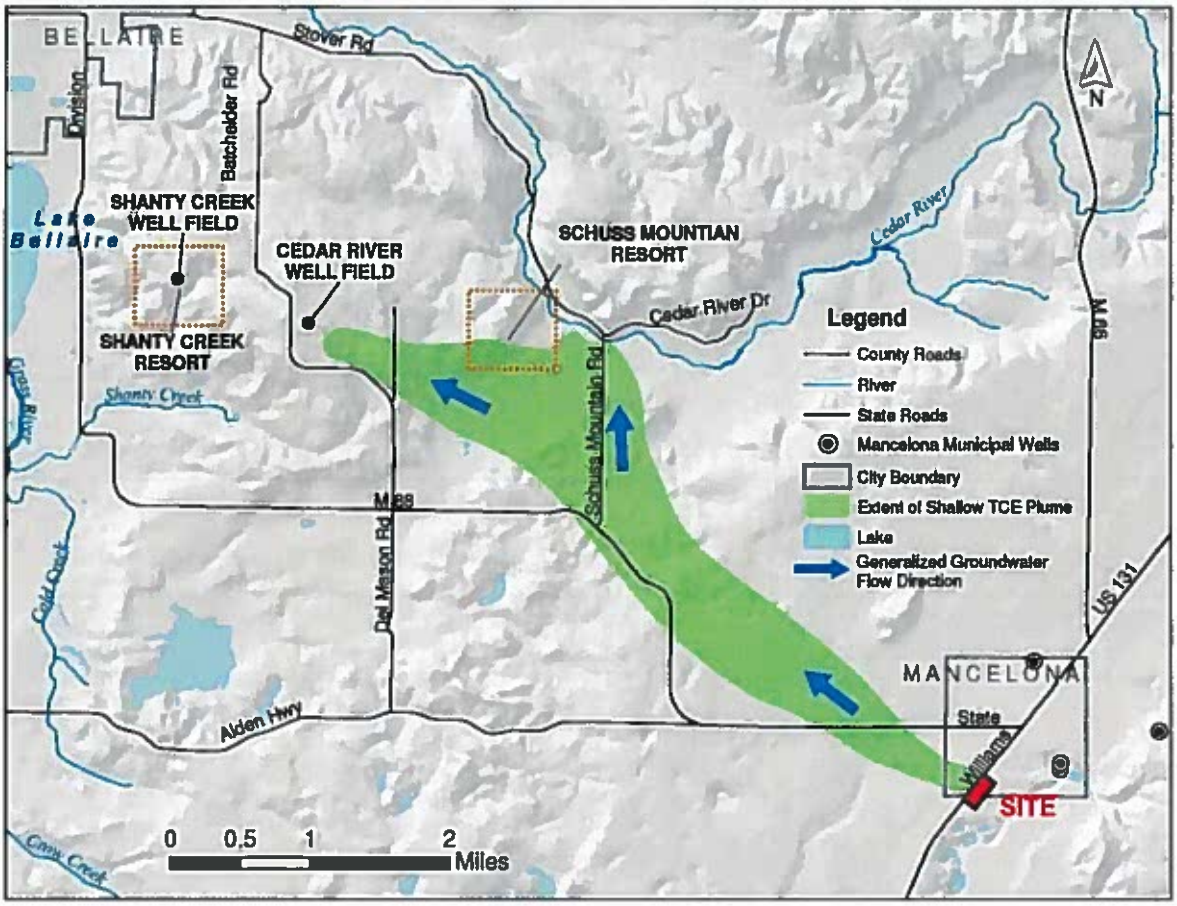
## WICKES MANUFACTURING TRICHLOROETHYLENE (TCE) PLUME

# TABLE OF CONTENTS







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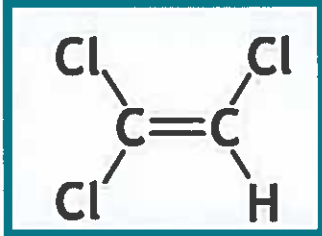
*Last revised May 16, 2016*

## WICKES MANUFACTURING TRICHLOROETHYLENE (TCE) PLUME

# FACT SHEET 1 - TRICHLOROETHYLENE

## WHAT IS TCE?

TCE is a manmade substance that was first produced in the U.S. in about 1925. TCE was once used as an anesthetic for surgery and was used as a dry cleaning solvent until the 1950s. TCE was widely used as a metal parts degreaser and as an industrial cleaner.




TCE is composed of carbon (C), chloride (Cl) and hydrogen (H). It is a colorless liquid that evaporates quickly in the air and dissolves in groundwater. TCE quickly dissipates to the air when it reaches surface water such as a stream, wetland or lake.

If there is a release of TCE into the air, soil, or groundwater, the rate it dissipates varies. When TCE is released into the air, it breaks down quickly. When TCE is released into soil or groundwater, it breaks down slowly. Once in groundwater, TCE may remain for a long time since it cannot evaporate. TCE does not build up or bio-accumulate significantly in plants or animals.

## WHAT ARE THE HUMAN HEALTH RISKS OF TCE?

TCE is a known human cancer-causing agent. Long term exposure can adversely affect liver, kidney, immune system and/or central nervous system function. Effects of TCE can result from low-level exposure over long periods of time (many years) or over short time frames at high concentrations.

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## HOW DOES EXPOSURE OCCUR?

Exposure to TCE occurs when:

- TCE contaminates drinking water supplies,
- TCE vents to surface water, and/or
- TCE vapors enter buildings.

These exposure routes are called pathways. When looking at exposure to humans and/or the environment, all pathways are investigated to determine which pathways are complete. A complete pathway means TCE has contaminated the water and/or air and there is the potential for exposure to the TCE. A pathway is not complete if there is a physical or other barrier that prevents exposure.

## WHAT LEVELS OF TCE ARE SAFE?

Toxicology studies have established levels of TCE that are protective to humans and the environment. These studies are based on levels measured in parts per billion (ppb). For instance, 1 ppb is equal to 1 gallon of TCE dissolved in 1 billion gallons of water. Based on these scientific studies, the following maximum safe, allowable levels have been established:

- TCE in drinking water is safe below 5 ppb.
- TCE in groundwater below 200 ppb can safely flow into or vent to surface water, such as rivers, lakes or wetlands.
- TCE dissolved in groundwater at levels below 2,200 ppb is safe for indoor air (when ground water is more than 10 feet below the building).

**The primary pathway of unacceptable exposure risk from the TCE release at the former Wickes Manufacturing Plant is drinking water. There are no known exposure risks related to TCE at the resorts in the area (e.g., snow making, irrigation water, drinking water, etc.) at this time.**

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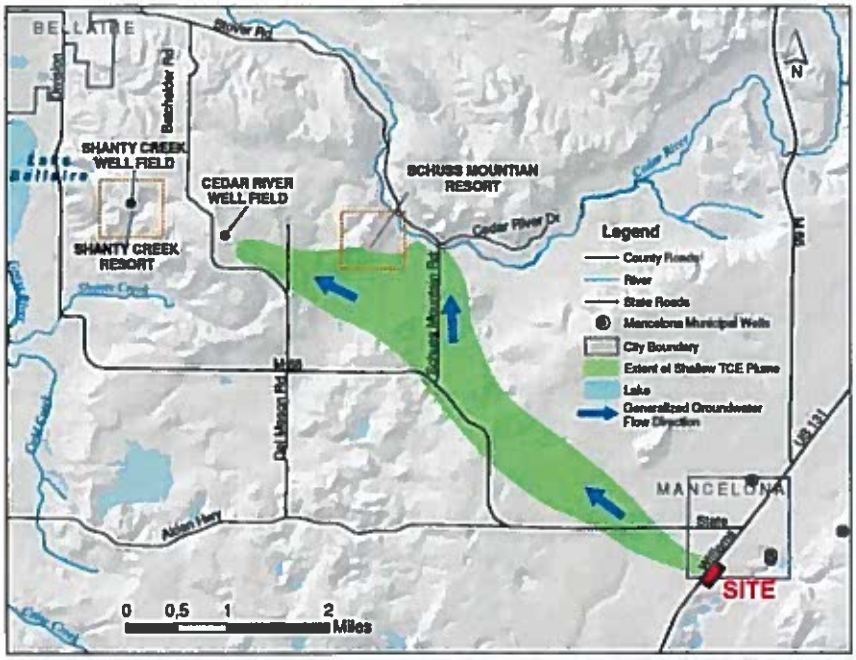
*Last revised May 16, 2016*

## WICKES MANUFACTURING TRICHLOROETHYLENE (TCE) PLUME

# FACT SHEET 2 – TCE IN GROUNDWATER IN ANTRIM COUNTY

## HISTORY

Mount Clemens Industries, Inc., later known as Wickes Manufacturing, used TCE in vapor degreasers as part of the manufacturing of auto parts in Mancelona from 1947 to 1967. Waste containing TCE was discarded on the ground and in lagoons, where it seeped through the soil and became dissolved into the groundwater. Both companies went out of business many years ago. As a result, DEQ funds have been allocated to address the TCE in groundwater.




## EARLY RESPONSE

In order to prevent exposure to TCE residential wells in the Mancelona area, the DEQ worked with the community to found and fund the Mancelona Area Water and Sewer Authority (MAWSA). MAWSA operates the public water system that now provides safe drinking water to residences affected by TCE.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## WHAT WE KNOW

There is very little TCE left in the soil and groundwater at the former Wickes Manufacturing Plant.

TCE moves from the former Wickes Manufacturing Plant in Mancelona through two townships, under Schuss Mountain Resort, and is now moving toward Shanty Creek Resort and Lake Bellaire. Some TCE also enters the Cedar River.

TCE in groundwater extends approximately 6 miles and is up to 1.5 miles wide. TCE has been detected in groundwater in some locations as deep as 500 feet below the ground. The exact depth of TCE in groundwater at any given location depends on the local ground topography (hills and valleys).

TCE in groundwater has affected 500 shallow residential drinking water wells and some former shallow community drinking water supply wells that served Schuss Mountain Resort.

The drinking water wells used by MAWSA today are regularly tested and provide safe drinking water to area residents that is free of TCE.

*Last revised May 16, 2016*

## WICKES MANUFACTURING TRICHLOROETHYLENE (TCE) PLUME

# FACT SHEET 3 - KNOWING THE EXTENT

## GROUNDWATER MONITORING

**There are 121 permanent monitoring wells that have been installed to determine groundwater flow direction and rate, where TCE occurs in groundwater, and how TCE levels in groundwater change over time. Monitoring wells have been installed from the former Wickes Manufacturing Plant in Mancelona to Shanty Creek Resort. Monitoring well data collected over the last 20 years shows that the natural flow of groundwater below the former Wickes Manufacturing Plant is to the northwest; away from the public supply wells located in Mancelona.**

**Monitoring wells assess TCE in groundwater at different depths, focusing on the Shallow, Intermediate, and Deep Zones where TCE is found or may be found in the future.**

## ONGOING RISK EVALUATION

- Each year, during the spring and fall, the DEQ collects groundwater samples from select monitoring wells and sends them for laboratory analysis. Since 2004, 1,035 monitoring well samples have been collected and analyzed. Monitoring well sampling of the groundwater is critical to providing "early warning" of TCE movement in groundwater.
- The DEQ contracts the Health Department of Northwest Michigan to collect water from residential drinking water wells. On average, 45 residential drinking water wells are sampled each year. This residential drinking water well sampling helps us ensure no one is exposed to TCE.
- Each year, during spring or fall, water from the Cedar River and surrounding wetlands is collected and analyzed in a laboratory. This water sampling ensures that TCE levels in groundwater entering the river and wetlands are below levels determined to be safe to the environment.

## HOW HAVE WE INVESTIGATED GROUNDWATER?

The occurrence of TCE in groundwater has been defined by numerous subsurface investigations. In addition to recurring monitoring well and residential well sampling activities that are performed each year, additional investigations performed include:

- Soil samples are used to define soil characteristics, soil layers, and the vertical position of the water bearing zones.
- Groundwater samples collected at relatively close spaced intervals from temporary bore holes have been used to define the occurrence of TCE in Shallow, Intermediate, and Deep Zones. This technique is called vertical aquifer sampling (VAS). Since 2004, a total of 368 VAS groundwater samples have been collected to investigate the extent of TCE in groundwater.
- Geophysical investigations assess soil layering "indirectly". Seismic surveys, which measure the soil response to ground vibration, have helped to establish the thickness and continuity of soil layers. Nearly 40,000 linear feet of seismic surveying has been completed.
- Pumping tests, which monitor the effect of pumping at existing supply wells like the Cedar River Well Field on surrounding monitoring wells, are used to determine how or if water moves vertically between the Shallow, Intermediate, and Deep Zones. Test results have been used in 3-D models to identify ways to minimize risk of exposure to TCE in groundwater.


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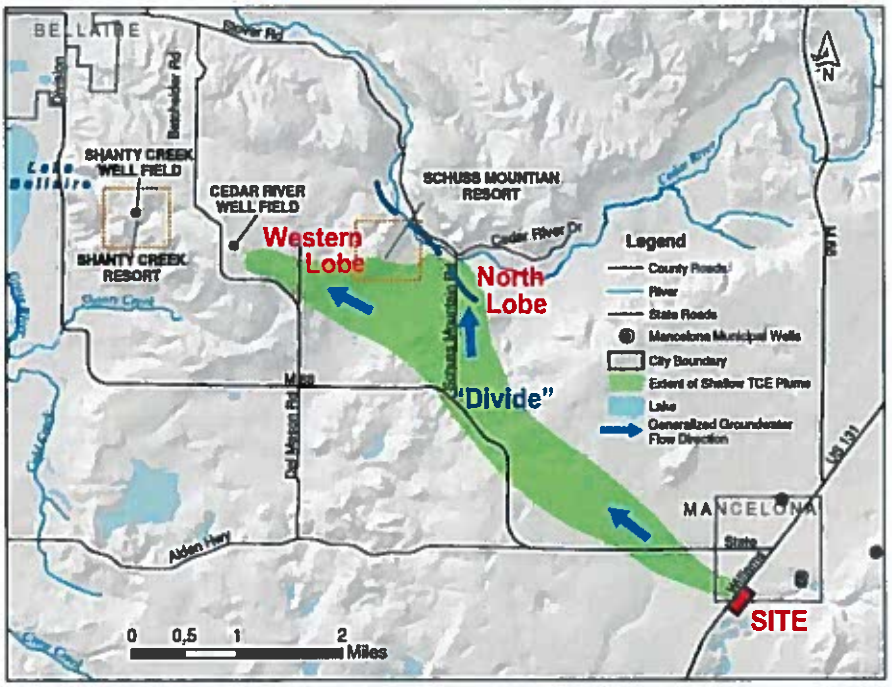
## WICKES MANUFACTURING TRICHLOROETHYLENE (TCE) PLUME

# FACT SHEET 4 - HOW DOES TCE MOVE IN GROUNDWATER?

## TCE MOVEMENT

TCE is dissolved in groundwater at the former Wickes Manufacturing Plant. Because it is dissolved, it moves or flows with groundwater. Groundwater flows "downhill" from areas of high groundwater (Mancelona) to areas of low groundwater to the west-northwest (towards the Cedar River and Lake Bellaire).




## HOW DOES TCE MOVEMENT AFFECT TCE LEVELS?

Groundwater conditions sometimes promote TCE to break down into less harmful chemicals; thus, under certain conditions, the amount of TCE in groundwater tends to decrease over time.

TCE breakdown does not occur significantly in the groundwater under Antrim County. The levels of TCE in groundwater decrease only as the TCE moves and spreads out over time, or when TCE gets temporarily stuck or adsorbed onto silt or clay in the soil.

## WHERE IS THE TCE GOING?

Much like hills that separate one river from another, groundwater that flows over a broad area in soil sometimes separates at a groundwater divide; beyond this point, some groundwater flows to one low spot or another.

Western Lobe is a term used to describe the TCE in groundwater moving below Schuss Mountain Resort toward Shanty Creek and Lake Bellaire. TCE moving in this direction is not likely to reach Lake Bellaire for many years and is not expected to flow beyond Lake Bellaire.

North Lobe is a term used to describe TCE in groundwater that flows into or vents to the Cedar River. TCE has been detected in the Cedar River, but it quickly evaporates from the river. It has not been detected in the river downstream of the venting area, nor has it been detected in groundwater north of the river.

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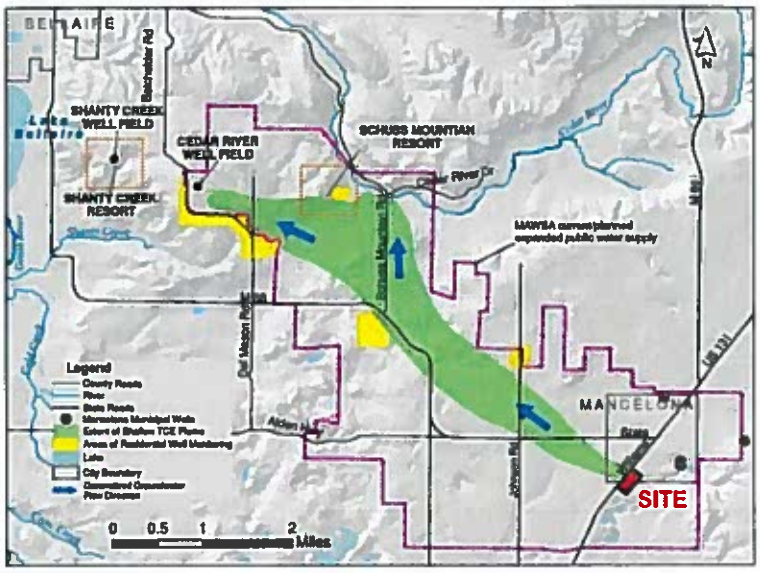
## WICKES MANUFACTURING TRICHLOROETHYLENE (TCE) PLUME

# FACT SHEET 5 - WHAT IS BEING DONE?

## CURRENT ACTIONS

The DEQ monitors TCE levels in groundwater to understand where and when potential exposures might occur. At-risk residential wells are sampled regularly by the Health Department of Northwest Michigan (HDNM). If TCE is detected in a residential well, that well is abandoned and the home is hooked up to the public water supply. The HDNM implements the Well First Policy to ensure new wells are not exposed to TCE (See Fact Sheet 8, Well First Policy).




## DID YOU KNOW?

The DEQ invested approximately $10 million in the community to fund the Mancelona Water and Sewer Authority (MAWSA).

The DEQ has also invested nearly $11 million and has reserved another $2 million to:

- Extend water mains to new areas,
- Hook up homes to new/existing water mains if TCE is detected in the residential well,
- Provide funding to the HDNM to sample residential wells near the edges of TCE impacted groundwater,
- Provide bottled water to residents until they are hooked up to the public water system when TCE is identified in their well water at any detectable level (even if less than 5 parts per billion),
- Expand the current monitoring well network and collect groundwater samples twice a year to monitor the location of TCE in groundwater,
- Monitor the effect of pumping on the groundwater system to identify engineering alternatives,
- Sample groundwater and surface water at the Cedar River where TCE in groundwater vents to it,
- Annually update the website and technical reports

## CLEANUP OPTIONS

Options for cleaning up the estimated 13 trillion gallons of groundwater contaminated with TCE were studied in 2008 (DEQ), in 2014 (University of Detroit Mercy), and in 2015 (Michigan Technological University.) Options included pumping and treating the groundwater, injecting or recirculating chemicals, or adding biologic treatments to the groundwater that would destroy TCE, or extend public water.

The cost for active remediation ranged from $22 million to $99 million, with none of the technologies guaranteeing complete cleanup of the TCE and all required 20+ years of operation and maintenance costs.

**All studies to date show the safest, most viable and cost effective means to assure no unacceptable exposure to TCE is to provide public water.**

The DEQ remains committed to considering new and emerging technologies.

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## WICKES MANUFACTURING TRICHLOROETHYLENE (TCE) PLUME

# FACT SHEET 6 - WHAT'S NEXT?

## ONGOING ACTIVITIES

The DEQ continues to work with the Mancelona Area Water and Sewer Authority, its consultant, and area stakeholders. Recent steps include:

- Collaborative efforts to fund additional storage at the Cedar River Well Field (CRWF) will allow use of these existing wells, piping, and pumps to continue.
- Connecting a high pressure water main from the Mancelona supply wells to the CRWF.
- Expanding public water supply lines to Alpenhaus Lane and along Shanty Creek Road to Deskin Road.
- Ongoing DEQ funded monitoring of existing residential wells by the Health Department of Northwest Michigan (HDNM).
- Ongoing DEQ monitoring to track the movement of TCE in groundwater.
- Installing new monitoring wells to ensure that an adequate "early warning" detection system is in place as the TCE in groundwater moves. New monitoring wells for this purpose were added in 2015.
- The HDNM implements the Well First Policy to ensure new wells are not installed where TCE is present (See Fact Sheet 8, the Well First Policy.)


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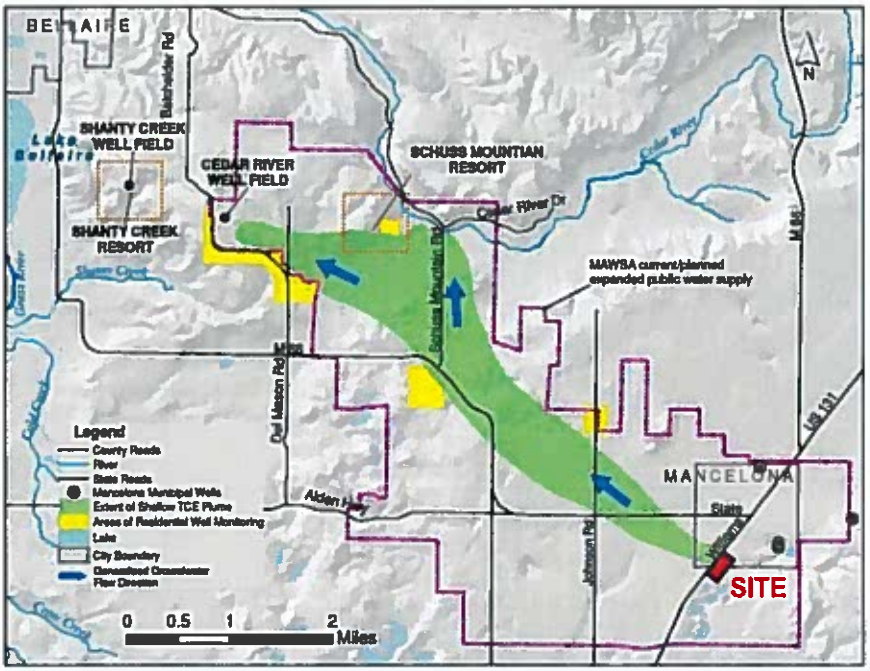


## WHAT WELLS ARE AT RISK?

TCE in the groundwater is moving toward the location of the CRWF, the Shanty Creek Well Field, and residential wells along Shanty Creek and Deskin Road.

- CRWF wells withdraw public supply water from <u>below</u> the Shallow and Intermediate Zones of groundwater containing TCE. Silts and clays, which help to limit vertical movement of groundwater, are present near these wells and may keep the TCE in the Shallow and Intermediate Zones from entering the public supply.
- Shanty Creek Well Field wells supply community drinking water to the resort. Monitoring and testing is ongoing. Some of the Shanty Creek well screens withdraw water from the same depth interval where TCE is found in the Shallow Zone. It is estimated these wells may detect TCE in groundwater in the future (approximately 2030). The silt and clays are absent here. Groundwater may move faster in this area without the silt and clays to slow TCE movement.
- Residential Wells typically draw water from similar depths where Shallow Zone TCE is known to occur in groundwater. They are vulnerable to impact as TCE moves in groundwater toward them. Wells west of Shanty Creek Road at Deskin Road will continue to be monitored into the future.

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*Last revised May 16, 2016*

## FORMER WICKES MANUFACTURING TRICHLOROETHYLENE (TCE) PLUME

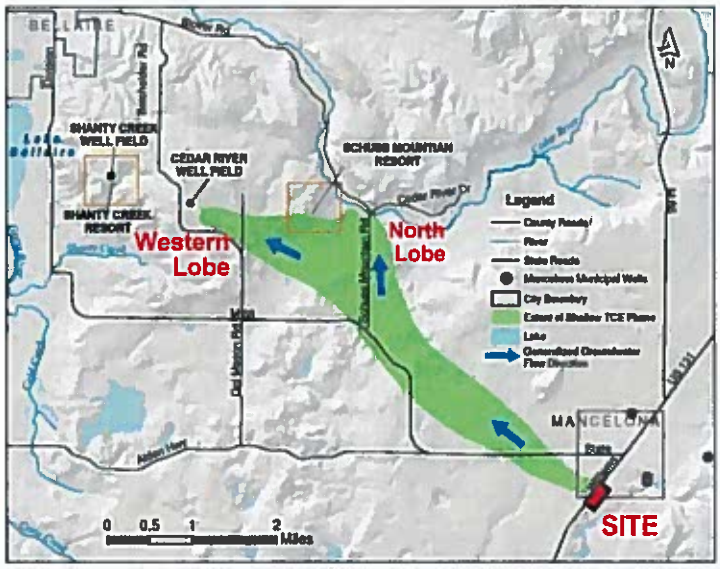
# FACT SHEET 7 - HOW FAST IS TCE MOVING TO THE WEST?

## TCE IN THE WESTERN LOBE

TCE extends vertically within the groundwater and is found in three different zones; the Shallow, Intermediate, and Deep Zones.

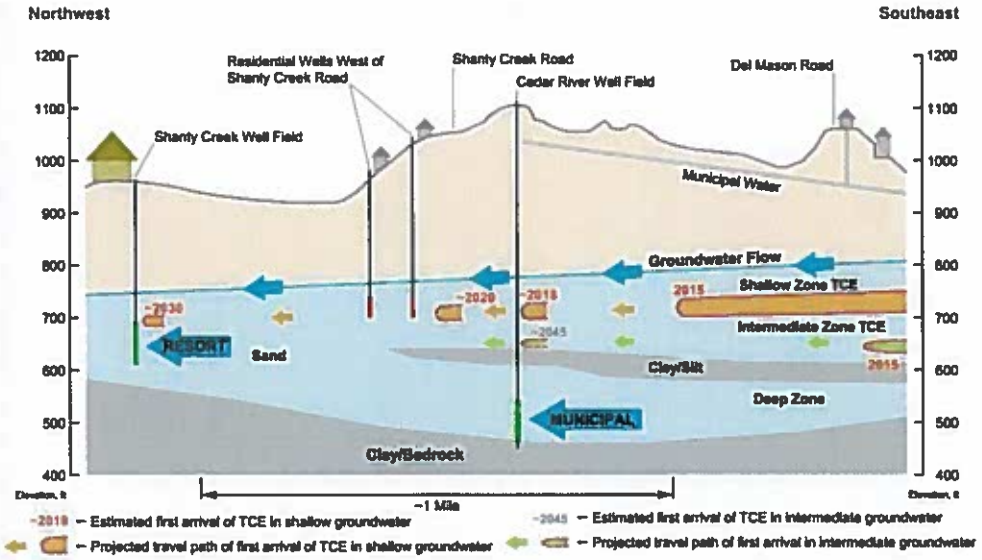
Groundwater moves to the northwest in all three zones. TCE will continue to move with groundwater in the Shallow and Intermediate Zones toward the Cedar River Well Field, the Shanty Creek Well Field, and Lake Bellaire.

TCE levels in the Deep Zone have been declining and do not appear to be concentrated enough to move with groundwater at measureable levels.




**The DEQ is working with the community on two water system infrastructure projects, and expansion of the public water system to ensure safe drinking water is available as TCE moves to the northwest.**

## RATE OF MOVEMENT




Groundwater (and thus, TCE) moves at different rates at different depths:

- **Shallow Zone:** TCE moves at a rate of 320 to 400 feet per year.
- **Intermediate Zone:** TCE moves at a rate of approximately 100 feet per year.
- **Deep Zone:** TCE has not been found to spread from one well to another in the Deep Zone. Based on groundwater flow rates, TCE likely moves at a rate of less than 50 feet per year.

The assumptions we use to determine TCE groundwater flow rates and timelines are based upon the extensive investigations and long term monitoring that have been performed to date. Based on this data, it has been determined that the TCE and groundwater move at different rates in each of these zones.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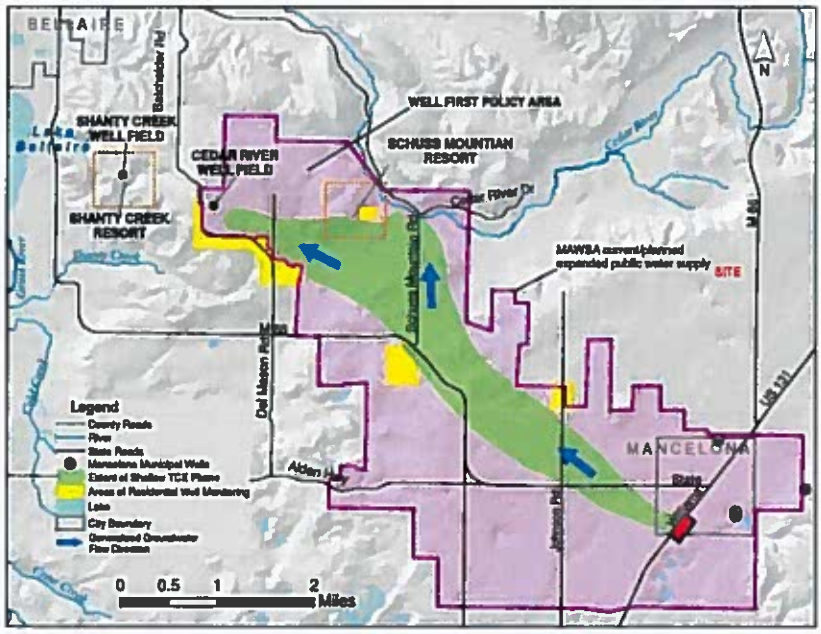
## WICKES MANUFACTURING TRICHLOROETHYLENE (TCE) PLUME

# FACT SHEET 8 - WHAT IS THE WELL FIRST POLICY?




## HOW WELL FIRST POLICY WORKS

The Well First Policy prevents new well installations where public water is available. Connection to public water is required when it becomes available. Where public water is not available, the policy outlines well construction and sampling requirements, including:

- Targeted Well Depth – working with the DEQ and well drillers to target screen depths accounting for regional and site-specific geology and using the most current information available regarding known groundwater quality.
- Drilling Technique – mud rotary drilling methods must be used and the well must be grouted (or sealed) along the entire length of the well casing. The well is developed by pumping and surging (prohibiting well development by air).
- Water Quality Sampling – groundwater is collected and analyzed at a laboratory for volatile organic compounds (which includes TCE) before use.
- Final Inspection – HDNM final inspection prior to use.
- Connection to Public Water – property must connect if public water becomes available.
- Well Abandonment – all existing approved or unapproved wells must be properly abandoned once connected to public water.

## WELL FIRST POLICY

The Health Department of Northwest Michigan (HDNM) implemented the Well First Policy in 2005 to assure that any water supply well installed outside the public water system service area was safe for use.

This policy is designed to be an institutional control to prevent exposure to TCE in groundwater.

The area affected by the Well First Policy is regularly reviewed and modified as TCE in groundwater moves and information about the location and nature of the TCE in groundwater is updated.

The DEQ and HDNM work together to monitor existing residential wells and share information with the community to allow the Well First Policy area to be expanded based on TCE in groundwater data.

The latest expansion of the Well First Policy was approved by the HDNM in 2012.

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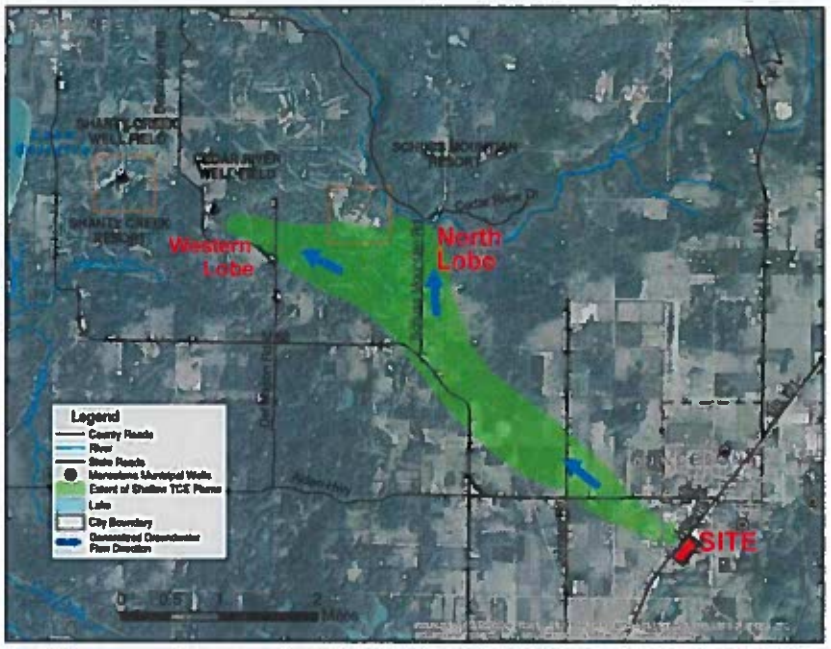
## WICKES MANUFACTURING TRICHLOROETHYLENE (TCE) PLUME

# FACT SHEET 9 - TCE AND THE CEDAR RIVER

## TCE IN SURFACE WATER

Water Quality Standards have established levels of TCE that are considered protective to surface water and the organisms that live in them. Based upon these scientific studies, the following levels have been established for TCE:

- The maximum allowable level of TCE in groundwater that can safely enter surface water, such as rivers or wetlands, is 200 parts per billion (ppb).
- The maximum allowable level of TCE in surface water, like the Cedar River and nearby springs in its floodplain, for aquatic life is 1,800 ppb and for human health is 370 ppb, when not used as a drinking water source.




## WHAT HAPPENS TO TCE?

Two things happen as TCE in groundwater moves toward and enters the river:

- Some TCE begins to break down in groundwater near the river. This decreases TCE levels entering the river.
- Once in the river, TCE readily evaporates into the air. There is no evidence that TCE remains in the waters of the Cedar River for a significant time.

Studies of aquatic life in the Cedar River from 1991 and 2013, where TCE vents to it, have scored the aquatic health of the river as "good" to "excellent." No adverse effects related to TCE have been detected to date.

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## DOES TCE ENTER THE RIVER?

The North Lobe of TCE in groundwater flows into or vents to the Cedar River. Here's how we know this:

- Groundwater measurements show that it enters the river from both the north and south sides of the river.
- Measured gradients show that vertical flow is upward directed near the river.
- The Cedar River and groundwater entering it are sampled every year to monitor TCE levels. TCE has been detected in the Cedar River on the south side, where TCE is present in the groundwater.
- The volume of water in the Cedar River increases as it passes the location where TCE occurs in groundwater. This indicates that groundwater flows into the river.
- The levels of TCE in groundwater near the Cedar River shoreline are typically below 100 ppb (below the 200 ppb maximum allowable level of TCE).
- TCE levels in the Cedar River have not been detected above 30 ppb (well below the maximum allowable levels for aquatic life and human health). The only detections of TCE in surface water have been where groundwater vents to surface water. TCE has not been detected downstream of this area because TCE evaporates readily once it enters the river.

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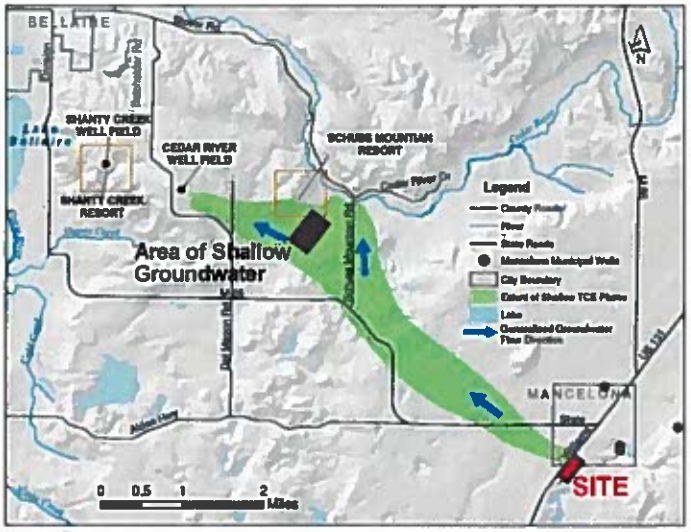
## WICKES MANUFACTURING TRICHLOROETHYLENE (TCE) PLUME

# FACT SHEET 10 - TCE IN INDOOR AIR

## WHAT IS VOLATILIZATION?

TCE is a volatile organic compound, meaning that it readily changes from a liquid to a vapor. This property causes TCE to move from surface water bodies, like the Cedar River, to the air. This same property works underground; TCE dissolved in groundwater can become a vapor and move into the air space in the soil above the water table.




## WHEN IS THIS A CONCERN?

Long term inhalation of TCE is a human health concern. TCE dissolved in groundwater at levels above 2,200 parts per billion (ppb) may adversely affect indoor air (when groundwater is more than 10 feet below the building). We have not found TCE in the groundwater at these levels in any of our monitoring.

Alternative screening levels for TCE have been developed when groundwater occurs at less than 10 feet below a building foundation. The screening level for TCE in shallow groundwater is 41 ppb and is as low as 5 ppb when a sump or other feature may be present in the home.

If TCE exceeds the groundwater screening levels, it does not necessarily mean that TCE is intruding into homes, but it does mean that additional investigations of soil vapor are warranted.

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## IS TCE IN THE GROUNDWATER A CONCERN FOR HOMES?

**The groundwater table is typically 50 feet to as much as 250 feet below the ground surface in Antrim County and the area of TCE in groundwater. The 2,200 ppb screening level applies in most areas and the concentrations of TCE in groundwater are well below 2,200 ppb.**

However, in some valleys, like the base of Schuss Mountain, groundwater occurs at less than 10 feet below buildings, and the lower screening levels apply.

In order for TCE to move into a home, it must move from being dissolved in groundwater to a vapor in soil. This happens where groundwater is in contact with the air space in the soil. This occurs naturally when TCE is dissolved in groundwater at the surface of the water table. When TCE is below the water table surface, as in the case here, the risk is greatly reduced.

**The DEQ monitored for TCE in 2013 and 2015 in the area of shallow groundwater. TCE was not present at the surface of the water table (it was below the shallow groundwater screening level of 41 ppb.) Typically, TCE in the Shallow Zone occurs at depths 40 to 50 feet below the water table surface.**

**DEQ continues to monitor shallow groundwater to assure there is no risk of TCE in homes.**


**Michigan Department of Environmental Quality**
Contact: Janice Adams at 989-705-3434
Email: adamsj1@michigan.gov

**Health Department of Northwest Michigan**
Contact: Scott Kendzierski at 231-547-7651
Email: s.kendzierski@nwhealth.org


For additional information please see the Mancelona Township Library, the Bellaire Public Library, or the Antrim County Building in Bellaire.

*Last revised May 16, 2016*

## WICKES MANUFACTURING TRICHLOROETHYLENE (TCE) PLUME

# FACT SHEET 11 - WHO IS INVOLVED

## ROLES AND RESPONSIBILITIES

The State of Michigan, through the Remediation and Redeveloprnent Division (RRD) of the DEQ, conducts the investigation and management of the TCE in groundwater. The DEQ:

- Collects groundwater and surface water samples for laboratory analysis to monitor for TCE,
- Funds the collection and laboratory analysis of water samples from residential wells by the Health Department of Northwest Michigan (HDNM),
- Publishes and makes available the results of laboratory analyses and other investigative activities,
- Arranges for bottled water if TCE is found in residential wells and public water is not yet available, and
- Funds Mancelona Area Water and Sewer Authority (MAWSA) to extend the public water supply in response to TCE movement.

## WHO DO I CONTACT TO HAVE MY WELL SAMPLED?

Residential well sampling priorities are determined annually based on the location of a residential well to the known extent of and location of the TCE in groundwater. The HDNM should be called to discuss adding your well to this sampling program. The DEQ interactive website can help you understand the proximity of TCE in groundwater to your property and to view the historical extent of TCE in groundwater:

https://ifrastructure.amec.com/wickes/

If your well is not in a priority area where it is deemed to be threatened by TCE impacts, you can contract one of several area laboratories to have your water tested for TCE.

## OTHER RESOURCES

Copies of all technical reports prepared by/for the DEQ are available at the Mancelona Township Library, the Bellaire Public Library, or the Antrim County Building in Bellaire.

## OTHER PARTNERS

**Antrim County United Through Ecology (ACUTE):** A community stakeholders group developed in response to the TCE in groundwater.

**Antrim County, Custer Township, Kearney Township, Mancelona Township and all area residents:** Active support throughout project implementation and participants in public meetings.

**AMEC Engineering & Consulting of Michigan (AMEC):** Environmental contractor working for the DEQ since 2003 on the former Wickes Manufacturing Plant.

**DEQ Drinking Water Laboratory:** Provides drinking water analytical testing.

**DEQ Environmental Laboratory:** Provides soil and groundwater analytical services.

**DEQ Office of Drinking Water and Municipal Assistance:** Provides funding and support for MAWSA infrastructure expansion.

**HDNM:** Conducts residential well sampling, implements the Well First Policy to prevent unintended exposure to TCE contaminated drinking water.

**MAWSA:** Maintains the public supply system in the area. MAWSA operates the Mancelona Supply Wells and the Cedar River Well Field.

**Schuss Mountain and Shanty Creek Resorts, surrounding home owners associations and local real estate agencies:** Active support throughout project implementation and participants in public meetings.

**Michigan Department of Environmental Quality**
Contact: Janice Adams at 989-705-3434
Email: adamsj1@michigan.gov
**Health Department of Northwest Michigan**
Contact: Scott Kendzierski at 231-547-7651
Email: s.kendzierski@nwhealth.org

Department of Environmental Quality

HEALTH DEPARTMENT of Northwest Michigan

*Last revised May 16, 2016*

## WICKES MANUFACTURING TRICHLOROETHYLENE (TCE) PLUME

# FACT SHEET 12 – TCE AND PROPERTY

## TCE IN GROUNDWATER BENEATH MY PROPERTY

The potential for exposure to TCE in groundwater can occur when a drinking water well tests positive for TCE. Drinking water wells that are in the path of TCE have water tested annually by the Health Department of Northwest Michigan (HDNM). If ***ANY*** TCE is detected in a residential well, bottled water is supplied until the residence can be hooked up to the public water supply and the private drinking water well is properly abandoned to prevent exposure to the TCE in groundwater. The cost for hookup to the public water supply as well as the abandonment of private water wells is paid for by the Department of Environmental Quality (DEQ). For areas where the public water supply is not available, the HDNM's Well First Policy outlines well construction and sampling requirements. Refer to Fact Sheet 8, What is the Well First Policy?

## RESALE AND MARKETABILITY

**Property values can be affected when property cannot be used safely. Property in Antrim County where there is TCE in groundwater is safe to use due to the HDNM's Well First Policy (See Fact Sheet 8 – What is the Well First Policy), which assures new wells are not installed in areas with TCE in groundwater and groundwater is safe to drink in areas where public water is not yet available. If groundwater becomes unsafe to use as the TCE in groundwater moves, funding is provided through the DEQ to the Mancelona Area Water and Sewer Authority for extension of the public water supply to provide safe drinking water.**

## LAWS AND DISCLOSURE

**The Sellers Disclosure Act, Act 92 of 1993, requires certain disclosures in connection with transfers of residential property. This requires sellers to disclose the condition of the property at the time of sale, including any environmental issues.**

**The Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, regulates facilities of environmental contamination in Michigan. The TCE in the groundwater in Antrim County is covered under Part 201. Part 201 requires written disclosure of the general nature and extent of contamination when property transfers occur.**

**These laws do not prevent the transfer or use of property. Sellers can provide information to purchasers that safe drinking water is assured by the HDNM and the DEQ.**

## QUESTIONS ABOUT PROPERTY AND TCE

The DEQ and HDNM are committed to working with owners and purchasers during property transfers. Please direct questions to:

**Michigan Department of Environmental Quality**
Contact: Janice Adams at 989-705-3434
Email: adamsj1@michigan.gov

**Health Department of Northwest Michigan**
Contact: Scott Kendzierski at 231-547-7651
Email: s.kendzierski@nwhealth.org

DEQ Department of Environmental Quality

HEALTH DEPARTMENT of Northwest Michigan

For additional information please see the Mancelona Township Library, the Bellaire Public Library, or the Antrim County Building in Bellaire.

*Last revised May 16, 2016*

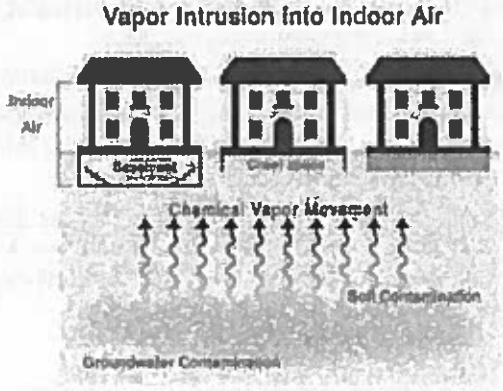
EPA
United States
Environmental Protection
Agency

# What You Should Know About Vapor Intrusion

EPA has developed this fact sheet to answer some of the most commonly asked questions about an important health issue called vapor intrusion. Vapors and gases from contaminated groundwater and soil have the potential to seep into indoor spaces and cause health problems.

## What is vapor intrusion?

When chemicals or petroleum products are spilled on the ground or leak from underground storage tanks, they can give off gases, or vapors that can get inside buildings. Common products that can cause vapor intrusion are gasoline or diesel fuel, dry cleaning solvents and industrial de-greasers. The vapors move through the soil and seep through cracks in basements, foundations, sewer lines and other openings. Vapor intrusion is a concern because vapors can build up to a point where the health of residents or workers in those buildings could be at risk. Some vapors such as those associated with petroleum products have a gasoline odor, others are odor-free.




## Can vapors in my home come from household sources?

Common household products can be a source of indoor air problems. Vapors and gases can come from: paints; paint strippers or thinners; moth balls; new carpeting and furniture; stored fuel; air fresheners; cleaning products; dry cleaned clothing and even cigarette smoke.

## What are the health concerns related to vapor intrusion?

When vapor intrusion does occur, the health risk will vary based on the type of chemicals, the levels of the chemical found, the length of exposure and the health of exposed individuals. Some people may experience eye and respiratory irritation, headaches and/or nausea. These symptoms are temporary and should go away when the vapors are addressed. Low-level chemical exposures over many years may raise the lifetime risk of cancer or chronic disease.

## How is vapor intrusion discovered?

Samples of gas in the soil or groundwater are first collected near a contaminated site. If no contamination is found near a site, then vapor intrusion should not be a problem. If contamination is found, depending on the type, the search may be widened to include samples closer to or on individual properties. The next step is to take vapor samples from the soil under the home's foundation; these are called slab, or sub-slab samples. EPA does not generally recommend indoor air sampling before slab or sub-slab sampling, because indoor air quality varies widely day to day. Also, household products may interfere with sampling results.

## What happens if a problem is found?

The most common solution is to install systems often used to reduce naturally occurring radon that seeps into homes in some geographic areas. These systems, called radon mitigation systems, remove soil vapors from below basements or foundations before they enter homes. Vapors are vented outside of the homes where they become dispersed and harmless. These systems use minimal electricity and do not affect heating and cooling efficiency. They also prevent radon from entering homes – an added health benefit especially in radon prone areas. Once the source of the vapors is eliminated, the systems should no longer be needed.

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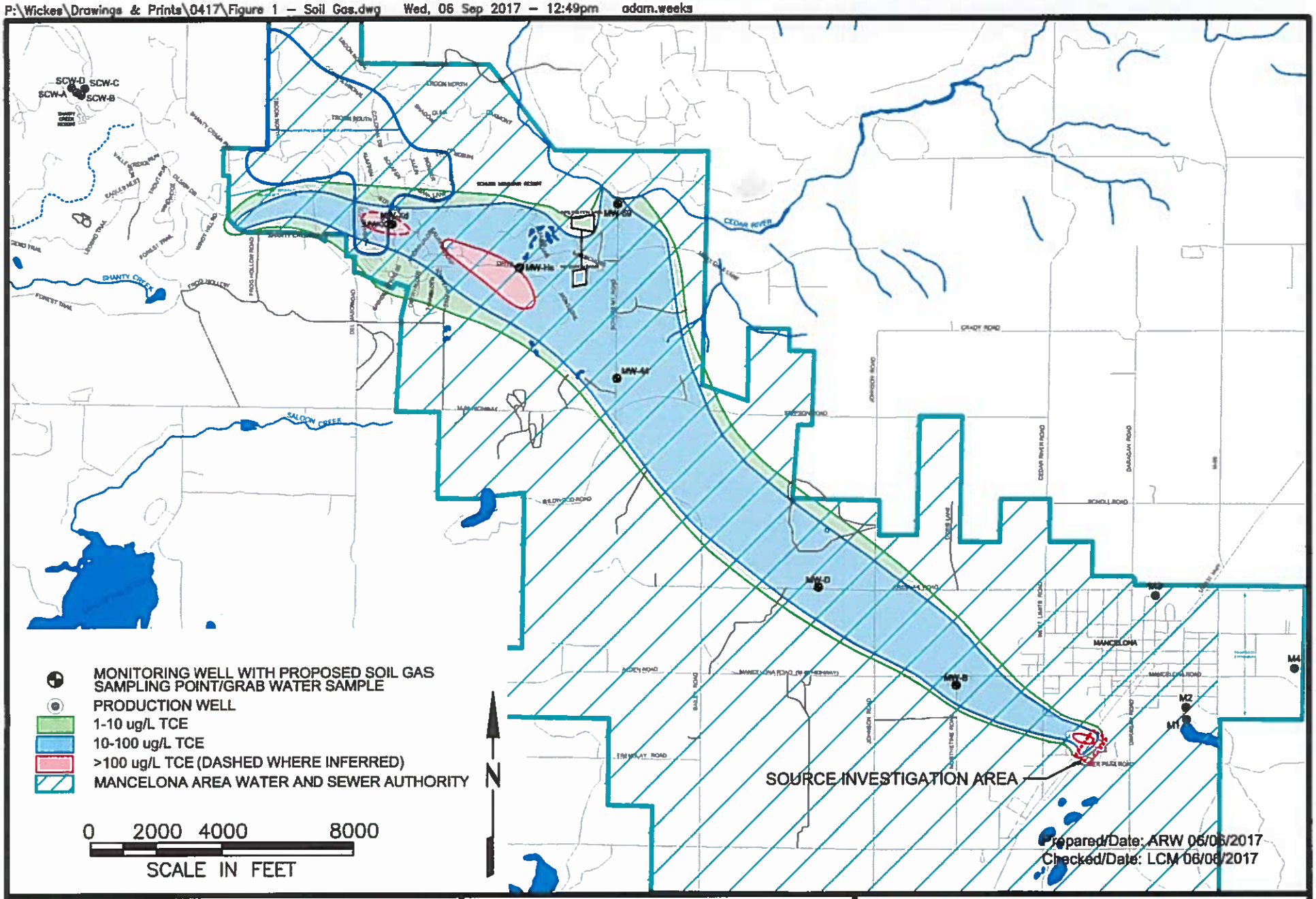


WICKES MANUFACTURING
MANCELONA, MICHIGAN

amec foster wheeler

SOIL GAS SAMPLING LOCATIONS
DOWN GRADIENT PLUME AXIS

FIGURE 3