2004 TRAFFIC VOLUME MAP

PUBLISHED FEBRUARY 2006

ERIE COUNTY

PENNSYLVANIA

PREPARED BY THE
PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
BUREAU OF PLANNING AND RESEARCH
TRANSPORTATION PLANNING DIVISION
IN COOPERATION WITH THE
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

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2006

GENERAL HIGHWAY MAP

ERIE COUNTY
PENNSYLVANIA

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Scale 1:65,000

POPULATION OF COUNTY (2000 Census).......280,843
AREA OF COUNTY (SQ. MI.)..................................804
(SQ. KM.).............................. 2,082

POLYCONIC PROJECTION – NAD 83 DATUM

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Susceptibility Analysis of Drinking Water Sources to Contamination

Appendix. The parameters used in these matrices include time of travel (TOT), persistence, and quantity. ***Although some of these parameters will be set, the parameters for quantity and the "potential for release" should be discussed and reflect local public concern***. The changes in the threshold values for the parameters must be consistent with setting high, medium and low values for the resulting factors and must apply to the entire group of potential contaminant sources (i.e. Volatile organic chemicals).

The time of travel (TOT) to the drinking water intake from a source of a potential contaminant is measured in terms of short, medium, or long. For groundwater sources, Wellhead Protection (WHP) areas I, II, and III are synonymous with short, medium, or long TOT, respectively. For surface water intakes, the definitions of the segmented delineations are based on TOT (zone delineations: A = 5 hours, B = 25 hours, and C represents the remainder of the watershed). Accordingly, the TOT for Zones A, B and C are short, medium and long, respectively.

The persistence of a potential contaminant will be measured as high, medium or low. This will be based on the contaminant ability to move in the environment and is determined on the adsorption and/or half-life (or rate of removal). If the contaminant has been known to contaminate water supply sources with concentrations greater than the MCL or in significant concentrations it will have a high to medium persistence. For ground water sources, the soils and geologic materials ability to remove the contaminant will be factored in as well. This will be based on the clay content and the hydraulic conductivity of the material.

Quantity will be measured as high, medium and low. Low quantities are those that are clearly on a domestic scale and can be categorized as non-reportable or non-regulated releases, volumes or events. Medium quantities are those that can be categorized as reportable releases, regulated minimum volumes, or events, or equivalent, up to 10X such a quantity, or those quantities that are associated with commercial- or industrial-sized operations and distribution. High quantities are those that are clearly associated with commercial- or industrial-sized operations and distribution, with a minimum 10X a reportable release, regulated minimum volume, event, or the equivalent.

The sensitivity of a drinking water source is most critical in a groundwater source where the aquifer and overlying geologic materials above are expected to provide some treatment of infiltrating water. Surface water sources are highly susceptible because of short travel times of contaminants and limited processes for mitigation of contaminants other than dilution, settling, oxidation, and volatilization. By definition, there is a higher susceptibility of contamination by potential sources within Zone I (Zone A) than Zone II (Zone B). Determining the potential for impact of a contaminant source on a drinking water source is related to the properties of the contaminant of concern, the amount that could be released, the distance or travel time of the contaminant and contaminant concentration reduction that can be expected. Some of these factors are represented in a

practical way in the rank of significance of the identified contaminant types ranked in the previous section. If the potential or existing potential sources of contamination are considered to be of a high density, their potential impact should be analyzed cumulatively.

One of the more important considerations in the susceptibility analysis is the potential for release of the contaminant of concern. This would include containment measures for stored potential contaminants. Of primary concern is the level of treatment, monitoring and quality assurance of any treatment process before release of a contaminant. This is the purpose of most permitting programs related to water quality and can be a measure of drinking water source susceptibility. If the activity or a contaminant potentially released from that facility or activity is not regulated, susceptibility can be related to the use of best management practices established voluntarily or as accepted practice. The definition of Best Management Practices here is broader then for agriculture and is the combination of practices accepted in the industry or supported by the department to protect surface and groundwater from contamination. This will include pollution prevention measures. Another tool for determining the potential for release of a contaminant is the establishment and implementation of emergency management plans to protect against release.

1. Susceptibility Analysis of Groundwater Sources to Contamination

The first step is to assess the potential for contamination of the drinking water source, if all the contaminant were released from the potential contaminant source without consideration of any source protection (See Flowchart 1). Factors controlling the potential for contamination from a release are the fate and transport of the contaminant, the amount of contaminant of concern that might be released and the time of travel (or distance) to the drinking water source. The relative value for this potential is determined from Matrix A and Matrix B.

Groundwater sources of drinking water have the benefit of a level of protection from contamination relative to their integrity and the vulnerability of their source aquifer. This defines the sensitivity of the groundwater sources to contamination. Factors related to the integrity of the well are the construction standards, depth of the well, pumping rate, and the rate of infiltration and movement of the groundwater. If the aquifer is confined, the drinking water source should be well protected from man-induced contamination. Site-specific factors that increase aquifer sensitivity such as sinkholes can be included in site-specific assessments. The potential for impact can be assessed by considering the intrinsic sensitivity of the drinking water source (Flowchart 2) and the potential for contamination, or the value from Matrix B. The potential for release is determined from the potential for release table and is based upon the following factors:

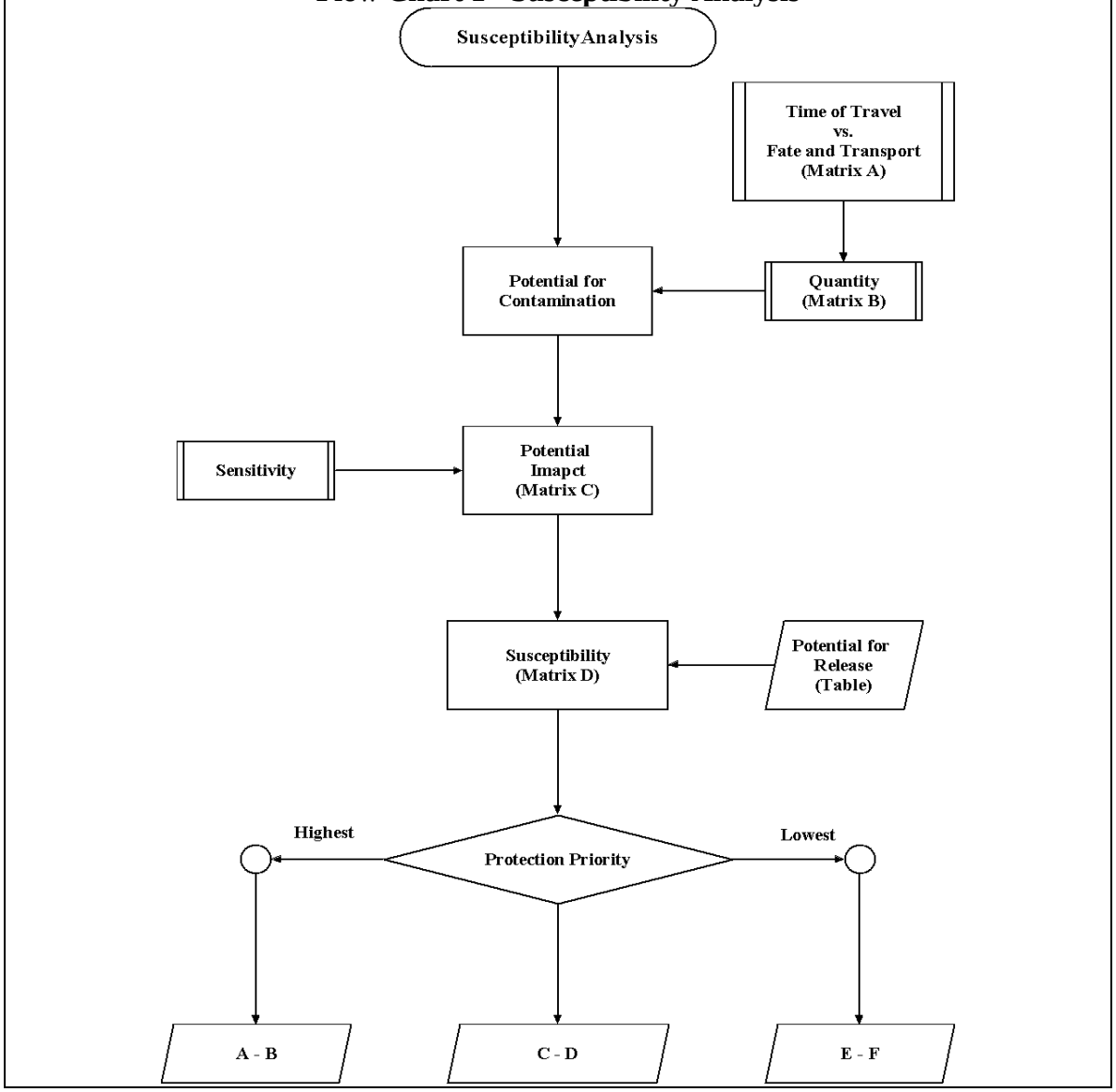
- Containment
- Regulatory control of the potential source of contamination
- Compliance
- Best Management Practices &/or Emergency Response Plan

If there were no control on the potential for release of the contaminant, the potential for release would be high. By relating the potential for impact described above to the potential for release, the susceptibility rating is determined from Matrix D. A potential source of contamination with a high potential for impact and a high potential for release would have a high susceptibility rating or priority.

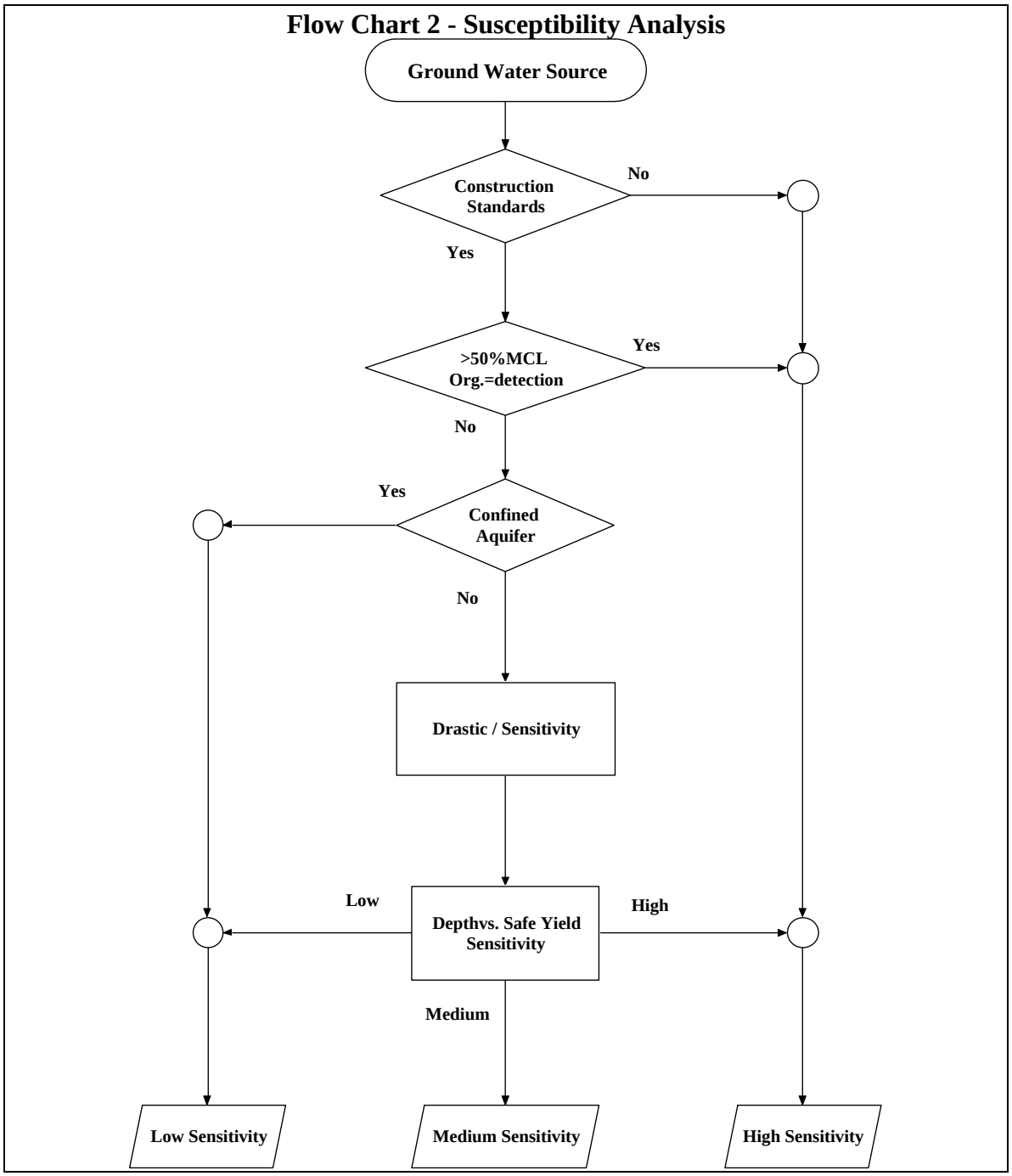
2. Susceptibility Analysis of Surface Water Sources to Contamination

The susceptibility analysis for a surface water source of drinking water would not be substantially different from an analysis of a groundwater source except for the limited protection and resulting high sensitivity of surface water sources to contamination. Large reservoirs with at least a one-month detention time at high flows could offer a medium sensitivity to upstream or distant potential sources of contamination.

Flow Chart 1 - Susceptibility Analysis



Flow Chart 2 - Susceptibility Analysis



Potential for Contamination
Matrix A (Step 1)
Time of Travel (TOT) vs. Fate & Transport (persistence)

**\ Persistence TOT **	High	Medium	Low
Short	High	High	Medium
Medium	High	Medium	Low
Long	Medium	Low	Low

Matrix B (Step 2)
Matrix A vs. Quantity

\ Quantity Matrix A Result	High	**Medium**	**Low**
High	High	High	Medium
Medium	High	Medium	Low
Low	Medium	Low	Low

Potential Impact
Matrix C
Potential for Contamination vs. Sensitivity

\ Sensitivity Potential for Contamination \ (from Matrix B)	**High**	**Medium**	**Low**
High	High	High	Medium
Medium	High	Medium	Low
Low	Medium	Low	Low

Potential for Release

**Potential for Release Control Practice **	**Low**	*Medium*	**Medium-High**	**High**
Regulated Containment &/or ERP	X			
Unregulated Containment / no ERP		X		
Regulated Discharge in Compliance			X	
" " *Not in Compliance*				X
NPS w/ Best Management Practices		X		
BMPs Not Operating			X	
No Control Practices				X

(ERP = Emergency Response Plan, NPS = Non-Point Source, BMP = Best Management Practice)

Susceptibility Rating
Matrix D

Potential for Release vs. Potential Impact

\ *Potential Impact* **(from Maxtrix C)** **Pot. For Release \ (from Table)**	*High*	**Medium**	**Low**
High	A	B	C
Medium High	B	***C***	D
Medium	C	***D***	E
Low	D	E	F