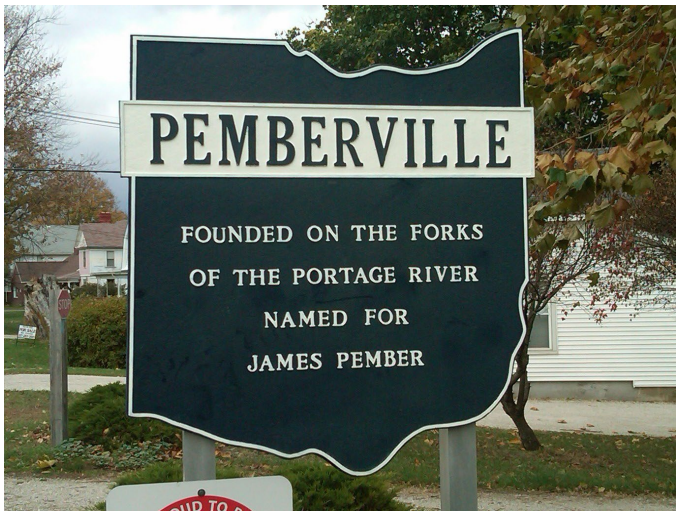
DRINKING WATER SOURCE PROTECTION PLAN

For the Village of Pemberville Wood County, Ohio

PWS ID# 8701712



May 2011

Developed by:
The Village of Pemberville's
Source Water Protection Planning Team

Prepared by:
Ohio Rural Water Association

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1.0 INTRODUCTION

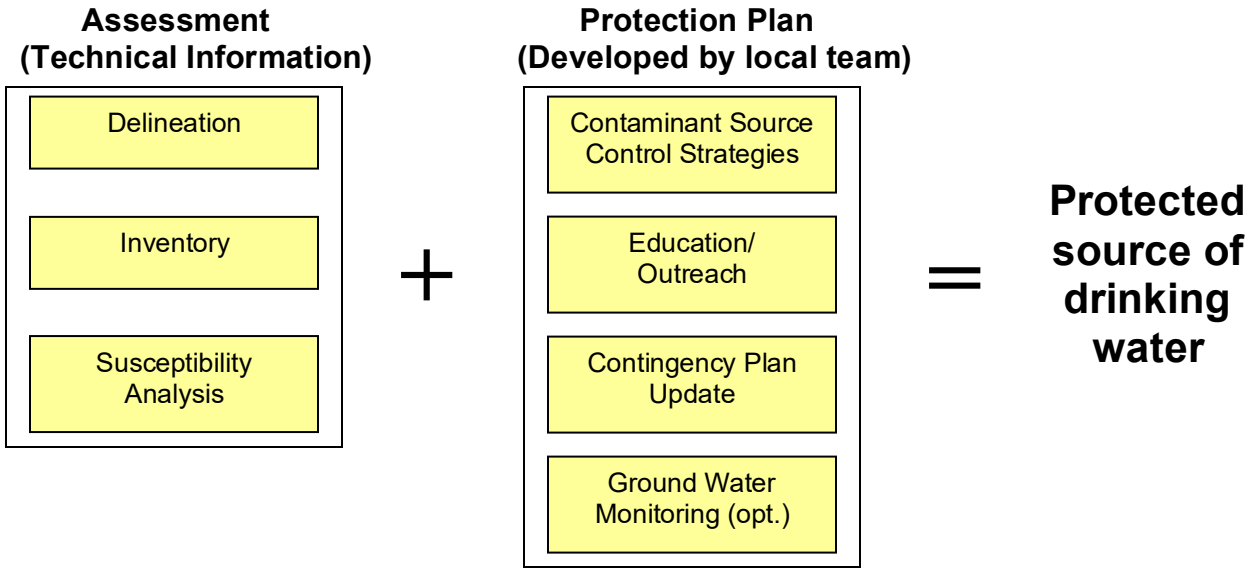
The Village of Pemberville has developed a Source Water Protection Plan ("Protection Plan") to document the strategies we will implement to protect the aquifer that supplies our drinking water from land-based contamination. Components of the Protection Plan include: contaminant source control strategies, education and outreach strategies, contingency plan update, and –in some cases—ground water monitoring.

This Protection Plan builds on the Source Water Assessment Report that was completed for the Village of Pemberville in September 2002 by Ohio EPA. This assessment (see Appendix A) includes delineation of the one year and five year time of travel areas, a potential contaminant source inventory and a susceptibility analysis. The potential contaminant source inventory was updated in October 2010 by the Village of Pemberville, to ensure the protective strategies documented here are based on currently existing contaminant sources.

1.1 BENEFITS OF A PROTECTION PLAN

A Protection Plan:

- Helps the Village of Pemberville provide the safest and highest quality drinking water to its customers at the lowest possible cost;
- Helps to plan for future expansion, development, zoning and emergency response issues; and
- Can provide more opportunities for funding in order to improve infrastructure, purchase land in the protection area, and other improvements to the wellfield.



1.2 SUMMARY OF THE VILLAGE OF PEMBERVILLE'S SOURCE WATER ASSESSMENT

The Village of Pemberville's water system operates 8 wells that pump approximately 129,800 gallons of water per day from a Silurian Age carbonate bedrock aquifer (water-rich zone).

The drinking water source protection area for the Village of Pemberville's wells is illustrated in the Drinking Water Source Assessment report prepared by Ohio EPA in 2002. The source water protection area includes two zones, one inside the other. The "inner protection zone" is the area that provides ground water to the wells within one year of pumping. The "outer protection zone" is the area that contributes water when the wells are pumped for five years.

Based on relevant databases and a field inspection of the area, eight potential sources of contamination were identified within the protection area. These include commercial sources, underground pipelines, and agricultural chemicals.

The Village of Pemberville's source of drinking water has a high susceptibility to contamination due to:

- Depth to water in the bedrock aquifer is 25 feet or less below ground surface;
- The wells are located in a sensitive potential karst area;
- Potential contaminant sources exist within the protection area;
- The wells are open between approximately 25 and greater than 100 feet in the fractured carbonate and the depth to water is less than 25 feet below the ground surface.

2.0 FORMING A PROTECTION TEAM

The Source Water Protection Plan was developed by a local team made up of water system staff, board members, emergency responders, and local businesses in the area.

2.1 BUY-IN BY DECISION MAKERS

The Village of Pemberville held a source water protection planning meeting attended by 6 individuals on November 1, 2010. The Board of Public Affairs has since passed a resolution that acknowledges the importance of source water protection and commits to developing and implementing a drinking water source protection plan.

System Decision Makers Meeting

Date of presentation to decision makers November 1, 2010

Was a resolution passed? _X__Yes ____No

Person in charge of oversight of the protection plan development

Gale Loebrich	Water Superintendent
Name	Title

419-409-0845
Phone Number

2.2 PROTECTION TEAM MEMBERS

Date Protection Team was formed: December 14, 2010

Table 2-1. List of Protection Team Members			
Name (E-mail address)	**Title**	**Organization**	**Phone Number**
Gale Loebrich	Water Superintendent	Village of Pemberville	419-409-0845
James Darling	Police Chief	Village of Pemberville	419-287-3250
Duane Martin	Fire Chief	Pemberville Freedom Fire Department	419-287-4593
Chuck Schulte	BPA President	Village of Pemberville	419-287-4519
Dean Krukemeyer	BPA Board Member	Village of Pemberville	419-287-2277
Tom Oberhouse	BPA Board Member	Village of Pemberville	419-287-4014
Joe Hirzel	Owner	Pemberville Foods	419-287-3288
Marc Schaller	General Manager	Countywide Co-Op	419-287-3241
Brian Heestand	Sewer Superintendent	Village of Pemberville	419-409-0847
Landry Sheets	Assistant Sewer Superintendent	Village of Pemberville	419-409-1270
John Lockard	Electrical Superintendent	Village of Pemberville	419-409-0846

3.0 STRATEGIES FOR CONTAMINANT SOURCES

The goal of this section is to develop protective strategies for the potential contaminant sources in Pemberville's protection area. The potential contaminant sources listed in the Source Water Assessment Report (see Appendix A) were evaluated. The Village of Pemberville developed specific protective strategies the community will use to protect its drinking water from the types of potential contaminant sources identified. A listing of the potential contaminant sources in the Village of Pemberville's protection area and the protective strategies selected to address them is presented in the following table.

Table 3-1. Strategies to Reduce Risk of Specific Contaminant Sources

Potential Contaminant Source	Priority/ Level of Threat	Protective Strategies	Timeline for Implementation	Who Will Implement? [Name/Title]
Commercial Sources -Beauty Salon -Gas Station -Pemberville Foods -Countyline Co-Op	1	1) Send letters to local business owners notifying them that they are in a source water protection area 2) Mail out SWAP educational brochures to the businesses in the protection area. Additionally, have brochures available to the public and businesses in the village hall and at Countyline Co-Op. 3) Mail Small Quantity Chemical Storage BMP to businesses 4) Have SWEET Team do a presentation at the Countyline Co-Op Shareholder meeting	1-3) By August 2011 and every 3 years thereafter 4) Starting in early June 2012, and continuing annually every year thereafter	Board of Public Affairs Utility Clerk

Agricultural Chemicals -Local Farmers -North Branch Nursery	2	Set up a booth at the Pemberville Fair to educate farmers, businesses, and the general public about their source water protection area, include fliers, brochures, and a map of the protection area. Have SWEET Team do a presentation at the Countyline Co-Op Shareholder meeting	By August 2011 Beginning in June 2012, continuing annually	Board of Public Affairs Utility Clerk will call the SWAP staff at Ohio EPA's Northwest District Office for assistance with the booth and potential presentations. Board of Public Affairs utility clerk will call the SWEET Team
Underground Pipelines	4	Notify owner of oil and gas pipelines of the source water protection area	By July 2011	Board of Public Affairs Utility Clerk
Leaking Underground Storage Tanks -Freedom TWP Hall -Marathon (Historical) -Modine (Historical)	5	All tanks are registered and regulated by BUSTR. Check BUSTR website for the status of the tanks.	Completed December 2010 -All of the LUSTs have been closed and are inactive.	Amy Rauch, ORWA, checked BUSTR database.

4.0 EDUCATION AND OUTREACH

The purpose of the Protection Team's education and outreach efforts is to inform people who live and work in the Village of Pemberville's drinking water source protection area about where their drinking water comes from and why it is important to protect this valuable resource. Education and outreach efforts will also inform the community how their activities can potentially impact groundwater and what they can do to prevent contamination.

Table 4-1. Educational Strategies

Education and Outreach Strategies	Target Audience	Time line for Implementation	Who (name and title) will implement this strategy?
Consumer Confidence Report – include information about actions residents can take to protect source water quality	Water customers	Distribute annually, in July 2011	Gale Loebrich, Water Superintendent
Mail letters to local businesses educating them about their role in protecting the village's water supply	Businesses	In August 2011, and every 3 years thereafter	Board of Public Affairs Utility Clerk
Include text on the utility bill informing customers about source water protection	Water Customers	Starting August 2011, continuing monthly	Board of Public Affairs Utility Clerk
Enclose an educational brochure with the CCR	Water Customers	Distribute annually, starting July 2011	Gale Loebrich, Water Superintendent
Update the Potential Contaminant Source Inventory	General Public	Completed January 2011, and updated at least once every 5 years	Gale Loebrich, Water Superintendent Joe Hirzel, Economic Development Committee Member
Place educational brochures and fliers in the village office, and at Countyline Co-Op	General Public	Starting in July 2011, replacing as needed	Board of Public Affairs Utility Clerk

Display SWP maps in village hall.	General Public	Complete by July 2011	Gale Loebrich, Water Superintendent
Educate businesses and public by setting up a booth at the Pemberville Fair that includes educational fliers, brochures, and a map of the source water protection area.	Agricultural Producers, Businesses, General Public	In August 2011, continuing annually	Board of Public Affairs Utility Clerk will call the SWAP staff at Ohio EPA's Northwest District Office for assistance with the booth and potential presentations.
Mail BMP about Small Quantity Chemical Storage to businesses	Businesses	In August 2011, and every 3 years thereafter	Board of Public Affairs Utility Clerk
Have SWEET Team do a presentation at the Countyline Co-Op Shareholder meeting	Agricultural Producers, Businesses	Starting in early June 2012, continuing annually	Board of Public Affairs Utility Clerk
Publicize/attend Portage Pride event put on by Bowling Green University in conjunction with the Portage River Basin Council	General Public	Annually in May	Holly Myers, Bowling Green State University Elaine Moebius, TMACOG and Portage River Basin Council
Have ODOT put up SWAP signs along State Routes 105, 199, and 6 along the borders of the delineation area.	General Public	Complete by July 2011	Gale Loebrich, Water Superintedent will call ODOT
Contact science teachers at Pemberville Elementary and Eastwood Middle School to schedule educational presentations, can coordinate with Ohio EPA Northwest District Office SWAP staff or SWEET team to do the presentation.	Students	Complete by September 2011	Board of Public Affairs Utility Clerk

5.0 UPDATE OF CONTINGENCY PLAN

A well-formulated contingency plan enables a utility to prepare for, respond to, and recover from crisis conditions without wasting time on futile or unnecessary efforts or spending funds unnecessarily. The plan defines the duties, responsibilities, and functions of all water system personnel with respect to each specific emergency condition. The Village of Pemberville has developed procedures to address specific situations that can be expected to arise, and these are documented in Pemberville's water plant contingency plan.

The following are issues that are specific to drinking water source protection. This information has been included in the water plant contingency plan.

5.1 DRINKING WATER SHORTAGE – SHORT TERM LOSS OF SOURCE

If the Village of Pemberville experiences a short-term loss of its drinking water source (such as through a short-lived emergency on the wellfield, collapse of a well, etc.), it will:

- Construct an emergency line with Northwestern Ohio Water and Sewer District
- Order water trucks to bring in water from Bowling Green or Northwestern Ohio Water and Sewer District – see page 26 of PWS Contingency Plan for more details

The Village of Pemberville can provide water from existing storage for up to 11.5 hours, provided it is not necessary to flush out the entire distribution system.

Current storage in gallons **/** (# of customers x 100 gal/day) = **# of days of storage**
66,000 gallons / (1380 customers x 100 gal/day) = 0.48 days of storage

5.2 DRINKING WATER SHORTAGE – LONG-TERM LOSS OF SOURCE

In the event of complete loss of the current wellfield, the Village of Pemberville would most likely:

- Move to secure another wellfield in the vicinity

- Investigate tying in with another nearby system, such as the Northwestern Water and Sewer District. The District is a distribution system. Currently, the District has water lines and storage tanks in two locations in fairly close proximity to the village of Pemberville. The nearest water storage tank has a storage capacity of 1 million gallons per day. The District has a bulk water contract with the City of Toledo to supply its customers with up to 17 million gallons per day.

5.3 FUNDING FOR WATER EMERGENCIES

The Village of Pemberville plans to create a Water Replacement Fund from which funds can be withdrawn in the event of an emergency. The Board of Public Affairs, Fiscal Officer, or Mayor may authorize the expenditures from this account under these conditions:

1. Delay in making the purchase presents a threat to the health or welfare of the citizens of Pemberville.
2. The purchase is required due to unforeseen circumstances, and delay would seriously hinder the effective delivery of municipal services.
3. There are no feasible alternatives to the emergency purchase.

If additional monies are required the Village of Pemberville has been in contact with state and local lenders with the authority to make loans in an emergency situation. See page 22 of PWS Contingency Plan for more details.

5.4 PLANNING FOR THE FUTURE

A. Current average daily pumpage= 136,450 gallons per day (as of December 2009)
B. Current daily system design capacity North Plant= 252,000 gallons per day (as of September 2010)
   Current daily system design capacity South Plant= 406,800 gallons per day (as of September 2010)
C. Wellfield capacity (the maximum amount the wells can pump, based on the capacity of the pumps) at the North Plant is 151,200 gallons per day.
   Wellfield capacity (the maximum amount the wells can pump based on the capacity of the pumps at the South Plant is 300,960 gallons per day.

The Village of Pemberville currently is pumping about 21**%** (A/B) of its design capacity and 30% (A/C) of its wellfield capacity.

5.5 EMERGENCY RESPONSE TO A TOXIC SPILL/RELEASE IN PROTECTION AREA

Pages 24-26 of the Village of Pemberville contingency plan address accidental chemical spills and releases in the protection area. A copy of this information is shown below:

Accidental Chemical Spill or Release within the Protection Area

1. ( ) Determine the following information:
   Who made the first observation? What is their phone number and location?
   When did it happen?
   What is it?
   Where is it? Is it isolated to one area or is it wide spread?
   Has the spill been reported to Ohio EPA?
   Has the fire department or hazardous materials response team been notified?
   Has the property owner been notified?

2. ( ) If no notifications have been made, immediately contact emergency personnel and agencies (i.e. fire dept., Ohio EPA, etc.) using the phone number(s) found on pages 30-32 of the Contingency Plan. Notify them of the situation.

3. ( ) Contact the following work personnel, city officials, and contractors using the phone number(s) found on pages 30-32 of the Contingency Plan

Gale Loebrich, Water Superintendent	419-409-0845
Brian Heestand, Sewer Superintendent	419-409-0847
Chuck Schulte, BPA President	419-287-4519
Dean Krukemeyer, BPA Board Member	419-287-2277
Tom Oberhouse, BPA Board Member	419-287-4014
Duane Martin, Fire Chief	419-287-4593
Jim Darling, Police Chief	419-287-3250

4. ( ) If it is safe to do so visit the scene to make contact with on-scene emergency personnel and agencies. The local fire department is generally the lead response agency.

5. ( ) Complete the following activities as soon as possible:

   a. ( ) Perform a physical check on the system and its structural integrity (check wells for damage, etc.).
   b. ( ) If it is determined that the spill resulted in the probable introduction of contaminants into the wells, proper precautions must be taken during sampling to prevent exposure to the contaminant and/or daughter products.
   c. ( ) If repairs are needed, coordinate with the lead response agency and Ohio EPA to ensure the safety of the repair crew. Proper precautions must be taken to prevent exposure to the contaminant and/or daughter products.
   d. ( ) If the system needs to be temporarily shut down as a result of the spill, the procedures can be found on page 24 of the contingency plan. Plans for short term loss of source can be found on page 26 of the contingency plan.

6. ( ) If the wells are secure, coordinate with the lead response agency and Ohio EPA on actions being taken to mitigate the spill. At a minimum, obtain the following information:

   Who is responsible for the cleanup? What is their phone number and other contact information?
   What contractors or consultants have been sent by the responsible party?
   What actions have they taken?
   How long is clean-up expected to take? How long must water use be stopped or reduced? (If greater than one week, options for long-term loss of source may be initiated. See pages 25-26 of Contingency Plan.)

7. ( ) Follow-up with the on-scene responders and contractors to determine if additional, long-term actions (such as ground water treatment and/or additional raw water monitoring) are required or recommended. If so, determine:

   - What kind of monitoring is needed, at what frequency
   - What levels will trigger return to normal operations
   - What kind of additional treatment may be needed

6.0 Ground Water Monitoring

The Village of Pemberville is participating in the Ohio EPA Ambient Ground Water Monitoring Program. Personnel from Ohio EPA take raw water samples every six months. Due to the village's participation in this program, the Pemberville source water protection team has decided not to incorporate additional ground water monitoring in its Source Water Protection Plan. The protection team believes that the ongoing ambient ground water monitoring, visual monitoring, and inspection of activities within the source water area will provide ample warning of potential ground water contamination.

7.0 Periodic Review

A protection plan is not a static document. Over time many issues related to protection planning will change- wells will be added or removed from the wellfield, existing potential contaminant sources will close, new education and outreach opportunities will become available, new partners in protecting the drinking water source will be identified. The protection plan needs to plan for these and other events.

The Village of Pemberville commits to reviewing the Drinking Water Source Protection Plan every year, beginning with May 2012.

7.1 Updating the SWAP Assessment

Delineation Updates

- Has the amount of pumping increased or decreased since the date Ohio EPA provided the Drinking Water Source Assessment report?
- Have any wells been added or removed?
- Has a new wellfield been added or are there any plans for a new wellfield?
- Is there new hydrogeologic data to refine the delineation model (e.g., flow direction, pump tests, new well logs etc.)?

If the answer to any of the above questions is yes, the Village of Pemberville will contact Ohio EPA's Source Water Assessment and Protection Program staff in the northwest district office to determine whether the protection area should be re-delineated.

Potential Contaminant Source Inventory

- Has the extent of the protection area changed?
- Has the community developed rapidly?
- Have land uses in and around the protection area changed?
- Has management of businesses in the protection area changed?

If the answer to any of the above questions is yes, the Village of Pemberville will update the inventory or conduct a new inventory. The Village of Pemberville may contact Ohio EPA's SWAP staff in the northwest district office for guidance or assistance in conducting the inventory.

Other

- Is the list of Protection Team members and contact numbers current?

7.2 Evaluating the Effectiveness of the Protective Strategies

In order to evaluate if the protective strategies in this Source Water Protection Plan are achieving the desired outcomes, the Village of Pemberville will consider the following types of questions and write any changes into the Protection Plan.

- *[If local protection area ordinances are in place]:* Has the ordinance achieved its purpose? (If not, why not?) Should it be revised to be more effective?

- *[If local protection area ordinances are <u>not</u> in place]:* Do we have reason to be concerned about how the drinking water source protection area may be used in the future? Should we consider trying to better protect it through a local ordinance? Would such an ordinance need to be enacted and implemented by another jurisdiction?

<u>Pollution Source Control Strategies:</u>

- Have we followed our own schedule of implementation/timeline (Section 2, Table 2-1) for each of the pollution source control strategies?
- Are there new potential contaminant sources that need to be addressed with new pollution source control strategies?
- Have we implemented any new protective strategies that are not documented here?
- Did any of our strategies result in removal or elimination of a potential source?
- Did any of our strategies result in business owners or individuals modifying practices to decrease the risk of contaminating the drinking water source?
- Did our coordination with other groups (SWCDs, county EMAs, local health dept., local watershed group, etc.) contribute to the implementation of protective strategies?
- Have the partnerships developed during plan implementation been productive?

<u>Education and Outreach:</u>

- Have we followed our own schedule of implementation/timeline (Section 3, Table 3-1) for each of the educational strategies?
- Are there any new groups in the population that we need to target with education and outreach strategies?
- Have we implemented any new educational strategies that are not already documented here?
- Has education and outreach targeting any specific group resulted in actions that reduced or could potentially reduce the risk of contaminating the drinking water source (e.g., septic system owners conducting regular maintenance, farmers using best management practices, properly sealing abandoned wells)?
- Have we received additional funding to continue any particular education and outreach strategy?
- Have we received any accolades, awards or recognition from outside entities or organizations for our educational efforts?

- Have we had any unsolicited requests for SWAP-related education (such as requests for plant tours, requests for presenters/speakers at events, etc.)?
- Did our coordination with other groups (SWCDs, SWEET Team, local health dept., local watershed group, etc.) contribute to the successful development and dissemination of SWAP-related information?
- Did we have sufficient staff and resources to complete all the planned educational efforts?
- Have educational efforts been cost effective? Efficient? (Consider level of attendance, attentiveness and participation by audience, comments received, etc., vs. the cost to facilitate the event) Should the frequency of the outreach be increased, decreased, or remain the same?
- Have the partnerships developed during plan implementation been productive?
- Have any of the target groups contacted the public water system for additional information about something they saw or heard about through these activities?

Drinking Water Shortage/Emergency Response:

- Are there any updates to the Drinking Water Shortage/Emergency Response Plan?
- Did our coordination with emergency responders at the local and county level result in better communication and handling of spill incidents that could impact our drinking water?

Ground Water Monitoring:

For systems that are monitoring raw ground water quality:

- Have we followed our ground water monitoring plan (i.e., sampled at the specific frequency, analyzed for the appropriate parameters, etc.)?
- Have there been any significant changes to our water quality?
- Do we have sufficient water quality data or other reasons (e.g., the source was removed) to conclude that ground water monitoring can be cut back or is no longer needed?
- Are there new issues with water quality, potential contaminant sources, or land use that would influence the need to expand our ground water monitoring network?
- Does our ground water monitoring plan need to be updated for any reason?

7.3 Revising the Plan

Upon review, if any revisions of the SWAP Assessment Report are needed, the village of Pemberville will contact Ohio EPA's Northwest District office for guidance. Also, if the local planning team makes any substantial changes to Pemberville's Protection Plan, a copy will be forwarded to Ohio EPA for concurrence. The revision will be documented on the front cover by adding "Revised [date]" beneath the date at the bottom of the page.

Appendix A

Ohio EPA's Drinking Water Source Assessment For the Village of Pemberville

DRINKING WATER SOURCE ASSESSMENT for Village of Pemberville (PWS ID # 8701712)

Protecting Ohio's Drinking Water Sources

OhioEPA

September 2002

INTRODUCTION. The 1996 Amendments to the Safe Drinking Water Act establish a program for states to assess the drinking water source for all public water systems. Ohio's Source Water Assessment and Protection Program is designed to help public water systems protect their sources of drinking water from becoming contaminated. This assessment:

- identifies the drinking water source protection area, based on the area that supplies water to the well(s);
- inventories the potential contaminant sources in the area;
- evaluates the susceptibility of the drinking water source to contamination; and
- recommends protective strategies.

The purpose of the assessment is to provide information that the Village of Pemberville can use to help protect its source of drinking water from contamination.

SYSTEM DESCRIPTION & GEOLOGY. The Village of Pemberville, Ohio is a community public water system serving 1,300 people. The drinking water source protection area for Village of Pemberville was delineated by the Toledo Metropolitan Area Council of Governments and was endorsed by Ohio EPA on September 8, 1995. The consultant used WHPA, A Modular Semi-Analytical Model for the Delineation of Wellhead Protection to delineate the protection area. More information on Village of Pemberville's protection area can be found in the report titled Delineation of Wellhead Protection Areas and Inventory for the Village of Pemberville dated April 1992. This system's delineation was endorsed by the OEPA in a letter dated September 8, 1995. The village pumps 129,800 gallons per day from eight wells located in three separate wellfields completed in the Silurian Age carbonate bedrock aquifer that is located in a potential karst region. Ohio's potential karst regions are carbonate aquifers that are covered by less than 25 feet of glacial material and typically exhibit surficial karst features, such as sinkholes. A map of the potential karst regions in Ohio is presented in Figure 1. The bedrock aquifer is covered by approximately 25 feet or less of low permeability sediments, which provides some protection from contamination. Depth to water in this aquifer is less than 25 feet below the ground surface.

Soils in the area are clay loam to loam which are poorly drained to very poorly drained. This means that much of the rainfall and snowmelt will not infiltrate in to the soil, instead it will fun off or pond. The topography is generally flat with an low average relief. Ground water in this area is replenished by the gradual flow of water underground from higher to lower elevations and by approximately 6 inches per year of precipitation that infiltrates through the soil. In northwest Ohio the regional ground water flow direction is primarily towards Lake Erie. In karst settings, however, local flow direction is highly variable and is influenced by fracture orientation. Since detailed information on local fracture orientation is unavailable, flow direction cannot be accurately determined..

PROTECTION AREA. The drinking water source protection area for Village of Pemberville's well is illustrated in Figure 2 thru 5. These figures show two areas, one inside the other. The "inner protection zone" is the area that provides ground water to Village of Pemberville's well within one year of pumping is also viewed in Figure 2 thru Figure 5. A chemical spill in this zone poses a greater threat to the drinking water, so this area warrants more stringent protection. The "outer protection zone" is the additional area that contributes water when the well is pumped for five years. Together, they comprise the drinking water source protection area.

INVENTORY. On August 14, 2002, an inventory of potential contaminant sources located within the drinking water source protection area was

completed by Ohio EPA with the assistance of Village of Pemberville personnel. Land use within the protection area is primarilly residential, with the outlying areas being agricultural of which are unsewered. Ohio EPA has identified several potential sources of contamination (see Figures 2 through Figure 5). Table 1 provides additional information about these types of potential contaminant sources.

A facility or activity is listed as a potential contaminant source if it has the **potential** to release a contaminant, based on the kinds and amounts of chemicals typically associated with that type of facility or activity. It is beyond the scope of this assessment to determine whether any specific potential source is **actually** releasing (or has released) a contaminant to ground water. Also, the inventory is limited to what staff were able to observe on the day of the site visit. Therefore, Village of Pemberville staff should be alert to the possible presence of potential sources of contamination that are not on this list.

GROUND WATER QUALITY. A review of Village of Pemberville's water quality record currently available in Ohio EPA's drinking water compliance database did not reveal any evidence of chemical contamination at levels of concern in the aquifer.

Please note that this water quality evaluation has some limitations:

1) The data evaluated is for treated water samples only, as Ohio EPA's quality requirements are for the water being provided to the public, not the water before treatment.

2) Sampling results for coliform bacteria and naturally-occurring inorganics were not evaluated for this assessment, because they are not a reliable indicator of aquifer contamination.

Current information on the quality of the treated water supplied by Village of Pemberville's Public Water System is available in the Consumer Confidence Report for the system, which is distributed annually. It reports on detected contaminants and any associated health risks from data collected during the past five years. Consumer Confidence Reports are available from Village of Pemberville.

SUSCEPTIBILITY ANALYSIS. This assessment indicates that Village of Pemberville's source of drinking water has a high susceptibility to contamination because:

- Depth to water in the bedrock aquifer is 25 feet or less below ground surface;
- The wells are located in a sensitive potential karst area;
- Potential comtaninant sources exist within the protection area;
- The wells are open between approximately 25 and greater than 100 feet in the fractured carbonate and the depth to water is less than 25 feet below the ground surface.

This does not mean that the aquifer will become contaminated, only that under the existing conditions ground water could become impacted by potential contaminant sources.

This susceptibility analysis is subject to revision if new potential contaminant sources are sited within the protection area, or if water sampling indicates contamination by a manmade contaminant source.

PROTECTIVE STRATEGIES. Protective strategies are activities that help protect a drinking water source from becoming contaminated. Implementing these activities benefits the community by helping to:

1. Protect the community's investment in its water supply.

2. Protect the health of the community residents by preventing contamination of its drinking water source.

3. Support the continued economic growth of a community by meeting its water supply needs.

4. Preserve the ground water resource for future generations.

5. Reduce regulatory monitoring costs.

Ohio EPA encourages Village of Pemberville to develop and implement an effective Drinking Water Source Protection Plan. The plan can be developed from the information provided in this Drinking Water Source Assessment Report. The

potential contaminant source inventory provides a list of facilities or activities to focus on. Table 2 lists protective strategies that are appropriate for the kinds of facilities/activities listed in the inventory. Finally, a document titled ***"Developing Local Drinking Water Source Protection Plans in Ohio"*** is enclosed. This document offers comprehensive guidance for developing and implementing a municipal Drinking Water Source Protection Plan. Ongoing implementation of the plan will help protect Village of Pemberville's valuable drinking water resources for current and future generations.

For further technical assistance on drinking water source protection, please contact the Ohio EPA Northwest District Office at (1-800-686-7330) or visit the Ohio EPA Source Water Assessment and Protection Web page at: http://www.epa.state.oh.us/ddagw/pdu/swap.html.

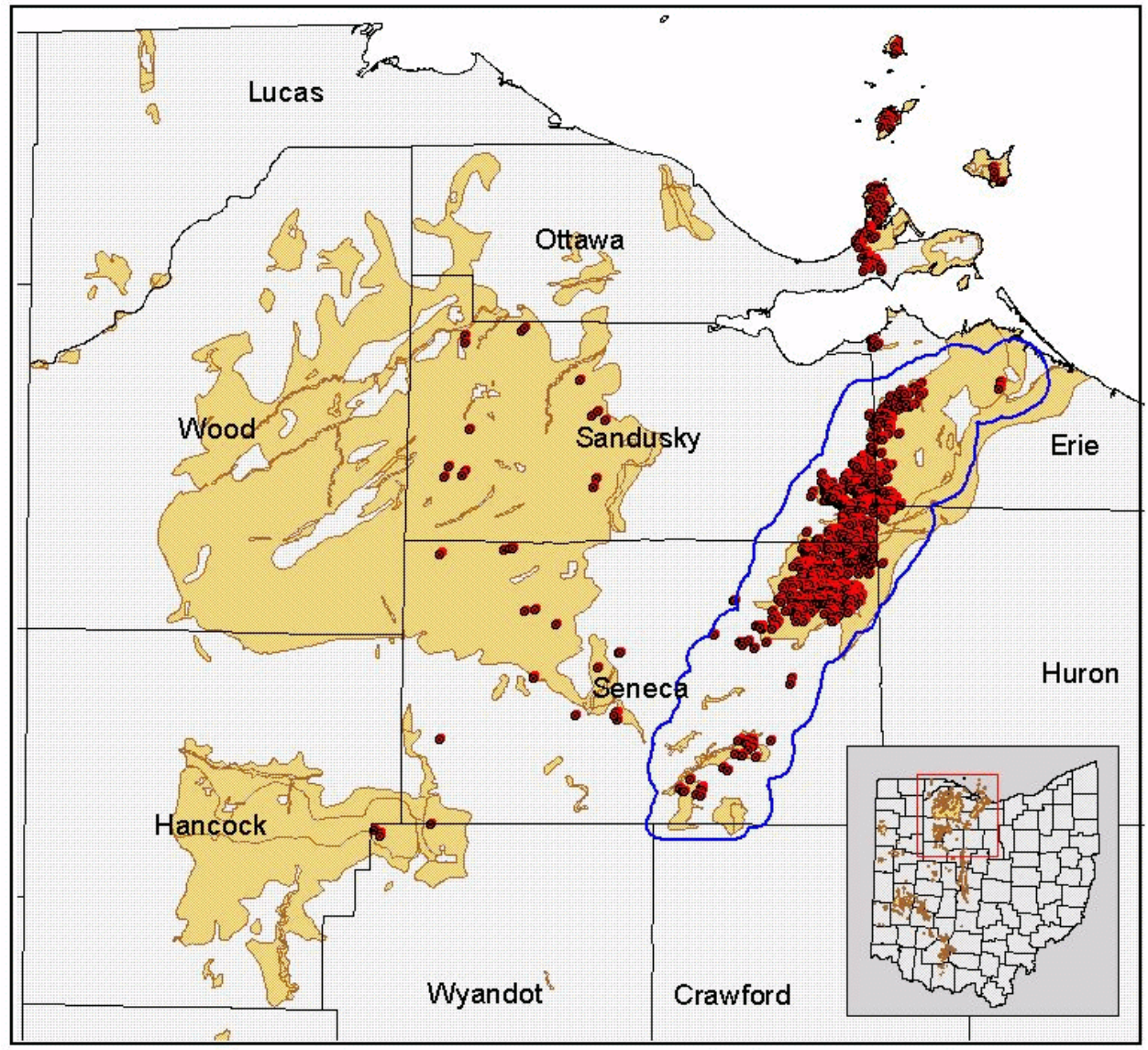
BIBLIOGRAPHY

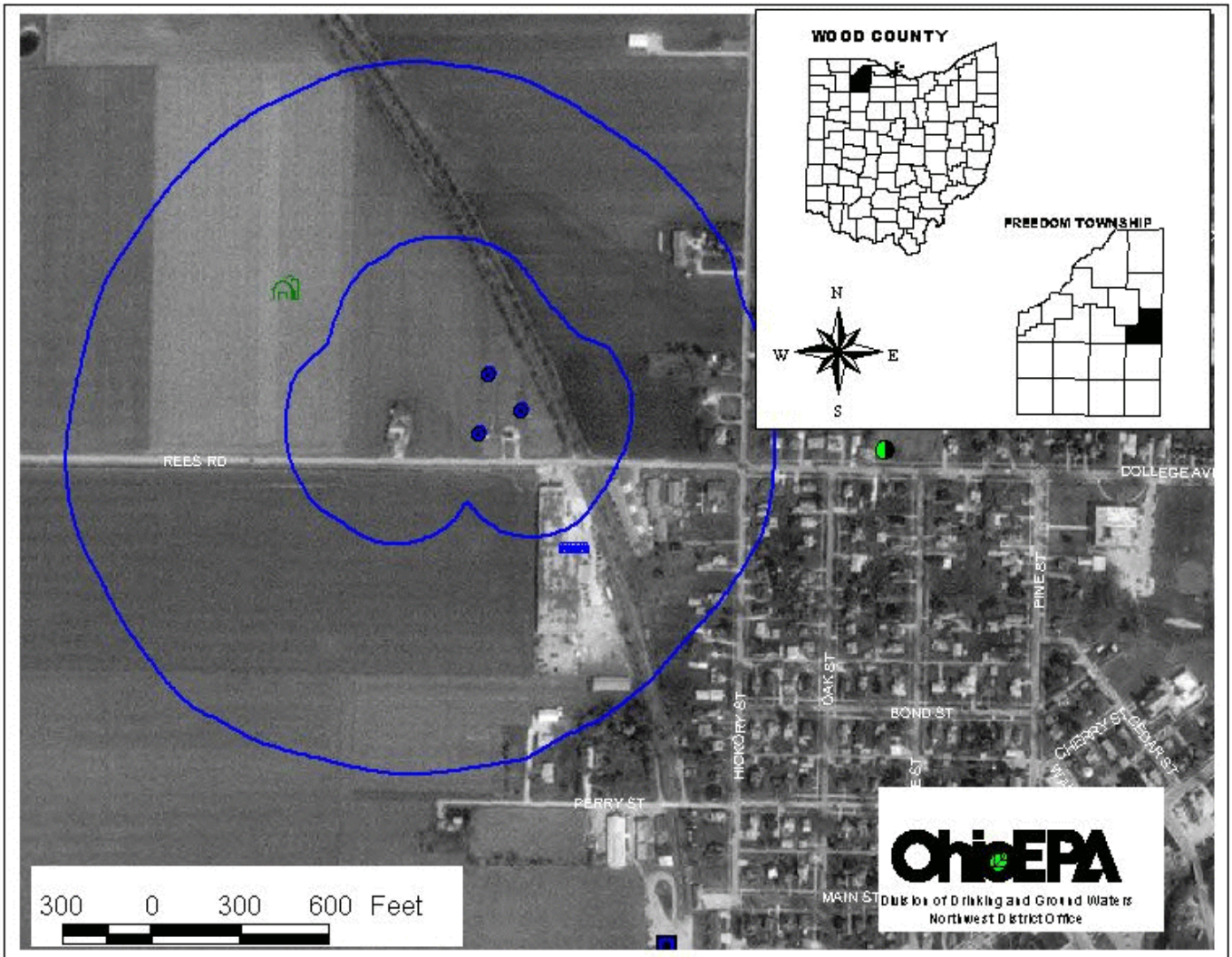
Ohio EPA public drinking water files.

Ohio EPA, 2002, *Drinking Water Source Protection Area Delineation Guidelines & Process Manual*, Draft (February, 2002).

Toledo Metropolitan Area Council of Governments, 1992, *Delineation of Wellhead Protection Areas and Inventory of Potential Pollution Sources*.

Figure 1. Potential Karst Regions (tan) and Sinkholes (red) in Northwest Ohio





- Above Ground Storage Tank
- Animal feedlot
- Barber/Beauty Shop
- Crops: corn, soybean, wheat
- Electrical Substation (Transformer)
- Fleet/Truck/Bus Terminal
- Gas Station (Existing/Abandoned/Historical)
- Gas Line
- Greenhouse/Nursery
- Lagoon/Pit/Pond
- Leaking Underground Tank
- Machine/Metalworking Shop
- OEPA DERR Sites
- Regulated Under Several EPA Programs

Information used to develop the Protection Area:

Number of Wells = 3
Total well Pumping Rate = 52,536 GPD
Porosity = 0.10
Aquifer Thickness = 225 feet
Hydrogeologic Setting = Bedrock

LOW | MODERATE | HIGH

SUSCEPTIBILITY

SEPTEMBER, 2002

Figure 2. Drinking Water Source Protection Area for the Village of Pemberville's North wellfield Public Water System Identification # 8701712

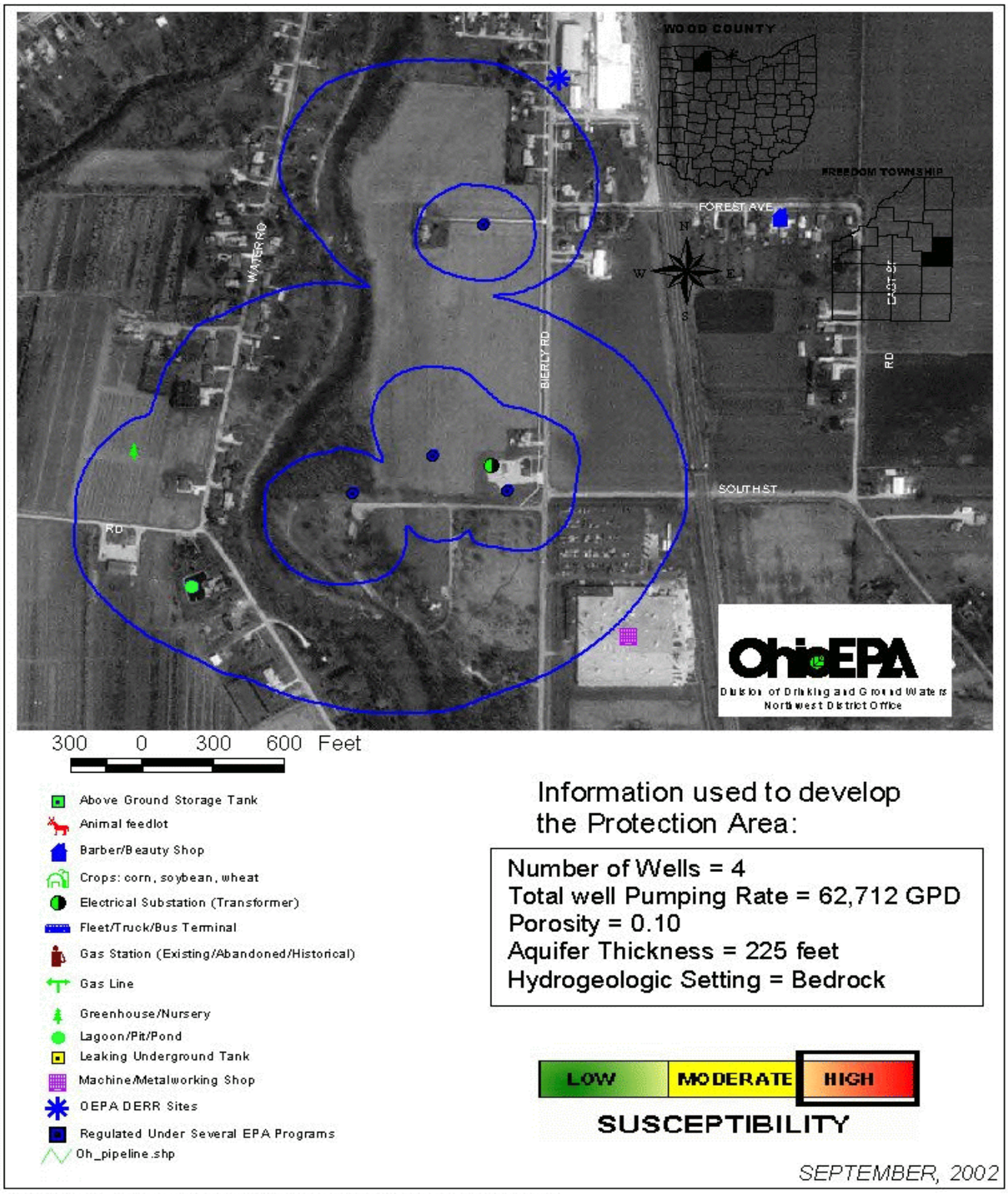


Figure 3. Drinking Water Source Protection Area for the Village of Pemberville (Middle wellfield) Public Water System Identification # 8701

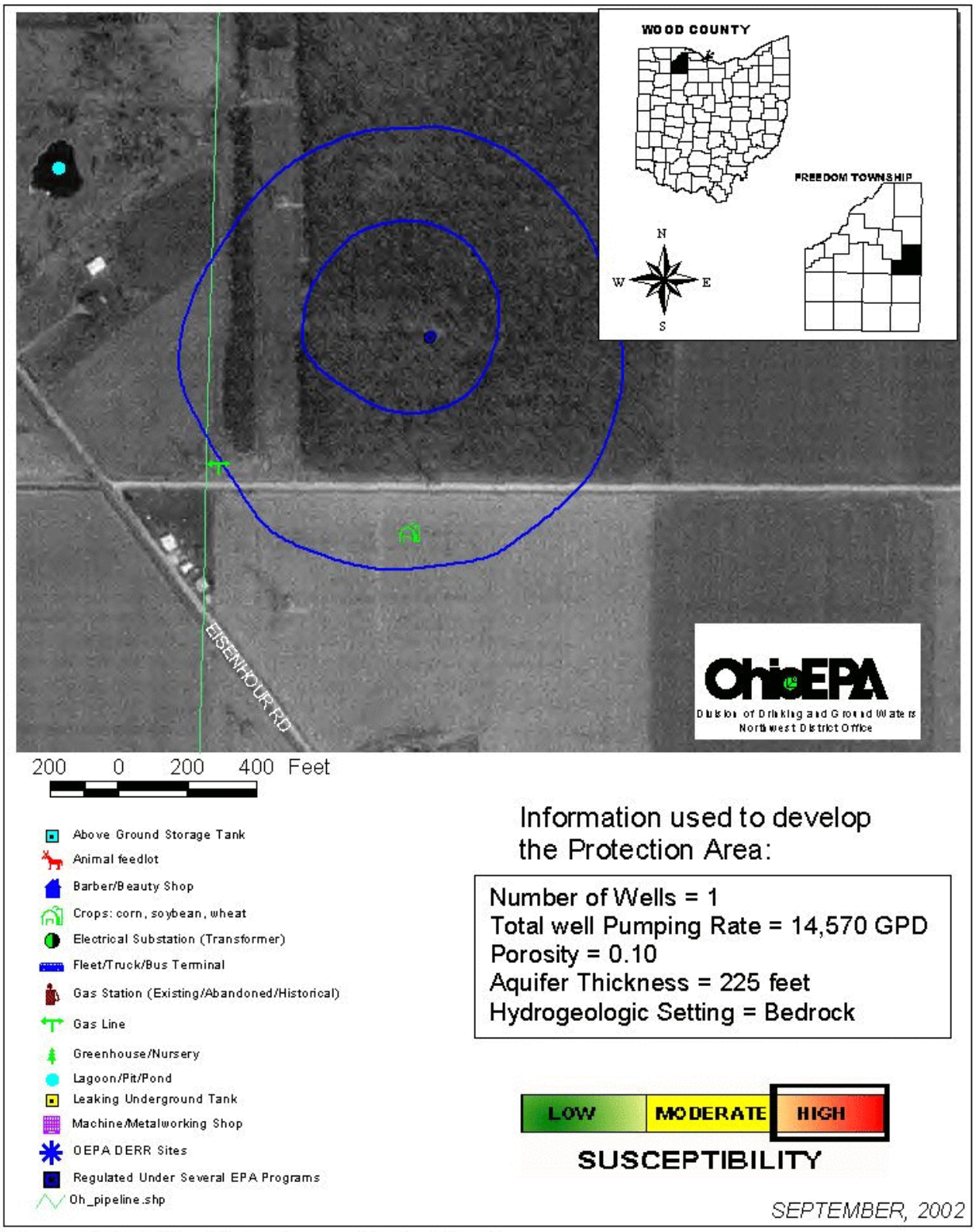


Figure 4. Drinking Water Source Protection Area for the Village of Pemberville (South wellfield) Public Water System Identification # 87017

0.4 0 0.4 0.8 Miles

N
W E
S

- Above Ground Storage Tank
- Animal feedlot
- Barber/Beauty Shop
- Crops: corn, soybean, wheat
- Electrical Substation (Transformer)
- Fleet/Truck/Bus Terminal
- Gas Station (Existing/Abandoned/Historical)
- Gas Line
- Greenhouse/Nursery
- Lagoon/Pit/Pond
- Leaking Underground Tank
- Machine/Metalworking Shop
- OEPA DERR Sites
- Regulated Under Several EPA Programs
- Oh_pipeline.shp

OhioEPA
Division of Drinking and Ground Waters
Northwest District Office

Figure 5: Overall View of all wellfields for the Village of Pemberville Public Water System ID # 8701712

Table 1. Potential Contaminant Sources Located in the Village of Pemberville's Drinking Water Source Protection Area.
Potential contaminant sources (PSI) listed in the table as (*NF*) indicate that the PSI was not found during Ohio EPA's inventory process. Ohio EPA encourages the village to review and amend the table as necessary.

Potential Contaminant Source	Number of Sources	Environmental Concerns	Protection Area
AGRICULTURAL SOURCES			
Animal Feedlots	1	Potential contaminant sources that may be found at feedlots include: concentrations of animal waste; aboveground storage tanks; underground storage tanks; and chemical storage areas. These types of facilities may be a source for nitrates, ammonia, animal pathogens, and pesticides in drinking water sources.	Inner Management Zone, Outer Management Zone, Outside Protection Area
Animal Burial Areas	*NF*	Animal burial areas may be a source of animal pathogens and may cause elevated chemical or biological oxygen demand in water.	
Animal Waste Storage / Treatment	*NF*	Animal waste storage and treatment facilities may be a source of nitrates, ammonia, and animal pathogens in surface or ground water.	
Confined Animal Feeding Operations (CAFOs)	*NF*	Confined animal feeding operations may be a source of nitrates, ammonia, animal pathogens, and/or pesticides in source water.	
Crops: Corn, Soybean, Wheat	Around Area	Potential contaminant sources that may be associated with pastures include sludge application, fertilizer, and pesticide use. Cropland may be associated with nitrates, ammonia, pesticides, and pathogens in drinking water sources.	Outside protection area
Crops: Orchards	*NF*	Potential contaminant sources that may be associated with orchards include fertilizer, and pesticide use. Orchards may be associated with nitrates and pesticides in drinking water sources.	
Crops: Other	*NF*	Potential contaminant sources that may be associated with crop land include sludge application, fertilizer, and pesticide use. Crop land may be associated with nitrates, ammonia, pesticides, and pathogens in drinking water sources.	
Dairy Facility	*NF*	Potential contaminant sources that may be found at dairy facilities include: aboveground storage tanks, underground storage tanks, other liquid storage, vehicle maintenance areas and agricultural chemical storage areas. These types of facilities may be associated with nitrates, ammonia, pesticides, animal pathogens, and the potential for oil, gasoline, and automotive fluid leaks and spills.	

Potential Contaminant Source	Number of Sources	Environmental Concerns	Protection Area
Drainage Canals / Tiles (Agricultural)	*NF*	Drainage canals receiving runoff from pastures, crop land, or confined animal feeding operations and agricultural drainage tiles may be a source of animal pathogens, excess nutrients, and/or pesticides in source water.	
Farm Chemical Distributor	*NF*	Among the potential contaminant sources related to these facilities are: aboveground storage tanks, underground storage tanks, and other chemical storage areas. These types of facilities may be associated with the potential for chemical leaks and spills.	
Farm Machinery Repair Areas	*NF*	Among the potential contaminant sources related to these facilities are: underground storage tanks; aboveground storage tanks; automotive fluid storage; and vehicle washing areas. These types of facilities may be associated with the potential for leaks and spills of oil, gasoline, other petroleum products, automotive fluids, and parts cleaners. Waste oil and machining wastes may contain metals that could contaminate drinking water sources.	
Greenhouses / Nurseries	1	Potential contaminants that may be associated with nurseries include nitrates, ammonia, and pesticides. Nurseries may also maintain storage areas for gasoline, diesel fuel, and other automotive fluids.	Outside protection area
Pasture	*NF*	Pastures may be a source of elevated levels nitrates, ammonia, and animal pathogens in ground and/or surface water.	
Pesticide/ Fertilizer / Petroleum Storage & Transfer Areas	*NF*	Pesticides, fertilizer, and petroleum products may be stored in liquid form in underground storage tanks, aboveground storage tanks, drums, or small containers. Pesticides and fertilizer may also be stored as a bulk solid. There is the potential for leaks and spills of during transfer operations or from storage areas.	
Silage Storage (Bulk)	*NF*	Runoff or infiltration of liquids from bulk silage storage areas may be a source of excess nutrients in source water.	
Other Agricultural Sources	*NF*	Environmental concerns are dependant on the materials used and other site specific conditions.	
MUNICIPAL SOURCES			
Artificial Ground Water Recharge Areas	*NF*	Artificial ground water recharge areas may be a source of microorganisms, nutrients, and organic chemicals in ground water.	
Composting Facility / Yard Wastes	*NF*	Runoff or infiltration of liquids from composting facilities and yard waste storage may be a source of excess nutrients and other organic compounds in source water.	

Potential Contaminant Source	Number of Sources	Environmental Concerns	Protection Area
Drinking Water Treatment Plants	2	Among the potential contaminant sources related to these facilities are: underground storage tanks; aboveground storage tanks; and storage of chemicals used in water treatment and testing.	Within the one year time of travel for each wellfield
Garages	*NF*	Among the potential contaminant sources related to these facilities are: underground storage tanks; automotive fluid storage; equipment storage areas; parking lots; vehicle storage areas; vehicle maintenance areas; and vehicle washing areas. These types of facilities may be associated with the potential for leaks and spills of oil, gasoline, other petroleum products, and automotive fluids. Waste oil and machining wastes may contain metals that could contaminate drinking water sources.	
Recycling Facilities	*NF*	Chemicals of concern at recycling facilities is dependant on the materials processed and the processes used at the facility. These areas may be a source of pesticides, metals, petroleum compounds, and organic chemicals.	
Schools	1	Among the potential contaminant sources schools include aboveground storage tanks, underground storage tanks, lawn chemical storage, and vehicle storage, maintenance, and washing areas.	Outside protection area
Storm Water Basins	various	Storm Water Basins may be a source of pesticides, microorganisms, nutrients, metals, petroleum products, and organic chemicals in source water.	Throughout protection area
Wastewater Treatment Plant		Among the potential contaminant sources related to these facilities are waste treatment lagoons, aboveground storage tanks, and underground storage tanks. Wastewater treatment plants may be associated with nitrates, ammonia, pathogens, and chemical spills and leaks.	Outside protection area
Wastewater Application Sites	*NF*	Biosolids application in excess of agronomic rates or in inappropriate locations may be a source of microorganisms, organic chemicals, metals, and nutrients, including nitrates.	
Other Municipal Sources		Environmental concerns are dependant on the materials used and other site specific conditions.	
COMMERCIAL SOURCES			
Auto Repair Shops / Body Shops		Among the potential contaminant sources related to these facilities are: underground storage tanks, automotive fluid storage, vehicle maintenance areas, and vehicle washing areas. These types of facilities may be associated with the potential for leaks and spills of oil, gasoline, other petroleum products, and automotive fluids. Waste oil and machining wastes may contain metals that could contaminate drinking water sources.	Outside protection areas

Potential Contaminant Source	Number of Sources	Environmental Concerns	Protection Area
Barber and Beauty Shops	1	Although the majority of chemicals found at these facilities are safe for human use, they may also store cleaning solutions. Potential contaminants that may be associated with beauty shops include cleaning fluids and solutions used for some hair treatments, such as permanents.	Five year time-of-travel
Boat Services / Repair / Refinishing	*NF*	Among the potential contaminant sources related to these facilities are chemicals and fuels in underground or aboveground storage tanks and other chemical storage areas, and vehicle maintenance and washing areas. These types of facilities may be associated with the potential for leaks and spills of oil, gasoline, and other petroleum products and chemicals.	
Car / Boat / Camper Dealerships	*NF*	Among the potential contaminant sources related to these facilities are: underground storage tanks; automotive fluid storage; equipment storage areas; parking lots; vehicle storage areas; vehicle maintenance areas; and vehicle washing areas. These types of facilities may be associated with the potential for leaks and spills of oil, gasoline, other petroleum products, and automotive fluids. Waste oil and machining wastes may contain metals that could contaminate drinking water sources.	
Car Washes	*NF*	Runoff from these facilities may be a source of metals, petroleum products such as motor oil, and organic compounds in source water.	
Carpet / Tile Stores	*NF*	Potential contaminants that may be associated with carpet stores include organic compounds glues and cements.	
Cemeteries	*NF*	Cemeteries have been associated with arsenic and formaldehyde contamination in ground water.	
Dry Cleaners	*NF*	Potential contaminant sources at these facilities include storage and use of dry cleaning chemicals.	
Equipment Rental / Repair Shop	*NF*	Among the potential contaminant sources related to these facilities are: underground storage tanks; automotive fluid storage; equipment storage areas; parking lots; equipment maintenance areas; and vehicle or parts washing areas. These types of facilities may be associated with the potential for leaks and spills of oil, gasoline, other petroleum products, and automotive fluids. Waste oil and machining wastes may contain metals that could contaminate drinking water sources.	

Potential Contaminant Source	Number of Sources	Environmental Concerns	Protection Area
Fleet / Truck / Bus Terminals	*NF*	Among the potential contaminant sources related to these facilities are: underground storage tanks; automotive fluid storage; equipment storage areas; parking lots; vehicle storage areas; vehicle maintenance areas; and vehicle washing areas. These types of facilities may be associated with the potential for leaks and spills of oil, gasoline, other petroleum products, and automotive fluids. Waste oil and machining wastes may contain metals that could contaminate drinking water sources.	
Food Processor	*NF*	Potential impacts to the drinking water source from food processing facilities are dependant on the specific facility.	
Funeral Services and Crematories	*NF*	Potential contaminant sources at these facilities include the storage and use of chemicals and the disposal of biological wastes.	
Furniture and Fixtures Manufacturers	*NF*	Among the potential contaminant sources related to these facilities is chemical storage and use. Potential impacts to the drinking water source are dependant on the specific facility, but may include leaks and spills of organic chemicals and solvents.	
Furniture Repair and Finishing Shops	*NF*	Potential impacts to the drinking water source are dependant on the specific facility, but may include leaks and spills of organic chemicals and solvents.	
Gas Stations	2	Among the potential contaminant sources related to these facilities are: underground storage tanks, automotive fluid storage, vehicle maintenance areas, and vehicle washing areas. These types of facilities may be associated with the potential for leaks and spills of oil, gasoline, other petroleum products, and automotive fluids. Historic gas station locations have been associated soil and water contamination related to leaks and spills of gasoline and other petroleum products. Unused underground storage tanks may be used for the improper disposal of wastes.	Outside protection area
Golf Courses	*NF*	Potential contaminants that may be associated with golf courses include nitrates, ammonia, and pesticides. Golf courses may also maintain storage areas for gasoline, diesel fuel, and other automotive fluids.	
Hardware / Lumber / Parts Stores	*NF*	Among the potential contaminant sources related to these facilities are: wood treatment chemicals, pesticides, fertilizers, parts cleaning solvents, and other chemical storage. These types of facilities may be associated with the potential for leaks and spills chemicals stored or used at that location.	

Potential Contaminant Source	Number of Sources	Environmental Concerns	Protection Area
Heating Oil Companies	*NF*	Potential contaminant sources commonly related to these facilities include underground and aboveground storage tanks and fuel transfer areas. These types of facilities may be associated with the potential for leaks and spills of oil and other petroleum products.	
Junk Yards: Scrap and Auto	*NF*	These types of facilities may be locations for leaks and spills of oil and other petroleum products. Waste oil and auto parts may contain metals that could contaminate drinking water sources.	
Landscaping Firms	1	Potential contaminants that may be associated with landscaping companies include nitrates, ammonia, and pesticides. Landscaping firms may also maintain storage areas for gasoline, diesel fuel, and other automotive fluids.	Outside protection area
Laundromats	*NF*	Waste water from laundromats may contain elevated levels of nutrients.	
Lawn / Farm Stores	*NF*	Lawn and garden or farm supply stores may store significant quantities of pesticides and fertilizers.	
Medical / Dental Offices / Clinics	*NF*	Among the potential contaminant sources related to these facilities are pathogen containing medical waste.	
Paint Stores	*NF*	Paint stores may store significant quantities solvents and other organic compounds.	
Pest Control Company	*NF*	Pest control companies may store significant quantities of pesticides, that if spilled could impact the drinking water source.	
Photo Processing / Printing Shops	*NF*	Chemicals of concern at photo processing facilities is dependant on the processes used at the facility, but may be a potential source of metals, solvents, and organic chemicals.	
Railroad Yards / Maintenance Areas	*NF*	Among the potential contaminant sources related to these facilities are: underground storage tanks; automotive fluid storage; equipment storage areas; parking lots; vehicle storage areas; vehicle maintenance areas; and vehicle washing areas. These types of facilities may be associated with the potential for leaks and spills of oil, gasoline, other petroleum products, and automotive fluids. Waste oil and machining wastes may contain metals that could contaminate drinking water sources.	
Veterinary Offices	*NF*	Among the potential contaminant sources related to these facilities are diseased and deceased animals. These types of facilities may be associated with animal pathogens.	
Welding Shops	*NF*	Wastes may contain metals that could contaminate drinking water sources. Welding shops may also store or use significant quantities of parts cleaning solvents,	

Potential Contaminant Source	Number of Sources	Environmental Concerns	Protection Area
Other Commercial Sources		Environmental concerns are dependant on the materials used and other site specific conditions.	
INDUSTRIAL SOURCES			
Asphalt / Cement / Concrete Plants	*NF*	Among the potential contaminant sources related to these facilities are: aboveground storage tanks, underground storage tanks, other liquid storage, vehicle maintenance areas, electric substations, and vehicle washing areas. These types of facilities may be associated with surface water contaminants and the potential for leaks and spills of oil, gasoline, other petroleum products, and automotive fluids.	
Chemical Plant	*NF*	Among the potential contaminant sources related to these facilities are chemical storage in underground storage tanks, above ground storage tanks, and other storage areas. The chemicals of concern at these facilities are dependant on the materials processed and the processes used at the facility, but may include solvents, metals, and organic chemicals.	
Electrical / Electronic Manufacturing	*NF*	These types of facilities may be associated with the potential for leaks and spills of solvents and other organic compounds. Waste oil and machining wastes may contain metals that could contaminate drinking water sources.	
Foundries and Metal Fabricators	*NF*	Among the potential contaminant sources related to these facilities are: waste handling and disposal practices; aboveground storage tanks; underground storage tanks; other liquid storage; bulk material storage; and equipment storage and maintenance areas. These types of facilities may be associated with the potential for leaks and spills of oil and other chemical. Waste streams may contain metals that could contaminate drinking water sources.	
Gravel Pits & Quarries	*NF*	Among the potential contaminant sources related to these facilities are: aboveground storage tanks, underground storage tanks, other liquid storage, vehicle maintenance areas and vehicle washing areas. These types of facilities may be associated with surface water contaminants and the potential for oil, gasoline, and automotive fluid leaks and spills.	
Historic hazardous materials sites	*NF*	Runoff or leachate from historic hazardous materials sites may be a source of metals, fuels, or organic compounds in source water, dependant on the materials disposed and other site specific conditions.	

Potential Contaminant Source	Number of Sources	Environmental Concerns	Protection Area
Machine and Metalworking Shops	1	Among the potential contaminant sources related to these facilities are: waste handling and disposal practices; aboveground storage tanks; underground storage tanks; other liquid storage; bulk material storage; and equipment storage and maintenance areas. These types of facilities may be associated with the potential for leaks and spills of oil and other chemical. Waste streams may contain metals that could contaminate drinking water sources.	Five year time-of-travel
Metal Finishing / Plating	*NF*	Among the potential contaminant sources related to these facilities are: waste handling and disposal practices; aboveground storage tanks; underground storage tanks; other liquid storage; bulk material storage; and equipment storage and maintenance areas. These types of facilities may be associated with the potential for leaks and spills of oil and other chemicals. Waste streams may contain metals that could contaminate drinking water sources.	
Petroleum Production and Storage Companies	*NF*	Potential contaminant sources commonly related to these facilities include underground and aboveground storage tanks and fuel transfer areas. These types of facilities may be associated with the potential for leaks and spills of oil and other petroleum products.	
Plastics / Synthetics Producers	*NF*	Among the potential contaminant sources related to these facilities are chemical storage in underground storage tanks, above ground storage tanks, and other storage areas. The chemicals of concern at these facilities are dependant on the materials processed and the processes used at the facility, but may include solvents and organic chemicals.	
Power Plants	1	Among the potential contaminant sources related to these facilities are: aboveground storage tanks, underground storage tanks, other liquid storage, electric substations, and material stockpiles. These types of facilities may be associated the potential for leaks and spills of oil, and other chemicals that may impact surface or ground water.	Outside protectiion area
Wood Preserving / Treating	*NF*	Among the potential contaminant sources related to these facilities is chemical storage and use. Potential impacts to the drinking water source are dependant on the specific facility, but may include leaks and spills of organic chemicals and solvents.	
Wood / Pulp / Paper Mills	*NF*	The chemicals of concern associated with these facilities are dependant on the materials processed and the processes used at the facility, but may include solvents and organic chemicals metals.	
Other Industrial Sources		Environmental concerns are dependant on the materials used and other site specific conditions.	

Potential Contaminant Source	Number of Sources	Environmental Concerns	Protection Area
WIDESPREAD SOURCES			
Aboveground Storage Tanks	1	Above ground storage tanks present a potential for leaks and spills that could impact surface or ground water.	Outside protection area
Septic Systems	various	If poorly maintained, may be a source of household chemicals, excess nutrients, viruses and bacteria in drinking water sources.	Outside protection area
Wells: Abandoned	*NF*	Improperly sealed unused water wells create a direct pathway for potential contaminants to reach the aquifer.	
Oil & Gas Wells	*NF*	Potential sources of petroleum and brine, which may leak into an aquifer. Oil, brine, and other fluids may also leak from storage tanks.	
Surface Water Bodies	2	May provide a direct pathway for spilled chemicals, nitrates, and pesticides from the ground surface to the aquifer.	Within and outside five year time-of-travel
Sewage Sludge / Biosolid Application	*NF*	Biosolids application in excess of agronomic rates may be a source of metals and nutrients, including nitrates.	
Highway / Transportation Route	1	Accidents on transportation routes pose the threat of leaks and spills of fuels and chemicals. Weed killers used to control vegetation can elevate levels of pesticides in drinking water sources. Runoff may contain oil, metals, and deicers.	Outside protection area
Pipelines	1	Spills and leaks from pipelines the potential to impact drinking water sources, even at small quantities. Condensate in natural gas pipelines may contain PCBs and other chemicals.	Five year time-of-travel

Table 2: Additional General Protective Stategies to Consider for the Potential Contaminan Sourses for the Village of Pemberville

Potential Contaminant Source	Protective Strategies To Consider
General	▸ Purchase additional property. ▸ Provide educational material to members of the community on topics regarding the drinking water source protection area. ▸ Include drinking water source protection into the local school curriculum. ▸ Provide education (material/meetings) local businesses and industries on topics relating to drinking water source protection. ▸ Encourage 'ground water friendly' development. ▸ Develop/enact/enforce a local ordinance which may include any of the following: changing zoning; illegal waste disposal; requiring registration of existing facilities; banning certain new types of activities; dictating chemical handling procedures; maintaining/filing a chemical inventory; facility spill/contingency planning; engineering controls for existing/new facilities; paralleling existing federal or state requirements.
Agricultural Sources	▸ Assess the use of best management practices and recommend additional practices. ▸ Encourage road safety with agricultural chemicals. ▸ Provide education (material/meetings) to local farmers and agribusinesses on appropriate topics. ▸ Plan/design/implement methods to control impacts to surface water.
Residential Sources	▸ Inventory/remove underground home heating oil tanks in the protection area. ▸ Identify areas used for illegal dumping. ▸ Provide education (material/meetings) to home owners on: drinking water protection; use/maintenance of septic systems; illegal dumping; proper well abandonment (both the reason and the process). ▸ Develop a centralized wastewater collection/treatment system. ▸ Encourage/require (and provide incentives) for sealing unused wells. ▸ Ensure enforcement of existing requirements for closing unused wells. ▸ Ensure the proper construction of new wells.
Municipal Sources	▸ Monitor compliance with existing regulations through inspections and/or contact with regulatory agencies (such as the local fire department, State Fire Marshal, or the Ohio EPA). ▸ Encourage/arrange hazardous materials training or waste and disposal assessments for employees. ▸ Develop an early release notification system for spills and emergency planning; educate emergency responders to be aware of drinking water protection areas; or coordinate facility spill/contingency planning. ▸ Encourage compliance with materials handling procedures/requirements. ▸ Install of engineering controls at municipal facilities ▸ Implement pollution prevention strategies. ▸ Work with the street department and Ohio DOT to minimize use of road salt. ▸ Evaluate and close fire cisterns or other city owned wells. ▸ Conduct routine sewer inspections, maintenance & upgrades.

Commercial Sources	▸ Monitor compliance with existing regulations through inspections and/or contact with regulatory agencies. ▸ Use routine inspections as an educational opportunity. ▸ Encourage compliance with materials handling procedures/requirements. ▸ Encourage/arrange hazardous materials training or waste and disposal assessments for local businesses (and their employees). ▸ Request installation of engineering controls for existing facilities. ▸ Encourage facility spill/contingency planning in conjunction with the fire department. ▸ Encourage local businesses to implement pollution prevention strategies.
Industrial Sources	▸ Monitor compliance with existing regulations through inspections and/or contact with regulatory agencies. ▸ Use routine inspections as an educational opportunity. ▸ Encourage compliance with materials handling procedures/requirements. ▸ Encourage/arrange hazardous materials training or waste and disposal assessments for local industries (and their employees). ▸ Encourage facility spill/contingency planning in conjunction with the fire department. ▸ Request installation of engineering controls for existing facilities. ▸ Encourage local industries to implement pollution prevention strategies. ▸ Encourage compliance with materials handling procedures/requirements. ▸ Encourage/arrange waste and disposal assessments for local businesses.
Oil & gas wells	▸ Provide education (material/meetings) to owners on maintenance. ▸ Ensure/monitor proper operation and maintenance. ▸ Develop an early release notification system for spills.
Spills	▸ Develop an early release notification system for spills and an emergency response plan. ▸ Include drinking water protection in response planning and training. ▸ Post signs indicating the extent of the protection area.
Transportation	▸ Create hazardous materials routes around the protection area and require/encourage transporters to use them. ▸ Work with local transporters on protection area awareness. ▸ Encourage road safety with chemicals. ▸ Post signs indicating the extent of the protection area.

Appendix B

Authorizing Village Resolution

Appendix C

Education and Outreach Materials

A Community Awareness Announcement
For Pemberville, Ohio

Month/Day/Year

Local Resident
Address:

Dear Local Resident,

This letter is to make you aware that your residence at **ADDRESS** is located within the Village of Pemberville's Drinking Water Source Protection Area. This protection area was developed for the Village of Pemberville by the Ohio Environmental Protection Agency and provided to the village in a drinking water source assessment report.

Our village's source of drinking water is supplied by ground water that is pumped out of the ground by the village's municipal wells. Liquid substances such as automotive products, fuel oil, cleaning fluids, and oil-based paints are common ground water contaminants. These substances can enter the ground water through improper disposal methods. Improper disposal methods include pouring chemicals on the ground, down a sink or toilet connected to a septic system, or down storm drains. Any contamination that enters the Village of Pemberville's ground water resources will force the village to implement additional costly measures in order to assure the water supplied to local customers is safe to drink.

The Village of Pemberville is asking all residents living within the protection area to report any spills to appropriate officials and prevent the improper disposal of any liquids that could contaminate the village's ground water resources.

The Village of Pemberville thanks you for your cooperation and assistance. Attached is a figure that shows the location of Pemberville's protection area. If you have any questions or would like to review the Village of Pemberville drinking water source assessment report, please contact the Board of Public Affairs Utility Clerk, at 419-287-3832.

Sincerely,

Chuck Schulte, Village of Pemberville Board of Public Affairs President
Gordon Bowman, Village of Pemberville Council President
James Opelt, Village of Pemberville Mayor

A Community Awareness Announcement
For Pemberville, Ohio

Month/Day/Year

Local Business Owner
Main Street
Pemberville, Ohio 43450

Dear Local Business Owner,

This letter is to make you aware that your business, **Business Name**, is located within the Village of Pemberville Drinking Water Source Protection Area. This protection area was developed for the Village of Pemberville by the Ohio Environmental Protection Agency and provided to the village in a drinking water source assessment report.

Our village's source of drinking water is supplied by ground water that is pumped out of the ground by the village's municipal wells. Liquid substances such as automotive products, fuel oil, cleaning fluids, and oil-based paints are common ground water contaminants. These substances can enter the ground water through improper disposal methods. Improper disposal methods include pouring chemicals on the ground, down a sink or toilet connected to a septic system, or down a storm drain. Any contamination that enters the Village of Pemberville's ground water resources will force the village to implement additional costly measures in order to assure the water supplied to local customers is safe to drink.

The Village of Pemberville is asking all businesses located within the protection area to follow all regulations as required by state and federal laws for their business, implement best management practices within business operations, report any spills to appropriate officials, and prevent the improper disposal of any liquids that could contaminate the Village of Pemberville's ground water resources.

The Village of Pemberville thanks you for your cooperation and assistance. Attached is a figure that shows the location of the village's protection area. If you have any questions or would like to review the Village of Pemberville's drinking water source assessment report please contact the Board of Public Affairs Utility Clerk at 419-287-3832.

Sincerely,

Chuck Schulte, Village of Pemberville Board of Public Affairs President
Gordon Bowman, Village of Pemberville Council President
James Opelt, Village of Pemberville Mayor

Did You Know…..

- Only 3% of the water on earth is drinkable.
- Less than one gallon of gasoline can pollute one million gallons of water.
- **You** can **avoid** contaminating your source of drinking water by properly disposing of chemicals that have the potential to cause ground water contamination.
- The following chemicals are common ground water contaminants:
  - Cleaning Products
  - Automotive Products
  - Fuel Oil
  - Furniture Strippers
  - Lawn & Garden Products
  - Oil based paints
- Improper disposal methods include:
  - pouring chemicals on the ground,
  - pouring chemicals down a sink or toilet connected to a septic system,
  - pouring wastes down a storm drain because many storm drains lead directly into the ground or to a nearby stream

Contacts
At
The Ohio Environmental
Protection Agency

Ohio Environmental Protection Agency
Lazarus Government Center
P.O. Box 1049
Columbus, Ohio 43215-1049
www.epa.state.oh.us

For questions concerning Drinking Water Protection, contact:

The Division of Drinking and Ground Waters
Phone: (614) 644-2752

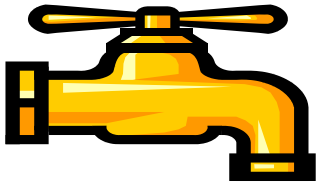
The Office of Pollution Prevention
Phone: (614) 644-3469

Contacts
In
Pemberville

For questions concerning Pemberville's Municipal Water Supply and Drinking Water Source Protection Area, contact:

Pemberville Village Office
Phone: (419) 287-3832

A Community Awareness Announcement for Pemberville, Ohio



Where does Pemberville's drinking water come from?

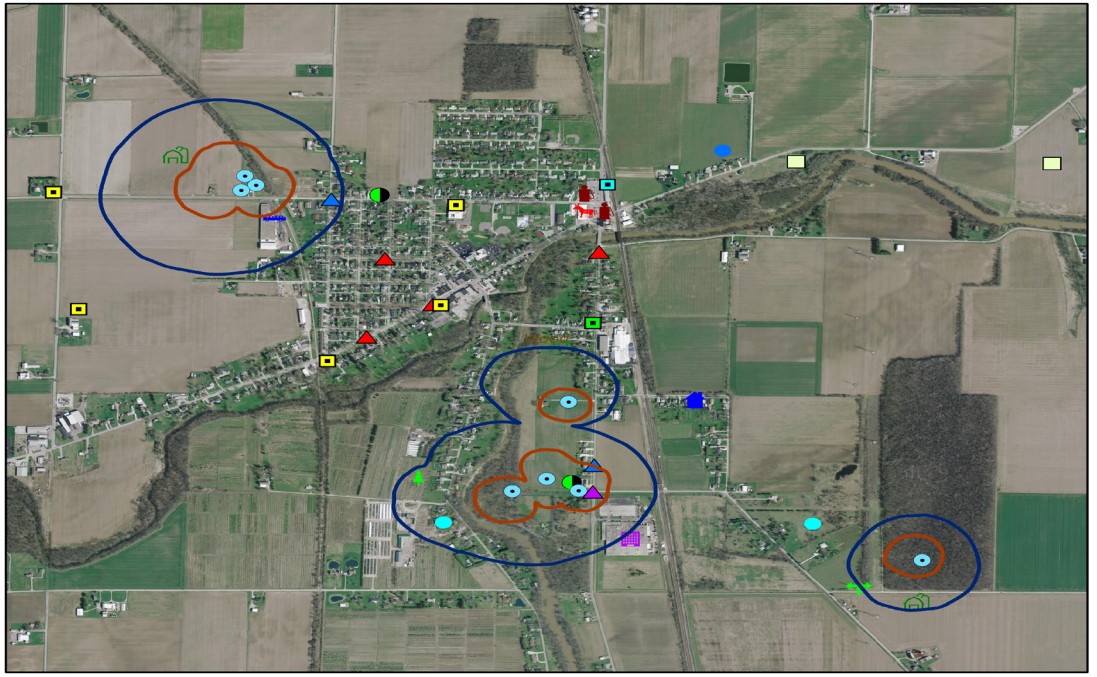
Pemberville's drinking water is pumped out of the ground by wells in three wellfields located on both the north and south side of town. This ground water is pumped to the water treatment plant where chlorine is added to kill harmful bacteria in it. From there, it is pumped through an underground network of pipes to Pemberville's homes and businesses.

Where does the ground water come from?
All ground water originally comes from rain or melted snow that has seeped into the ground. Water fills spaces between sand and gravel, as well as fractures in rocks. Where underground water is abundant enough to provide an adequate source of drinking water, the water-rich sediments or rocks are called an aquifer. Pemberville's drinking water supply comes from a carbonate bedrock aquifer.

Ground water does not stay in one place. In northwest Ohio the regional ground water flow direction is primarily towards Lake Erie. This means that if pollutants are spilled on the ground anywhere near the wells, or south or west of the wells, they may eventually enter the ground water that you are drinking. And although the water treatment plant removes bacteria, it would be very expensive to purchase treatment systems for every type of possible pollutant. This is why everyone in the Village of Pemberville should know about **Drinking Water Source Protection**.

What is Drinking Water Source Protection?
Drinking Water Source Protection is a plan of action for protecting the water you drink from contamination at the source.

Village of Pemberville,
PWSID# 8701712
Wood County



To assist the Village of Pemberville with our drinking water source protection efforts, Ohio EPA provided the village with a Drinking Water Source Assessment report. This report included a map of the protection area (see above), based on calculations of how far water travels through the aquifer in five years. The report also includes information on land uses and facilities that may pose a contamination risk to the drinking water source. Potential risks are based on proximity to the drinking water source and the kinds/quantities of chemicals that are typically handled by these types of facilities.

The Village of Pemberville has used the provided assessment to develop a drinking water source protection plan. If you would like to be more involved with the village's drinking water protection efforts or if you would like to see a copy of the city's drinking water source protection plan, please contact the Village of Pemberville's Water Department at (419) 287-3832.

Most importantly, if you live or work within the Village of Pemberville's drinking water protection area please pay attention to the "Did You Know…" portion of this brochure

Appendix D

Well History and Present Production

WELL HISTORY and PRESENT PRODUCTION

North Plant EP002

Well #1
Drilled 1934 10" casing
new pump 1934 7 1/2 hp @200'
new pump 1971
new pump 1975 7 1/2 hp @ 210' & 10 joints 2" pipe
new pump 1984 7 1/2 hp new 3" check valve
Cleaned pump 1994 70' new pipe
new pump 1995 7 1/2 hp & New Vault all new pipe
new pump 1999 7 1/2 hp @215'
5/10
Started @ 65 gpm
After 10 minutes 37 gpm
per plant effluent meter
9/22/10 AFTER 4HR = 100 GAL. = 2'19" = 43 GPM

Well #2
Drilled 1926? 10" casing to 140'
Drilled 1959 10" casing to 227
new pump 1934 7 1/2 hp @ 200'
new pump 1970 7 1/2 hp
new pump 1971 7 1/2 hp
new pump 1976 7 1/2 hp
new pump motor 1977 7 1/2 hp
new pump 1984 7 1/2 hp
5/10
Started @ 30 gpm
After 10 minutes 42 gpm
per plant effluent meter
9/22/10 AFTER 4HR = 100 GAL. = 2'08" = 47 GPM

Well #3
Drilled 1935? 10" casing
Drilled 1970 10" casing to 200'
new pump 1970 7 1/2 hp
new pump 1971 7 1/2 hp
new pump 1983 7 1/2 hp @ 200'
Dec 1998 Well house burned down
new pump 1998 7 1/2 hp New Vault

5/10
Started @ 53 gpm
After 10 minutes 38 gpm
per plant effluent meter
9/22/10 AFTER 4HR = 100 GAL. = 3'01" = 33 GPM

Well #6 about 60gpm
Drilled 1934? 10" casing 140'
Drilled 1964 10" casing to 200'
new pump 1964 7 1/2 hp @ 200'
new pump May 1972 7 1/2 hp
new pump Nov 1972 7 1/2 hp
new pump July 1973 7 1/2 hp
new pump 1978 7 1/2 hp
new pump 1984 7 1/2 hp @ 200'

5/10
Started @ 86 - 75 gpm meter jumps
After 10 minutes 43 -30 gpm meter jumps
per plant effluent meter

Well #7 1963 about 110gmp for 6hrs did not slow down
Drilled 1945? 10" casing 148'
Drilled 1967 10" casing to 200' new pump 10 hp @ 200'
new pump 1970 10 hp @200'
new pump 1972 10 hp @200'
new pump 1973 10 hp @200'
new pump 1979 7 1/2 hp @200'
new pump 1982 7 1/2 hp
new pump 1992 10 hp New Vault @ 225'
new pump 2000 10 hp
new pump 2003 10 hp
5/10
Started @ 106 - 76 gpm meter jumps
After 10 minutes 53 -43 gpm meter jumps
per plant influent meter
9/30/10 AFTER 10MIN = 100 GAL. = 1'31" = 66 GPM

South Plant EP001

Well #8
Drilled 1940? 10" casing 143'
Drilled 1965 10" casing to 200'
new pump 1965 10 hp @ 210'
new pump 1971 7 1/2 hp @ 210'
new pump 1980 7 1/2 hp @ 220' New Vault
new pump 2004 7 1/2 hp
Pulled 67 ft of 8" casing full of holes June 2010
installed 67 ft of 6" casing June 2010

5/10
Started @ 65 - 55 gpm meter jumps
After 10 minutes 34 - 25 gpm meter jumps
per plant influent meter
Failing T.C. in fall 2007
Failing T.C. & E coli springs 2010
OEPA said that the 8" casing was to be pulled
& 6" casing installed & rock cemented in
8" casing was full of large holes
OEPA said that the well was to be treated as
a new well with all of the test for a new well

5/10 New 4" 80GPM pump with 7 1/2 HP motor

9/30/10 AFTER 10MIN = 100 GAL. = 1'55" = 62 GPM

Well #9
Drilled 1952 6 5/8" casing 262'
new pump 1958
new pump 1966 7 1/2 hp
new pump 1973
new pump 1978
well cleaned & acidized 1976
new pump 1987 7 1/2hp @ 252' New Vault
1985 static water level 30'

5/10
Started @ 84 - 25 gpm meter jumps
After 5 minutes 0 gpm
per plant influent meter

6/10 New 4" 80GPM pump with 7 1/2 HP motor

9/30/10 AFTER 10MIN = 100 GAL. = 1'56" = 62 GPM

Well #10 170gpm
Drilled 1980 8" casing 260' tested But no pump
new pump 1987 20 hp @ 200'
1989 well finished static water level 17'
1990 flow rate decreased from 170gpm to 100 gpm
with 8" Valve only open about 1 - 10 1/2 turns
2000 8" Valve opened all the way
and new pump 2003 7 1/2 hp

5/10
Started @ 94 - 25 gpm meter jumps
After 10 minutes 25 - 0 gpm meter jumps
per plant influent meter
Failing T.C. in springs

North Plant all wells running
6/10 Started = effluent meter = @ 175 gpm
After 10 minutes 115 gpm
per plant effluent meter

9/22/10 AFTER 4HR = influent meter = 115 - 118 GPM
9/22/10 AFTER 4HR = effluent meter = 103 - 107 GPM

There for @ Start 175 gpm x 1440 = .252 mgd
There for after 4 hrs 105 gpm x 1440 = .1512 mgd

NOW
South Plant all wells running
6/10 Started = influent meter = @ 292 - 273 gpm meter jumps
After 2 minutes 272 - 285 gpm
After 5 minutes 245 - 240 gpm
After 10 minutes 236 - 230 gpm
After 15 minutes 225 - 223 gpm
After 40 minutes 212 - 210 gpm
After 60 minutes 210 - 209 gpm
After 65 minutes Plant shut off Tower had been filled from 12.9' to 14.5'
per plant influent meter
9/30/10 startup = influent meter = 276 GPM
9/30/10 AFTER 1HR = influent meter = 208 - 210 GPM
There for @ Start 282.5 gpm x 1440 = .4065 mgd
There for after 1 hr 209 gpm x 1440 = .30095 mgd

When the new telemetry was installed and before control was turned over to the new telemetry, the pumps were being turned on and off by the Mercury switches @ 9.3' & 11.4'.
When control was turned over to the new telemetry I started with turning the Lead Plant ON @ 9.8' & the Lead Plant OFF @ 12.8'.
I found out that the Tower over flowed @ 15.5' per the new telemetry.
I have worked the elevations for the Lead Plant on & off up to ON @ 12.0' & OFF @ 14.5' over the last 1 1/2 years with the Lag Plant ON @ 11.5' & OFF @ 14.0'.
HIGH TOWER ALARM is set @ 15.0' and LOW TOWER ALARM is set @ 11.8'.