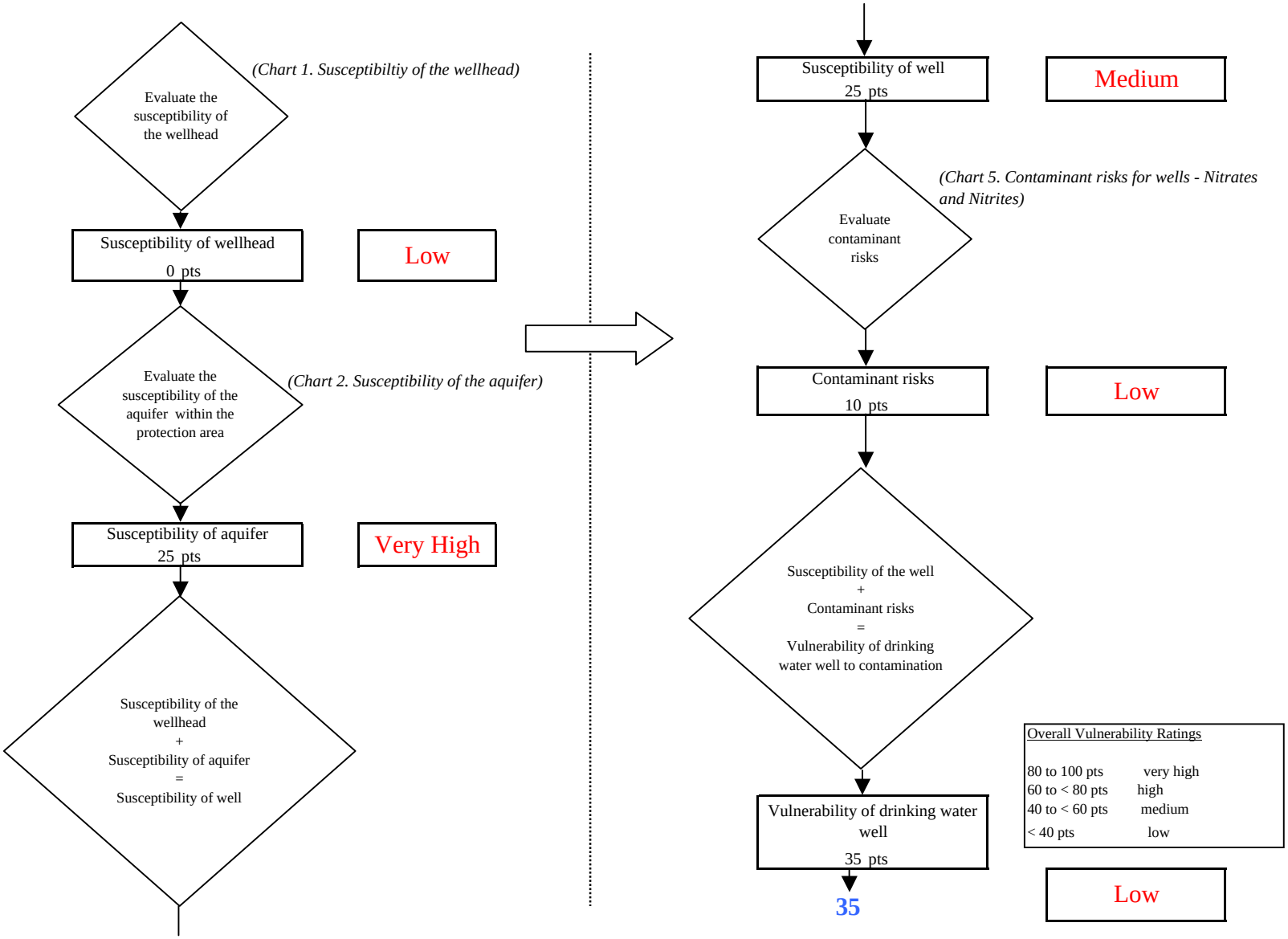


Chart 7. Contaminant risks for Pederson Point N. Pac. Proc. (261143.001) - Volatile Organic Chemicals

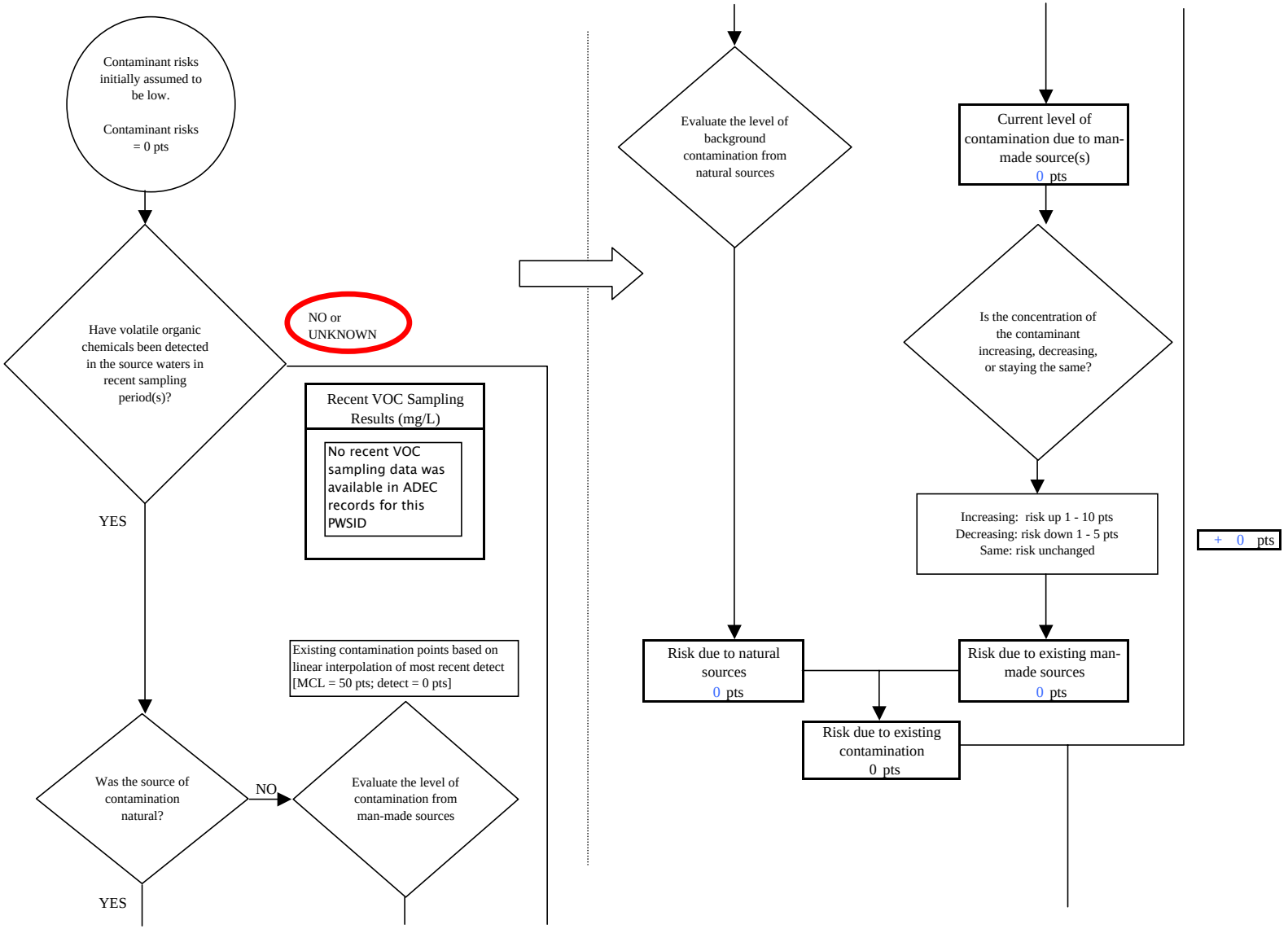
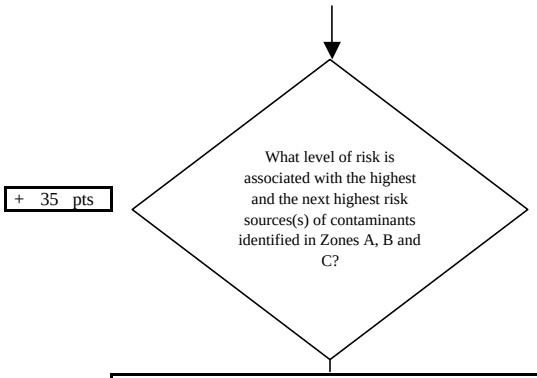


Chart 7. Contaminant risks for Pederson Point N. Pac. Proc. (261143.001) - Volatile Organic Chemicals



+ 35 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)	6	0	6
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 35

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

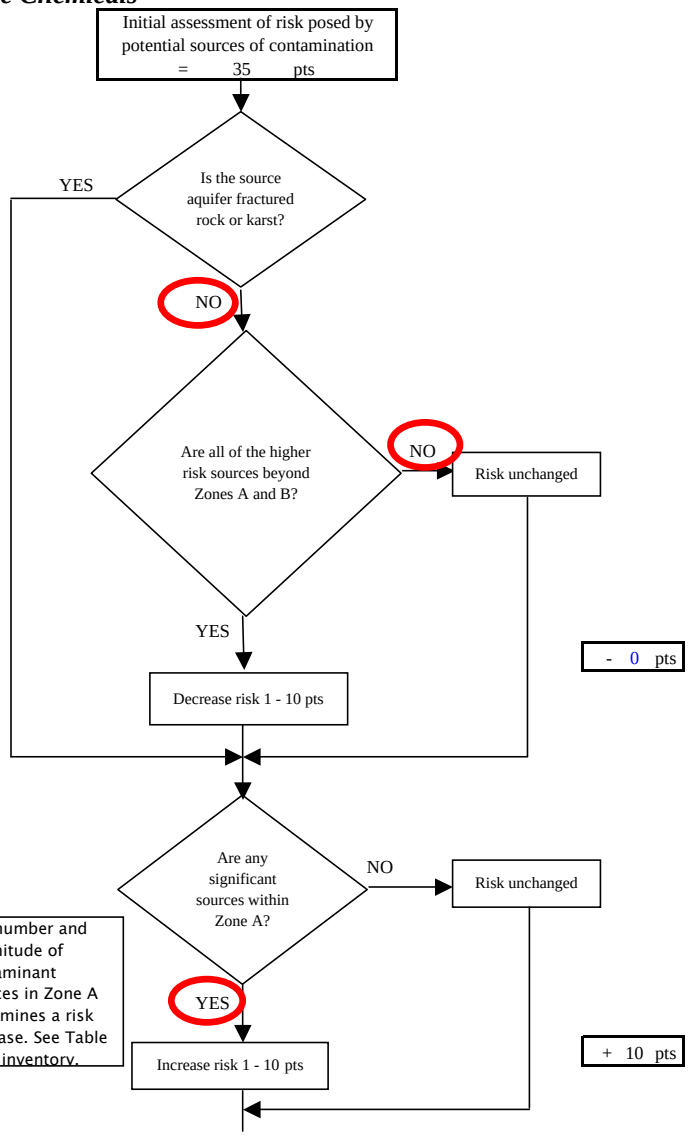


Chart 7. Contaminant risks for Pederson Point N. Pac. Proc. (261143.001) - Volatile Organic Chemicals

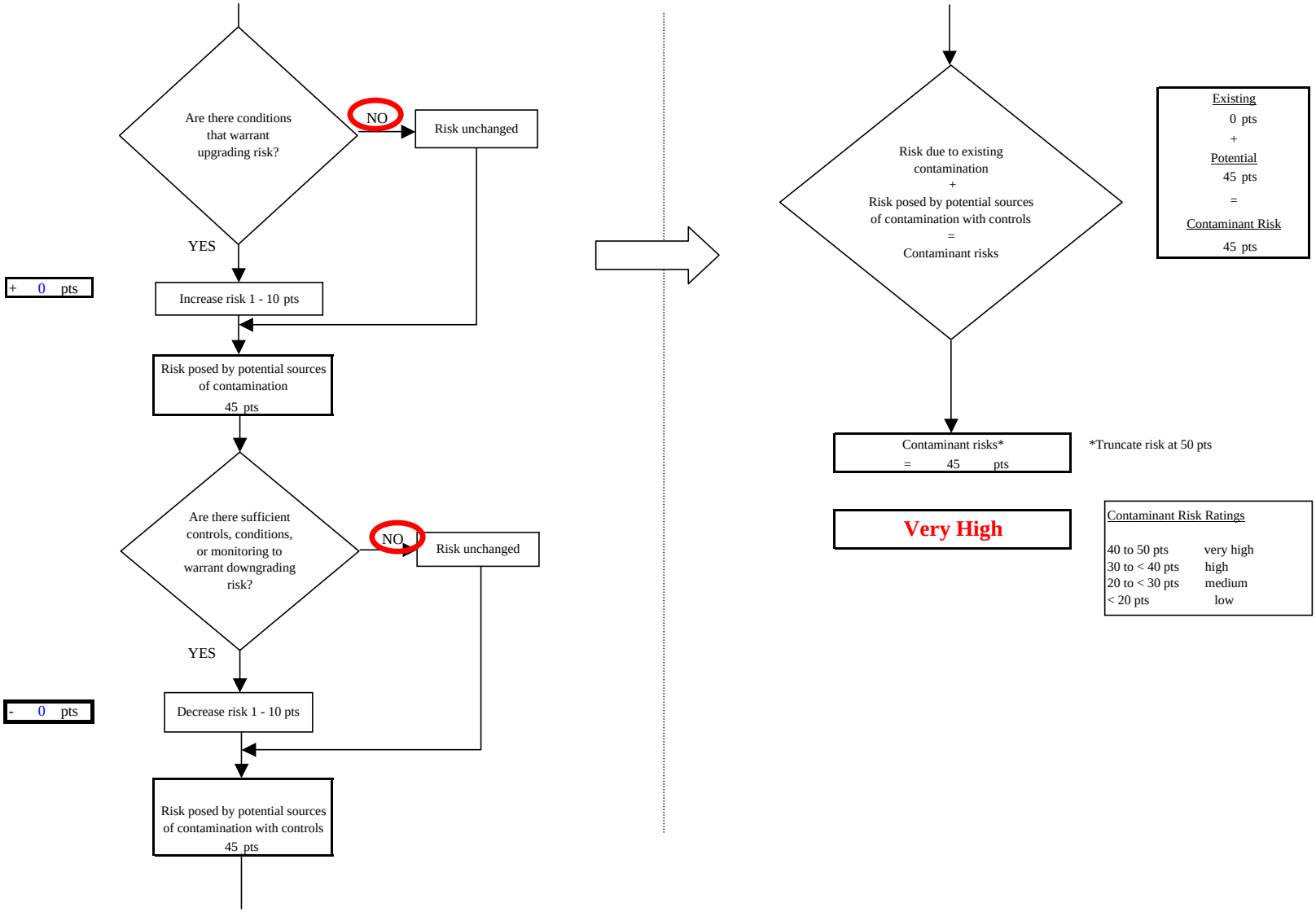


Chart 8. Vulnerability analysis for Pederson Point N. Pac. Proc. (261143.001) - Volatile Organic Chemicals