IS OUR WATER SAFE? A HISTORY OF BROKEN PROMISES AND STEPS TO ADDRESS WATER CONTAMINATION IN PULLMAN, MICHIGAN

Pullman, MI

Abstract

This report presents the findings of Beautify Pullman's community-led environmental investigation into groundwater contamination in Pullman, Michigan. A synthesis of historical state environmental records, results from well tests, and community survey results demonstrate more monitoring and testing are needed to understand the extent of groundwater contamination in Pullman. Testing results indicated elevated levels of containments in Pullman's groundwater; however, regular testing and monitoring have not occurred. The contaminants of concern in Pullman — primarily TCE, PCE, benzene, vinyl chloride, arsenic, and PFAS — are associated with serious health effects at elevated concentrations. Further monitoring and testing will help lay the foundation for developing an effective and appropriate remediation plan. Without further testing, regular monitoring, and development of a remediation plan, Pullman resident and the larger community are at risk of continuing to be exposed to hazardous materials. Failing to address groundwater contamination in Pullman has implications for health, safety, and economic development in the region.

Austin Cummings and Beautify Pullman

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SECTION 1: INTRODUCTION & PROJECT BACKGROUND

1.1 Purpose of This Report

This report presents the findings of Beautify Pullman's community-led environmental investigation into groundwater contamination in Pullman, Michigan. The project was funded through the U.S. EPA Environmental Justice Thriving Communities Grantmaking (EJ TCGM) Program, administered in EPA Region 5 through the Great Lakes Thriving Communities Grantmaking Program. Beautify Pullman was awarded funding under Grant Number TCEJ FR-00474, covering the project period of September 1, 2025 through August 31, 2026 (QAPP — Residential Water Testing, Grant FR-00474, January 2026; QAPP — Monitoring Well Baseline Study, Version 1.3, May 11, 2026).

The EJ TCGM program targets communities that have faced environmental risks without adequate institutional support. This project represents exactly that: a community that experienced documented industrial contamination beginning in 1991, received partial state remediation, and has had no documented state monitoring or follow-up since 2011 — a gap of more than 15 years (Utset, May 2026).

The purpose of this report is to:

- Synthesize historical state environmental records (1991–2011) drawn from the review of 1,147 EGLE/RIDE documents prepared by Xavier Utset (May 2026)
- Present results from 25 private residential well tests conducted by Beautify Pullman through the Great Lakes Community Action Partnership (GLCAP)
- Present results from monitoring well testing conducted June 17–19, 2026, by Michigan Consulting & Environmental (MCE)
- Summarize community survey data (n=56) documenting widespread water distrust
- Document the known and potential health impacts of exposure to the contaminants detected
- Provide clear, actionable recommendations for next steps in remediation and advocacy

This report is intended for a public and policy audience, including Pullman residents, elected officials, and EPA grantors.

1.2 Overview of the Pullman, Michigan Community & the Origin of This Project

Pullman is an unincorporated community in Lee Township, Allegan County, Michigan (ZIP code 49450), located in the southwestern region of the state. The community is centered at the Four Corners intersection of 109th Avenue and 56th Street and includes the Historic Lee Township Cemetery, the Pullman Post Office, Ravenswood Park, and Pullman Town Square (QAPP — Monitoring Well Baseline Study, Version 1.3, May 11, 2026). Scott Creek flows through the Village and drains to the Black River west of the site (MCE QAPP, Version 1.3). Surrounding land use is primarily residential, with some commercial and light industrial properties (MCE QAPP, Version 1.3).

The vast majority of Pullman residents rely on private groundwater wells as their primary drinking water source. A community survey conducted as part of this project found that 89% of respondents obtain their water from a private well, with only a small percentage connected to the Lee Township municipal well system (Beautify Pullman Community Survey, 2026, n=56).

The origin of this project dates to 2022, when Beautify Pullman attempted to drill a well at Pullman Town Square to provide water for the park. After months of engagement with EGLE and the Allegan County Health Department, the well permit was denied. The reason given was possible chemical contamination in Pullman's groundwater — contamination potentially remaining from industrial releases in the 1990s (Beautify Pullman Public Meeting Presentation, August 11, 2026). This experience raised critical questions:

- If new wells cannot be drilled even in areas outside the known contamination area, what does that mean for homeowners and businesses who may need to replace or add a well?
- How could ongoing contamination uncertainty affect economic development and housing in Pullman?
- How extensive is the contamination today, 15 years after state monitoring ended?
- How can the community better understand the condition of its groundwater?

These questions drove Beautify Pullman to pursue EPA EJ TCGM funding and undertake the investigation documented in this report.

1.3 Project Partners & Organizational Roles

This project was made possible through a multi-stakeholder partnership (QAPP — Residential Water Testing, January 2026; MCE QAPP, Version 1.3, May 11, 2026):

Table 1: Project Partners

Organization	Role
Beautify Pullman	Lead organization; 501(c)(3) founded 2020; Award Recipient; Quality Assurance Manager: Patricia Conway
Lionbear Ventures	Project management, grant administration; Project Manager: Joe Curtin
Great Lakes Community Action Partnership (GLCAP)	Private well testing and assessment through RCAP; Personnel: Michael Anderson, Sarah Stawasz, Brenden Rauch, Amy Hatfield
Michigan Consulting & Environmental (MCE)	Qualified environmental consultant; monitoring well QAPP, sampling, and technical memorandum; Project Manager: Bobby Glasser; Technical Lead: Ian Temchin, PMP; QA Manager: Craig Kielty; Field Scientist: Taylor Slyker
Metiri Group (formerly Fibertec Environmental Services)	Primary laboratory analytical services for monitoring well samples; Account Manager: Lori Near
Merit Laboratories, Inc.	Subcontract laboratory for 1,4-dioxane analysis
Trace Analytical Laboratories	EGLE-certified laboratory; VOC analysis for private well testing via EPA Method 524.2
Xavier Utset, Independent Consultant	Review of 1,147 EGLE/RIDE historical records
EGLE Remediation and Redevelopment Division	Regulatory coordination; EGLE point of contact: Ray Spaulding (monitoring well access)

Organization	Role
Allegan County Health Department	Local health authority

Note: Monitoring well sampling was coordinated with EGLE's Remediation and Redevelopment Division, with Ray Spaulding serving as the primary EGLE point of contact for monitoring well access (MCE QAPP, Version 1.3).

1.4 Data Sources & Methodology

This report integrates the following primary data sources:

Table 2: Data Sources

Data Source	Description	Date
EGLE/RIDE Records	1,147 historical state environmental documents reviewed by Xavier Utset	1991–2011; reviewed May 2026
Private Well Testing	25 residential wells tested by GLCAP using Trace Analytical Laboratories (EPA Method 524.2)	2025–2026
Community Survey	56-respondent survey on water use, concerns, and quality perceptions	2026
Monitoring Well Testing	11 monitoring wells tested by MCE; analyzed by Metiri Group and Merit Laboratories	June 17–19, 2026

Monitoring Well Analytical Methods

Groundwater samples collected from the monitoring well network were submitted for laboratory analysis of:

- **Volatile Organic Compounds (VOCs)** — EPA Method 8260D (GC/MS)
- **Michigan Part 201 Metals (Michigan 10 Metals)** — EPA Methods 200.8/220.8
- **1,4-Dioxane** — Low-level method by Merit Laboratories, Inc.
- **PFAS (Per- and Polyfluoroalkyl Substances)** — EPA Method 1633

PFAS were not routinely analyzed during earlier investigations (1991–2011) and are included as a screening parameter to evaluate their potential presence in groundwater and to supplement historical datasets (MCE QAPP, Version 1.3). Metals are included to evaluate the presence of inorganic constituents, including arsenic, which has been identified in groundwater in the vicinity of the site. 1,4-dioxane is included due to its potential association with chlorinated solvent releases (MCE QAPP, Version 1.3).

Monitoring Well Sampling Protocol

Groundwater samples were collected using low-flow purging and sampling techniques consistent with USEPA guidance (USEPA, 2017, EQASOP-GW4, Revision 4) (MCE QAPP, Version 1.3). Wells were purged using a peristaltic pump with dedicated HDPE and silicone tubing. Water quality indicator parameters (WQIPs) — including pH, dissolved oxygen (DO), specific conductance, temperature, oxidation-reduction potential (ORP), and turbidity — were recorded at five-minute intervals until stabilization criteria were met (MCE QAPP, Version 1.3).

PFAS cross-contamination prevention was a specific focus of the sampling protocol. PFAS-compatible containers were used, fluoropolymer-containing materials (e.g., Teflon) were avoided, powderless nitrile gloves were changed between wells, and PFAS containers were filled and sealed first at each well, consistent with NGWA *Practical Guide for PFAS Sampling* (NGWA, 2023) (MCE QAPP, Version 1.3).

Private Well Analytical Method

Private well testing was conducted using the Trace Analytical Laboratories Premium home drinking water test, employing EPA Method 524.2 — a purge-and-trap GC/MS procedure for VOC analysis in drinking water. Samples were preserved with hydrochloric acid (pH < 2) at $4°C$ and analyzed within a 14-day hold time. The method covers over 60 VOC analytes with reporting limits as low as $0.079\ \mu g/L$ (EPA Method 524.2 Analytical Method Information, July 10, 2025). Trace Analytical Laboratories is EGLE-certified to analyze drinking water for regulated and unregulated VOCs (QAPP — Residential Water Testing, January 2026).

Quality Assurance and Sample Collection Protocol

All testing was conducted under a Quality Assurance Project Plan (QAPP) approved by Patricia Conway (Quality Assurance Manager), Camden Ogletree (EPA Project Officer), and Blake Spitz (EPA Quality Assurance Officer) on January 5–7, 2026. Trace Analytical Laboratories is EGLE-certified to analyze drinking water for regulated and unregulated VOCs (QAPP, Step 2). Data quality objectives included precision, accuracy, representativeness, comparability, completeness ($> 90\%$), and sensitivity to ppm levels (QAPP, Step 3).

Sample collection protocol followed RCAP Private Well Program standards: faucet aerators removed, sanitized with 99% isopropyl alcohol, cold water flushed for 5 minutes, samples collected from outside spigot closest to well when possible. VOC samples collected in two glass vials with zero headspace (no air bubbles). Chain-of-custody documentation completed for all samples. One field blank collected per sampling event (QAPP, Step 4).

Section 1.5 Environmental Justice Context

1.5.1 What Is Environmental Justice?

Environmental justice is the principle that all people deserve equal protection from environmental health hazards and equal access to a clean and healthy environment. In practice, decades of research have documented that low-income communities, communities of color, and rural communities are disproportionately exposed to pollution and environmental risk. Moreover, these communities are often the least equipped, financially and politically, to respond.

The U.S. Environmental Protection Agency formally defined environmental justice in 1994 and has since developed a suite of tools to identify where these disparities are greatest. This project was funded through the EPA Environmental Justice Thriving Communities Grantmaking (EJ TCGM) Program specifically because Pullman was recognized as a community facing overlapping environmental and socioeconomic vulnerabilities (QAPP — Residential Water Testing, Grant FR-00474, January 2026).

1.5.2 EPA EJScreen: Pullman as a Designated Environmental Justice Community

EPA's EJScreen is the agency's national environmental justice screening and mapping tool, first released in 2015 and updated annually. EJScreen combines environmental burden indicators — such as proximity to hazardous waste sites, air toxics, and groundwater contamination — with demographic vulnerability indicators (such as low income, people

of color percentage, unemployment, low educational attainment, and low life expectancy) to produce composite Environmental Justice Index scores at the census block group level.

EJScreen's supplemental indexes incorporate five socioeconomic indicators particularly relevant to communities like Pullman: percent low-income, percent limited English-speaking, percent less than high school education, percent unemployed, and low life expectancy. These supplemental indexes are specifically noted by EPA as relevant for grant-making decisions — which is precisely how they were applied in identifying Pullman as a priority community for EJ TCGM funding.

The census block group encompassing Pullman, Michigan was identified as an Environmental Justice community through EPA's EJScreen tool (EPA EJScreen, accessed 2025–2026). This designation reflects the community's elevated scores across multiple environmental and demographic indicators when compared to state and national benchmarks. Users can verify and explore this designation directly at the EPA EJScreen tool.

Michigan's own environmental justice screening tool, MiEJScreen (Version 1.5), maintained by EGLE, provides a parallel state-level analysis combining environmental conditions (exposures, environmental effects) with population characteristics (sensitive populations, socioeconomic factors) at the census tract level. MiEJScreen uses a scoring matrix that averages percentile scores across four categories to produce an overall MiEJScreen score, allowing comparison of Census Tract 310.01 against all other census tracts in Michigan. Census tracts with high scores experience a combination of various stressors and potential increased vulnerability relative to other census tracts statewide.

1.5.3 Community Profile: Census Tract 310.01, Allegan County

Pullman is located principally within Census Tract 310.01 in Allegan County, Michigan. The 2020 Census counted 2,750 residents and 1,229 housing units in that tract. Census Tract 310.01 is classified as a non-urban census tract, reinforcing the rural context in which these vulnerabilities occur.

The following socioeconomic and demographic indicators characterize the community's vulnerability profile, drawn from EPA EJScreen, the CDC/ATSDR Social Vulnerability Index, and American Community Survey data:

Socioeconomic Vulnerability

Income and educational attainment: Lee Township has substantially lower income and educational attainment than Allegan County overall. Lower educational attainment is a key indicator in both EPA EJScreen's supplemental index and the CDC/ATSDR Social

Vulnerability Index (SVI), as it correlates with reduced capacity to navigate complex environmental and regulatory systems, access legal resources, or advocate effectively for remediation (CDC/ATSDR SVI, 2022).

Housing cost burden: Census Tract 310.01 has been identified as having a 27.6% housing cost burden, meaning more than one-quarter of households spend over 30% of their annual income on housing costs. Housing cost burden is a direct indicator in the CDC/ATSDR SVI's socioeconomic theme and reflects households with limited financial reserves to respond to environmental emergencies — such as purchasing bottled water, installing filtration systems, or pursuing legal remedies.

Unemployment: Elevated unemployment relative to county and state averages further constrains the community's capacity to absorb the costs of contamination — both the direct costs of safe water and the indirect costs of health impacts (EPA EJScreen, 2024).

Health Vulnerability

EPA EJScreen incorporates health-vulnerability information, including measures related to asthma, heart disease, cancer, disability, and low life expectancy, to help identify communities that may be less able to withstand additional environmental stressors. These indicators are critical in the context of Pullman because the contaminants detected in the community's groundwater are associated with precisely the kinds of chronic health conditions that EJScreen uses as vulnerability markers: cancer, cardiovascular disease, and immune dysfunction.

The CDC/ATSDR Social Vulnerability Index (SVI), which uses 16 U.S. Census variables grouped into four themes (socioeconomic status, household characteristics, racial and ethnic minority status, and housing type and transportation) provides a complementary measure of community vulnerability to hazards and environmental stressors. The SVI is specifically designed to identify communities that may need support before, during, or after disasters, including chemical spills and contamination events. Communities with high SVI scores are those that may have the greatest difficulty recovering from environmental emergencies without external assistance.

Rural Isolation

The rural character of Pullman compounds all other vulnerabilities. Rural communities face specific challenges in environmental justice contexts that are not always captured by tools calibrated primarily to urban settings:

- Reliance on private wells: With no required monitoring or testing under Michigan law, contamination can go undetected for years or decades without active community or government intervention

- Distance from regulatory agencies, legal services, and environmental advocates limits access to the resources needed to identify and respond to contamination
- Limited local government capacity: Lee Township is a small rural township without the staff or budget of larger municipalities to monitor environmental conditions or advocate for state action
- Economic dependence on land and water: For residents who garden, farm, or rely on their property for their livelihood, groundwater contamination has direct economic as well as health consequences

1.5.4 Cumulative Burden: The Intersection of Environmental and Social Vulnerability

The concept of cumulative burden is central to environmental justice analysis. It recognizes that communities do not experience environmental risks in isolation; instead, they experience them on top of existing social, economic, and health vulnerabilities that reduce their capacity to withstand, respond to, and recover from environmental harm.

In Pullman, these cumulative burdens are clearly documented:

Table 3 : Cumulative Burdens of Environmental Risk in Pullman

Vulnerability Domain	**Pullman Indicator**
Environmental	Active groundwater contamination (TCE, PCE, PFAS, vinyl chloride, arsenic); 15-year gap in state monitoring; unresolved "Approved Partial Closure" status
Economic	Lower income and educational attainment than county average; 27.6% housing cost burden; elevated unemployment
Housing	Over one-quarter of households cost-burdened; rural housing stock with limited capacity for filtration infrastructure
Health	Contaminants associated with cancer, cardiovascular disease, immune dysfunction, and developmental harm; pre-existing health vulnerabilities identified through EJScreen health indicators

Vulnerability Domain	Pullman Indicator
Geographic/Rural	Non-urban census tract; private well dependence; distance from regulatory and legal resources; limited local government capacity
Institutional	35-year history of contamination; state remediation never completed; liability determination that foreclosed legal accountability; no monitoring for 15 years

Taken together, these indicators show that Pullman faces overlapping rural, socioeconomic, housing, and health vulnerabilities — the cumulative conditions that form the environmental justice context for this project (Beautify Pullman EJ Background, 2026; EPA EJScreen, 2024; CDC/ATSDR SVI, 2022).

1.5.5 The Environmental Justice Failure in Pullman: A Pattern, Not an Accident

The history of the Pullman Industries Inc. contamination is not simply a story of industrial pollution. It is a story of how environmental justice failures compound over time when communities lack the resources and institutional support to hold polluters and regulators accountable.

The pattern is documented in the historical record:

- Delayed response: Residents reported bad odors in their water in 1991. Systematic community-wide testing did not begin until 1993 — a two-year gap (Utset, 2026, EGLE ID69).
- Inadequate remediation: The state committed $1.3 million to a cleanup system that was never built. The contract was closed in 2006 due to funding limitations, with no successor plan (Utset, 2026, EGLE ID915).
- Contested liability: The determination that Pullman Industries was not legally liable, internally disputed by at least one state attorney, effectively foreclosed any private legal avenue to compel a full cleanup (Utset, 2026, EGLE ID369, ID384).
- Institutional abandonment: The project was classified as "Approved Partial Closure" in 2008 and has not been formally revisited. State monitoring records end in 2011 (Utset, 2026, EGLE ID1063).

- Undetected new contamination: PFAS (a class of contaminants with serious health effects) were detected in Pullman's groundwater in 2026 but were never tested during the 15 years of state oversight.

A community with greater economic resources, political influence, or proximity to regulatory centers might have been able to compel continued state action, pursue private litigation, or fund independent monitoring.

SECTION 2: HISTORY OF PULLMAN INDUSTRIES CONTAMINATION & PAST REMEDIATION

2.1 Overview

The Pullman Road and 109th Avenue facility (EGLE Site ID 03000163) was home to the Pearl Creamery until 1953 and subsequently to Pullman Industries Inc. (PII), a manufacturer of metal parts and trim for the automotive industry, which operated at the site until 2001. Industrial solvents and degreasers — primarily tetrachloroethylene (PCE) and trichloroethylene (TCE) — were present in the soil and groundwater beneath and around the property (Utset, May 2026). Exposure to these materials can have harmful impacts on human health.

Prior site investigations have characterized shallow groundwater conditions in the area and identified an unconfined aquifer composed primarily of sand, with a laterally continuous clay unit at depth (MCE QAPP, Version 1.3). This geological structure is significant because PCE, as a dense non-aqueous phase liquid (DNAPL), can sink through the saturated aquifer until it encounters less-permeable layers — meaning contamination may extend to depths not captured by the existing monitoring well network.

The following narrative is drawn from the review of 1,147 public records from EGLE's Remediation Information Data Exchange (RIDE) database, conducted by Xavier Utset in May 2026. The review included resident notification letters, lab testing results, project management and contracting documentation, work plans, site reports, internal memos, and email communications (Utset, May 2026, Background). Maps of the plume existing in Pullman are depicted in the Appendix.

2.2 Contamination Timeline: 1991–2011

1991: First Detection

The contamination crisis in Pullman came to light in 1991, when residents began complaining of bad odors in their residential water. The first formal contamination detection notice in the EGLE database was sent by the Michigan Department of Public Health (MDPH) on May 9, 1991, to a residential address at 860 56th Street, near Pullman Elementary School (Utset, 2026, EGLE ID10, ID11).

Later that year, on November 15, 1991, Pullman Industries notified the Michigan Department of Natural Resources (MDNR) of a potential involuntary contamination incident involving lead paint at its facility. State authorities determined there were "no adverse environmental problems" from this self-reported incident (Utset, 2026, EGLE ID12).

1993: Contamination Confirmed Across Dozens of Wells

From March 1993 through April 1994, MDNR conducted sampling at more than 50 wells across Pullman, confirming that at least 27 were contaminated with a variety of pollutants including PCE and TCE — more than two years after the first contamination had been reported (Utset, 2026, EGLE ID69).

On August 20, 1993, MDNR approved the supply of bottled water to 3 contaminated addresses. This arrangement eventually extended to approximately 30 households and continued until 1997 (Utset, 2026, EGLE ID6).

By November 1993, MDNR formally notified PII that its plant was in noncompliance with environmental regulations and demanded timely remedial steps. On the same date, MDNR notified Lee Township that 7 types of contaminants had been detected in the Township's own well (Utset, 2026, EGLE ID93, ID92).

1994–1995: Health Advisories and Expanding Investigations

On June 10, 1994, MDPH issued a formal Health Advisory for Pullman, confirming that more than 20 contaminated wells had been detected across the community (Utset, 2026, EGLE ID71).

On April 28, 1995, MDNR issued a Michigan Environmental Response Act (MERA) Authorization confirming 20 wells contaminated with another 20 suspected, noting VOC sampling was being conducted at over 70 wells in the area, and recommending the Township evaluate alternative water supply options (Utset, 2026, EGLE ID47).

1996: State Funding Secured

On July 9, 1996, a Lee Township contractor (Alpha GeoSciences) produced an alternative water supply options report, funded by MDPH, presented to affected residents at a community town hall. The report delimited the affected area to 54 residential buildings, 15 commercial establishments, an industrial facility, the township hall, and a school — comprising as many as 250 people. The report identified only two realistic alternatives: replacing individual contaminated wells with deeper wells, or developing a Type I water supply system. MDNR chose well replacement (Utset, 2026, EGLE ID143).

On August 20, 1996, MDEQ authorized $1 million in Quality of Life Bond funds to investigate the contamination and begin remediation planning (Utset, 2026, EGLE ID136).

1997: Source Confirmed; Replacement Wells Installed

Engineering firm ABB completed a detailed site investigation in July 1997, confirming that the contamination plume originated at the Pullman Industries site. Three leaking barrels and an underground cistern or tank on PII's property were identified as the sources. The primary contaminants in soil and groundwater were confirmed as PCE, TCE, and 1,1,1-TCA, with 12 additional contaminants also identified. The plume was estimated to extend 1,200 feet long by 300 feet wide (Utset, 2026, EGLE ID245).

Between 29 and 37 new, deeper residential wells were installed across Pullman to replace contaminated ones. Six properties that could not obtain sufficient water from the new wells were later connected to a shared Type III well, which became operational in March 2001 (Utset, 2026, EGLE ID256, ID347).

1998–1999: PII Cleanup Actions & Liability Determination

PII undertook a series of on-site cleanup actions in April 1998, including the removal of contaminated tanks, drums, and sludge, and a short-term Soil Vapor Extraction (SVE) trial that reportedly reduced soil chemical concentrations by approximately 50% (Utset, 2026, EGLE ID329).

In November 1999, after consultations with the Attorney General's Office, MDEQ formally determined that PII was not a legally liable party for the contamination plume. The rationale was that the leaking underground tank had been installed by Pearl Creamery, a prior occupant, before the current PII corporation came into existence. This determination was internally disputed — at least one MDEQ attorney dissented in writing (Utset, 2026, EGLE ID369, ID384).

Despite being cleared of legal liability, PII voluntarily contributed at least $125,000 toward the installation of the shared Type III well and donated the land on which it was located (Utset, 2026, EGLE ID371).

2000–2005: Remediation Planning & Investigation

On August 8, 2000, MDEQ authorized $1.3 million for a comprehensive groundwater pump-and-treat remediation system, awarded to engineering firm Harding ESE (later MACTEC) with Fishbeck, Thompson, Carr, and Huber (FTCH) as subcontractor. The scope included designing and installing the pump-and-treat system and operating it for 10 years (Utset, 2026, EGLE ID359, ID363).

In July 2002, FTCH produced a Remedial Action Investigation report confirming PCE and TCE remained present in soil and groundwater. The report identified Scott Creek as a probable receptor of contaminants, noting the creek appeared to function as a natural hydrologic barrier limiting the plume's southward expansion (Utset, 2026, EGLE ID524).

In 2002, Pullman Elementary School connected to the Type III well system, elevating its classification to a Type II well system (Utset, 2026, EGLE ID557).

By 2003, Bloomingdale Public Schools had begun due diligence to acquire the PII site. Investigators discovered arsenic on the property as well as a pit containing contaminated waste metals and concrete slabs — contamination not previously documented (Utset, 2026, EGLE ID550, ID632).

In February 2005, MDEQ reported that VOCs had been detected in 3 consecutive sampling rounds at a replacement well at 885 Pearl Street — the first replacement well found to be contaminated. This well, drilled in 1997 to a depth of 134 feet, prompted MDEQ to consider encouraging the Township to develop "a municipal water supply system for the whole area" (Utset, 2026, EGLE ID743, ID827).

By July 2005, approximately $1.75 million had been committed to the Pullman project, with an additional $1 million expected through planned closure in 2015 (Utset, 2026, EGLE ID874).

2006–2007: Remediation Contract Closed; PII Site Demolished

In March 2006, the MACTEC/FTCH engineering contract — the primary vehicle for all active remediation work — was abruptly closed out prior to completion of its principal deliverable (the groundwater pump-and-treat system). Available records cite funding limitations as the reason. No successor contract was awarded (Utset, 2026, EGLE ID915, ID939).

In October 2007, Bloomingdale Public Schools demolished the PII plant structure. Working with Villa Environmental Consultants, the school district excavated the facility's drainage and piping systems, removed contaminated sediments, cleaned production areas, and closed the plant's production wells. The PII site itself was considered environmentally safe from that point forward (Utset, 2026, EGLE ID1000, ID1001).

2008–2011: Project on Indefinite Hold

On November 21, 2008, MDEQ formally classified the Pullman project as "Approved Partial Closure" (APC) — effectively on hold pending availability of funding to install the groundwater remediation system. The report noted that $1.55 million in additional funds would be needed and warned that "downgradient and replacement wells continue to be at risk from the plume." Total state expenditures to that point stood at approximately $1.156 million (Utset, 2026, EGLE ID1063).

Well testing results from 2006 through 2011 showed substantial improvement, with virtually all tested wells returning results below harmful thresholds — a trend attributed in part to natural attenuation and earlier remediation activities. ***However, the state's records end in early 2011, and no assessment of the underground plume is available in the public record after that date (Utset, 2026).***

Regional Groundwater Context: Allegan County Water Study

Pullman's groundwater contamination does not exist in isolation. It is part of a broader regional picture of groundwater quality challenges in Allegan County that has been documented through the Allegan County Water Study, a multi-year investigation conducted by the Allegan County Water Study Workgroup and presented in a Final Report to the Allegan County Board of Commissioners on March 13, 2025.

Key findings from the Allegan County Water Study that are directly relevant to Pullman include:

- Allegan County relies on groundwater for 90% of its drinking water supply, including private residential wells, irrigation, and municipal supplies. The vast majority of Pullman residents are part of this private well-dependent population.
- The county's groundwater faces multiple quality challenges, including naturally occurring contaminants (iron, manganese, arsenic) and industrial contamination. The Allegan County Groundwater Assessment Report (September 2024) documents these challenges across the county.
- PFAS contamination is an active and growing concern in Allegan County. The Hamilton Area of Interest (Hamilton AOI), located in Allegan County, documented

PFOA at up to 50 ppt in drinking water wells (more than 12 times the EPA MCL)with 7 of 29 tested wells exceeding drinking water criteria as of February 2024 (MCE QAPP, Version 1.3).

- The Allegan County Health Department notes that ACHD sanitarians require additional VOC and heavy metals testing for new wells based on proximity to historical plumes of contamination identified by EGLE. This policy is directly relevant to Pullman, where a new well permit was denied in 2022 due to contamination concerns (Allegan County Health Department, Groundwater Education, 2025).
- The Allegan County Water Study Workgroup recommended a holistic approach to water resource management, including improved monitoring, public education, and consideration of water supply infrastructure. These recommendations directly align with the needs identified in this report.

The findings of this Beautify Pullman investigation are consistent with and add to the body of evidence documenting serious groundwater quality challenges across Allegan County. The Pullman community's experience should be considered as part of any county-wide or regional water quality planning effort

2.3 Key Figures at a Glance

Table 4: Key Figures

Metric	**Value**	**Source**
Year contamination first confirmed	1991	Utset, 2026 (EGLE ID10)
Unique addresses tested	87	Utset, 2026 (EGLE ID1123)
Addresses with VOC detections	53	Utset, 2026 (EGLE ID1123)
People estimated impacted (1997)	At least 250	Utset, 2026 (EGLE ID245)

Metric	Value	Source
Contaminated wells replaced (1997)	29–37	Utset, 2026 (EGLE ID256)
Estimated plume dimensions	1,200 ft × 300 ft	Utset, 2026 (EGLE ID245)
PCE detected in soil (excess over residential limit)	Up to 34×	Utset, 2026 (EGLE ID871)
TCE detected in groundwater (excess over drinking water threshold)	Up to 24×	Utset, 2026 (EGLE ID871)
Year PII determined non-liable	1999	Utset, 2026 (EGLE ID369)
Total state commitments	~$1,750,000	Utset, 2026 (EGLE ID1063)
Total state expenditures	~$1,160,000	Utset, 2026 (EGLE ID1063)
Year state records end	2011	Utset, 2026
Gap in state monitoring (as of 2026)	**15 years**	Utset, 2026

2.4 A Critical Technical Concern: PCE as a Dense Non-Aqueous Phase Liquid (DNAPL)

One of the most important technical dimensions of the Pullman contamination — and one that was not fully resolved during the 1991–2011 state response — is the behavior of PCE underground as a Dense Non-Aqueous Phase Liquid (DNAPL).

Unlike water, PCE is denser than water and does not simply float on the water table. Instead, it can sink through soil and the saturated aquifer until it encounters a less-permeable layer, such as the clay unit identified at depth beneath Pullman (MCE QAPP, Version 1.3). Small amounts of PCE can then slowly dissolve into groundwater over long periods, creating or sustaining a contaminant plume even decades after the original release.

This has several critical implications for Pullman:

1. **The contamination may be deeper and more complicated than routine well testing suggests.** A monitoring well screened at one depth can tell you something important without necessarily describing the entire plume.
2. **PCE can break down into other chlorinated chemicals.** Under some groundwater conditions, microorganisms can transform PCE through a series of compounds that can include TCE, dichloroethylene, and ultimately **vinyl chloride** — some of which have their own significant health concerns (Health Effects Notes).
3. **The "deep" monitoring wells installed by the state are not particularly deep.** Based on the MCE QAPP monitoring well construction details, the deepest screened intervals are only **22.5–27.5 feet below ground surface** (MCE QAPP, Version 1.3, Table 2). This means contamination at greater depths may not be captured.
4. **Cleanup can take many years.** PCE trapped in soil pores, fractures, or as residual DNAPL can act as a continuing source of groundwater contamination for very long periods.
5. **Contamination can affect property use and redevelopment.** A contaminated plume may trigger environmental investigation, disclosure, due-diligence, remediation, or vapor-mitigation requirements when properties are sold, redeveloped, or buildings are constructed — even properties that did not cause the contamination.

2.5 Five Overarching Conclusions from the Historical Record Review

The Xavier Utset review of 1,147 EGLE/RIDE records yields five overarching conclusions (Utset, May 2026, Conclusion):

1. **The contamination was extensive and confirmed late.** VOC contamination impacted at least 57 wells, reaching concentrations up to 24× the drinking water threshold for TCE and 34× for PCE in soil. Despite first odor complaints in 1991,

systematic sampling did not begin until 1993, and the primary source was not formally identified until 1997 — a 6-year gap.

2. **The institutional response was chronically slow.** Bottled water began in 1991, but replacement wells were not installed until 1997. The Type III well was not operational until 2001. The $1.3M remediation contract was awarded in 2000 but its core deliverable — the pump-and-treat system — was never installed before the contract was closed in 2006.
3. **The liability determination was contested and consequential.** MDEQ's 1999 decision to clear PII of liability was internally disputed and effectively foreclosed any legal avenue to compel full remediation funding. No subsequent attempt to pursue alternative liable parties is documented in EGLE records.
4. **Scott Creek was both a critical environmental boundary and a contamination receptor.** Multiple FTCH reports (2002–2005) identified Scott Creek as a natural barrier limiting southward plume migration and a probable receptor of VOC discharges from contaminated groundwater. No water quality assessment of the creek is included in EGLE records.
5. **The contamination source was removed, but the plume was never remediated.** The physical source was eliminated in 2007. However, no pump-and-treat system was ever installed, no permanent SVE system was deployed, and as of 2008, MDEQ still identified downgradient and replacement wells as "at risk." Whether the plume has since dissipated through natural attenuation or continues to migrate is unknown.

SECTION 3: PRIVATE WELL TESTING RESULTS — OVERVIEW & ANALYSIS

3.1 Overview of Testing Program

Between January 13-15 and June 17-18, 2026 , Beautify Pullman, through the Great Lakes Community Action Partnership (GLCAP) Rural Community Assistance Program (RCAP), conducted private well testing at 25 residential properties in the Pullman area. GLCAP field staff — including Senior Rural Development Specialists Brenden Rauch and Sarah Stawasz, supervised by Michael Anderson — administered the well water tests. GLCAP staff are trained private well professionals who work directly with state and federal regulatory agencies on sampling and analysis protocols (QAPP, Step 2).

Testing was conducted using the Trace Analytical Laboratories Premium home drinking water test, employing EPA Method 524.2 — a purge-and-trap GC/MS procedure for VOC analysis in drinking water. Trace Analytical Laboratories is EGLE-certified to analyze drinking water for regulated and unregulated VOCs (QAPP — Residential Water Testing, January 2026, Step 2). Each household received one test kit; five vials were used per household: one for bacteria, one for anions, one for metals, and two for VOC testing (QAPP — Residential Water Testing, January 2026, Step 3).

The VOCs of primary interest were trichloroethylene (TCE) and benzene, as these had been previously found in residential wells in Pullman (QAPP — Residential Water Testing, January 2026, Step 1). The full panel of analytes tested under EPA Method 524.2 included over 60 compounds (EPA Method 524.2 Analytical Method Information, July 10, 2025).

Testing was designed to provide results to both residents inside the known contamination plume and those outside it in approximately equal amounts, to assess the full geographic extent of current contamination (QAPP, Step 3).

3.2 Key Finding: 4 of 25 Wells (16%) Showed Elevated Contamination

> *"4 of 25 wells tested (16%) were positive for elevated levels of VOCs or arsenic, with arsenic found in deepest wells (>80 ft)."* — Beautify Pullman Public Meeting Presentation, August 11, 2026

This is the headline finding of the private well testing program. Four of the 25 wells tested returned results showing elevated levels of concern — either VOC contamination or elevated arsenic. Notably, arsenic was detected in the deepest wells, those exceeding 80 feet in depth. This pattern warrants further investigation, as deeper wells were installed in 1997 specifically to replace contaminated shallower wells.

3.3 Contaminants of Concern & Applicable Standards

The following Michigan Part 201 residential drinking water criteria and EPA Maximum Contaminant Levels (MCLs) are the primary benchmarks for evaluating results. These are the same standards that governed historical EGLE monitoring at this site:

Table 5: Contaminations of Concern

Contaminant	Michigan Part 201 Residential Criterion	EPA MCL	Historical Detection at Site?
Trichloroethylene (TCE)	$5\ \mu g/L$	$5\ \mu g/L$	Yes — up to 24× threshold in groundwater
Tetrachloroethylene (PCE)	$5\ \mu g/L$	$5\ \mu g/L$	Yes — detected in groundwater and up to 34× in soil
1,1,1-Trichloroethane (1,1,1-TCA)	$200\ \mu g/L$	$200\ \mu g/L$	Yes
Benzene	$5\ \mu g/L$	$5\ \mu g/L$	Yes
Vinyl Chloride	$2\ \mu g/L$	$2\ \mu g/L$	Tested
Arsenic	$10\ \mu g/L$	$10\ \mu g/L$	**Detected in 2026 testing**
1,4-Dioxane	$7.2\ \mu g/L$	No federal MCL	Tested

The historical EGLE records document PCE detected in soil at levels up to 34 times the residential protection criteria (Utset, 2026, EGLE ID871). It is important to clarify that soil cleanup criteria and groundwater drinking water criteria are separate standards governing different environmental media. Soil criteria are designed to protect against exposure through soil contact, ingestion, and vapor intrusion pathways, not direct consumption. The Michigan Part 201 residential drinking water criteria listed in the table above apply specifically to groundwater and are the appropriate benchmark for evaluating well water results. While elevated soil concentrations are significant because contaminated soil can serve as an ongoing source of groundwater contamination, direct comparison of soil concentrations to groundwater drinking water criteria is not scientifically appropriate (Michigan Administrative Code, R. 299.44; MCE QAPP, Version 1.3). All private well and

monitoring well results in this report are evaluated against the applicable groundwater criteria only.

The detection of arsenic in deeper private wells (>80 ft) is a significant new finding. While arsenic can occur naturally in Michigan groundwater, its detection specifically in the deepest wells raises questions about whether deeper aquifer layers have been impacted by site-related contamination, or whether naturally occurring arsenic at depth was previously uncharacterized. Arsenic was included in the monitoring well analytical suite specifically because it had been identified in groundwater in the vicinity of the site (MCE QAPP, Version 1.3).

3.4 Geographic Context

Testing was designed to cover both properties within the known historical contamination plume and those outside it, to assess whether contamination has migrated beyond previously documented boundaries. The last plume map available in EGLE records is from FTCH's 2005 Remedial Investigation Addendum (Utset, 2026, EGLE ID889). ***That map has not been updated in over 20 years.***

SECTION 4: MONITORING WELL TESTING DATA — ANALYSIS

4.1 Overview of Monitoring Well Testing

Monitoring wells provide the most direct tool for tracking the movement and concentration of groundwater contamination over time. The EGLE database documents the installation of 23 monitoring wells in Pullman: three by Gove Associates in 1994 at the PII plant site, and 20 by FTCH across the Pullman community in 2001. Seven abandonments are documented (Utset, 2026, Research Question 3).

These monitoring wells had not been tested for approximately 15 years when Beautify Pullman undertook this project (Beautify Pullman Public Meeting Presentation, August 11, 2026).

Beautify Pullman engaged Michigan Consulting and Environmental (MCE) to conduct monitoring well testing on June 17–19, 2026, under a Quality Assurance Project Plan (QAPP Version 1.3) signed by Ian Temchin (MCE Technical Lead), Craig Kielty (MCE QA Manager), Camden Ogletree (EPA Project Officer), and Blake Spitz (EPA QA Officer) on May 11 and 21, 2026 (MCE QAPP, Version 1.3). The monitoring well network was mapped

by Terracon (Figure 2 — Site Layout, Project No. 51948.3, Drawing Date 2026-07-23, PM: Bobby Glasser, Drawn by: Ian Ternchin).

4.2 Wells Tested

The following monitoring wells were planned for sampling, with construction details as documented in the EGLE RIDE database and confirmed by MCE (MCE QAPP, Version 1.3, Table 2):

Table 6: Monitoring Wells

Monitoring Well ID	Screened Interval (ft bgs)	Top-of-Casing Elevation (ft amsl)
MW-5	25 – 30	652.29
MW-6	30 – 35	649.93
MW-7	29 – 34	648.88
MW-9	15 – 20	651.90
MW-10	24 – 29	649.61
MW-11S	11 – 15	647.30
MW-11D	20 – 25	647.42
MW-13	20 – 25	646.83
MW-14S	5 – 10	645.85
MW-14I	15 – 20	645.82
MW-14D	22.5 – 27.5	645.60

Planned test wells: MW-5, MW-6, MW-7, MW-9, MW-10, MW-11S, MW-11D, MW-13, MW-14S, MW-14I, and MW-14D.

Field findings: During field reconnaissance, MW-5 and MW-10 were determined to have been abandoned or destroyed and were not available for sampling. MW-3S and MW-3D were identified as additional monitoring wells and added to the sampling program (Beautify Pullman Public Meeting Presentation, August 11, 2026).

Final wells sampled: MW-3S, MW-3D, MW-6, MW-7, MW-9, MW-11S, MW-11D, MW-13, MW-14S, MW-14I, MW-14D *(11 wells total)*.

The monitoring well locations are shown in the Appendix Map 3 (Site Layout in Michigan Consulting and Environmental, Project No. 51948.3), with Scott Creek Drain shown as the southern boundary of the study area.

4.3 Monitoring Well Results — Key Findings

The monitoring well testing produced two critical findings (Beautify Pullman Public Meeting Presentation, August 11, 2026; Michigan Consulting and Environmental, Figure 4 — Analytical Results):

Finding 1: VOCs Remain Present in Groundwater

VOCs were detected in monitoring well samples, confirming that contamination has not fully dissipated through natural attenuation since state monitoring ended in 2011. Specific detections noted in the public meeting results include:

Table 7: VOCs were Detected in Monitoring Wells

Well	**Contaminant**	**Result ($\mu g/L$)**	**Screening Criterion**
MW-14I	Tetrachloroethene	**43**	$5\ \mu g/L$ — **EXCEEDS**
MW-14I	Trichloroethene	**20**	$5\ \mu g/L$ — **EXCEEDS**
MW-14D	Tetrachloroethene	**15**	$5\ \mu g/L$ — **EXCEEDS**

Well	Contaminant	Result ($\mu g/L$)	Screening Criterion
MW-14D	Trichloroethene	**5.3**	$5\ \mu g/L$ — **EXCEEDS**
MW-6	Benzene	**0.8**	$5\ \mu g/L$ — Below criterion
MW-6	Tetrachloroethene	**15**	$5\ \mu g/L$ — **EXCEEDS**
MW-6	Trichloroethene	**5.3**	$5\ \mu g/L$ — **EXCEEDS**
MW-11S	1,1,2-Dichloroethane	**7**	$5\ \mu g/L$ — **EXCEEDS**
MW-11S	Vinyl Chloride	**1.9**	$2\ \mu g/L$ — Near criterion
MW-3S	Tetrachloroethene	**19**	$5\ \mu g/L$ — **EXCEEDS**

The detection of vinyl chloride at MW-11S ($1.9\ \mu g/L$, approaching the $2\ \mu g/L$ criterion) is particularly significant. Vinyl chloride is a breakdown product of PCE and TCE under anaerobic conditions and is itself a known human carcinogen (ATSDR, 2024) [1] . Its presence suggests that biological degradation of the chlorinated solvents is occurring in the subsurface — a process that, while potentially beneficial if it proceeds to complete degradation, can produce toxic intermediates.

Finding 2: PFAS Detected Throughout Monitoring Wells

Per- and polyfluoroalkyl substances (PFAS) — synthetic "forever chemicals" not previously tested at this site — were detected throughout the monitoring wells sampled. Most significantly, PFOA (perfluorooctanoic acid) exceeded the project screening criterion at select wells (Beautify Pullman Public Meeting Presentation, August 11, 2026).

Table 8: PFOAs Detected in Monitoring Wells

Well	PFOA Result (ng/L)	Michigan Residential DW Criterion	Status
MW-11S	**13**	$8\ ng/L$	**EXCEEDS**

Well	PFOA Result (ng/L)	Michigan Residential DW Criterion	Status
MW-3S	**19**	$8\ ng/L$	**EXCEEDS**

The detection of PFAS in Pullman's monitoring wells is a significant new finding that was not part of the original contamination investigation. PFAS were not regulated or routinely tested during the 1991–2011 state monitoring period (MCE QAPP, Version 1.3). In April 2024, EPA finalized the first-ever federal PFOA Maximum Contaminant Level at 4 parts per trillion (ng/L) under the Safe Drinking Water Act PFAS National Primary Drinking Water Rule [2] . The source of PFAS contamination in Pullman's groundwater is not yet determined and requires further investigation.

4.4 Comparison to Historical Monitoring Well Data (1993–2011)

The EGLE database documents monitoring well testing results across numerous sampling events from 1993 through 2011 (Utset, 2026, Table 2). Key historical reference points include:

- **1994 (EGLE ID78, ID79):** Results from 3 monitoring wells at the PII site
- **2002 (EGLE ID524):** FTCH Remedial Investigation — results from 20 monitoring wells
- **2005 (EGLE ID853, ID852, ID850):** FTCH Quarterly Groundwater Monitoring Reports

The 2026 monitoring well results confirm that VOCs remain present in groundwater at concentrations exceeding Michigan residential drinking water criteria, particularly in wells MW-14I, MW-14D, MW-6, and MW-3S. This is consistent with the 2008 MDEQ warning that "downgradient and replacement wells continue to be at risk from the plume" (Utset, 2026, EGLE ID1063).

4.5 Data Gaps & Limitations

The following data gaps limit the completeness of the current assessment (MCE QAPP, Version 1.3; Utset, 2026):

1. **MW-5 and MW-10 were abandoned or destroyed** and could not be sampled, leaving gaps in the monitoring network
2. **The contamination plume has not been mapped since 2005** — the current extent and migration pathway of the plume are unknown

3. **The monitoring wells are screened at relatively shallow depths (5–35 ft bgs)** — given PCE's DNAPL behavior, contamination at greater depths may not be captured (Health Effects Notes)
4. **PFAS were not tested during the 1991–2011 state monitoring period** — historical baseline data for PFAS does not exist for this site
5. **Scott Creek has never been formally assessed** for water quality related to this contamination — its current status as a contamination receptor is unknown
6. **No vapor intrusion assessment** has been conducted — the potential for VOC migration from groundwater into indoor air at nearby homes has not been evaluated
7. **The data generated represent groundwater conditions at the time of sampling** and are intended to support a screening-level evaluation rather than a comprehensive characterization of site conditions (MCE QAPP, Version 1.3)

SECTION 5: Health Impacts of Contamination Exposure

5.1 Overview

Understanding the health impacts of the contaminants detected in Pullman's groundwater is essential context for residents, elected officials, and decision-makers. The contaminants of concern in Pullman — primarily TCE, PCE, benzene, vinyl chloride, arsenic, and PFAS — are associated with serious health effects at elevated concentrations. The severity of risk depends on the concentration, duration, and route of exposure, as well as individual susceptibility (ATSDR, 2024) [1] .

Critically, groundwater contamination can create exposure in more than one way: through drinking or using contaminated well water, and through inhalation of vapors migrating into buildings (vapor intrusion). This makes identification of the contaminant plume, testing of private wells and monitoring wells, and evaluation of potential vapor-intrusion pathways all important parts of protecting public health in Pullman.

5.2 Trichloroethylene (TCE)

TCE is a colorless, volatile liquid that was used as an industrial solvent and degreaser — exactly the use at the Pullman Industries facility (ATSDR, 2019) [3] . TCE is one of the most common groundwater contaminants in the United States, found in at least 1,051 of the 1,854 current or former EPA Superfund National Priorities List sites (ATSDR, 2019) [3] .

Classification: The U.S. Department of Health and Human Services (HHS) has classified TCE as "known to be a human carcinogen." The International Agency for Research on Cancer (IARC) classifies it as "carcinogenic to humans." EPA has characterized it as "carcinogenic in humans by all routes of exposure" (ATSDR, 2019) [3] . In December 2024, EPA finalized a risk management rule to address unreasonable risk posed by TCE to human health [4] .

Health effects with sufficient evidence for causation (ATSDR, 2024) [1] :

- Kidney cancer
- Non-Hodgkin lymphoma
- Cardiac defects (developmental)

Additional health effects with evidence of association (ATSDR, 2024; ATSDR, 2019) [1] [3] :

- Leukemia, liver cancer, multiple myeloma, end-stage renal disease
- Parkinson's disease, scleroderma (autoimmune disease)
- Neurological effects: delayed reaction times, problems with short-term memory, visual perception, attention, and color vision
- Reproductive effects: spontaneous abortion, low birth weight, congenital heart defects, central nervous system defects in children
- Immune system impairment

Vapor intrusion: TCE readily evaporates from contaminated groundwater or soil. When contaminated groundwater or soil lies beneath or near a building, chemical vapors can migrate through soil and enter indoor spaces through cracks, utility openings, foundations, sumps, or other pathways. People can then inhale the contaminants over extended periods while living, working, or attending school in the building. Because TCE can present health concerns from relatively low, sustained inhalation exposures — particularly for pregnant women and developing fetuses — vapor intrusion from TCE-contaminated groundwater warrants careful investigation and, where indicated, mitigation (Health Effects Notes; ATSDR, 2019) [3] .

Exposure routes: Drinking contaminated water, breathing contaminated air (including vapor intrusion), skin contact with contaminated water, and ingestion of contaminated soil (ATSDR, 2019) [3] .

5.3 Tetrachloroethylene (PCE)

PCE (also called perchloroethylene or tetrachloroethene) is the other primary contaminant at the Pullman site, detected at concentrations up to 34 times the residential protection criteria in soil and 8.6 times the drinking water criterion in monitoring wells in 2026 (Utset, 2026; Beautify Pullman Public Meeting Presentation, August 11, 2026).

Classification: PCE is considered a likely/probable human carcinogen by EPA, with evidence linking exposure particularly to bladder cancer (ATSDR, 2024) [1] .

Health effects with sufficient evidence for causation (ATSDR, 2024) [1] :

- Bladder cancer

Additional health effects with evidence of association (ATSDR, 2024) [1] :

- Non-Hodgkin lymphoma, end-stage renal disease
- Neurological effects, reproductive effects, breast cancer
- Fetal death, low birth weight, neural tube defects, oral cleft defects

DNAPL behavior: As described in Section 2.4, PCE's behavior as a dense non-aqueous phase liquid (DNAPL) makes it particularly difficult to remediate. It can sink to depths not captured by shallow monitoring wells and slowly dissolve into groundwater for decades after the original release (Health Effects Notes). Private wells deserve particular attention in a rural community: a household may have no obvious indication that its groundwater is affected because PCE at concentrations of concern may not produce a noticeable taste, odor, or appearance.

Degradation products: Under some groundwater conditions, PCE can break down through a series of compounds that can include TCE, dichloroethylene, and ultimately vinyl chloride — some of which have their own significant health concerns. The detection of vinyl chloride at MW-11S ($1.9\ \mu g/L$) in 2026 monitoring well testing suggests this degradation process is occurring in Pullman's subsurface.

5.4 Benzene

Benzene is a known human carcinogen strongly associated with **leukemia and other blood disorders** (ATSDR, 2024) [1] . It was detected at MW-6 at $0.8\ \mu g/L$ — below the Michigan Part 201 criterion of $5\ \mu g/L$ — but its presence confirms ongoing VOC contamination in the groundwater.

Health effects with sufficient evidence for causation (ATSDR, 2024) [1] :

- Leukemias
- Non-Hodgkin lymphoma

5.5 Vinyl Chloride

Vinyl chloride is a known human carcinogen associated particularly with liver cancer (ATSDR, 2024) [1] . It is a breakdown product of PCE and TCE and was detected at MW-11S at $1.9\ \mu g/L$ — approaching the Michigan Part 201 criterion of $2\ \mu g/L$.

Health effects with sufficient evidence for causation (ATSDR, 2024) [1] :

- Liver cancer

5.6 PFAS (Per- an Polyfluoroalkyl Substances) — Including PFOA

PFAS are a group of manufactured chemicals that have been used in industry and consumer products since the 1940s. They are known as "forever chemicals" because many break down very slowly and can build up in people, animals, and the environment over time (EPA, 2026) [5] . PFOA was detected in Pullman's monitoring wells at levels exceeding both the EPA MCL ($4\ ng/L$) and the Michigan screening criterion ($8\ ng/L$) (Beautify Pullman Public Meeting Presentation, August 11, 2026).

EPA Regulation: In April 2024, EPA finalized the first-ever federal PFOA Maximum Contaminant Level at 4 parts per trillion (ng/L) under the Safe Drinking Water Act PFAS National Primary Drinking Water Rule [2] . This is a legally enforceable standard.

Health effects associated with PFAS exposure (ATSDR, 2024; EPA, 2026; NASEM, 2022) [5] [6] :

- Increased risk of kidney and testicular cancer (PFOA — sufficient evidence of association)
- Increased cholesterol levels (sufficient evidence of association)
- Reduced immune response — including lower antibody response to vaccines in children (sufficient evidence of association)
- Adverse birth outcomes — including low birth weight and preterm delivery (sufficient evidence of association)
- Pregnancy-induced hypertension and preeclampsia (limited/suggestive evidence)
- Thyroid disease and dysfunction — research suggests associations between PFOA/PFOS and thyroid disease [7]
- Liver enzyme changes (limited/suggestive evidence)

- Developmental effects in children — including behavioral changes, bone variations, and accelerated puberty (EPA, 2026) [5]

PFOA bioaccumulates in blood, liver, and breast milk, with a human serum half-life of approximately 3.5 years — meaning a single exposure persists for years [2] . The source of PFAS in Pullman's groundwater is not yet determined and requires further investigation.

5.7 Arsenic

Arsenic was detected in the deepest private wells tested (>80 ft depth) during Beautify Pullman's 2026 private well testing program (Beautify Pullman Public Meeting Presentation, August 11, 2026). Arsenic was also included in the monitoring well analytical suite because it had been identified in groundwater in the vicinity of the site — including on the former PII property, where arsenic was discovered during Bloomingdale Public Schools' due diligence investigation in 2003 (Utset, 2026, EGLE ID550, ID632; MCE QAPP, Version 1.3).

The EPA MCL for arsenic in drinking water is $10\ \mu g/L$. Long-term exposure to arsenic in drinking water is associated with bladder, lung, and skin cancers, as well as cardiovascular disease, diabetes, and neurological effects.

5.8 The Four Pathways of Exposure in Pullman

For the Pullman community, the contamination issue should be understood in terms of **four exposure pathways**, rather than simply asking whether someone's drinking-water sample exceeds a standard:

1. **Contaminated drinking water** — the most direct pathway. This can be in part addressed by private well testing, implementing a comprehensive monitoring plan, and developing a clear remediation plan.
2. **The location and movement of the groundwater plume** — addressed by monitoring well testing. The plume’s current extent is unknown.
3. **Vapor intrusion into buildings** — the migration of volatile contaminants from groundwater into indoor air. This has yet to be assessed in Pullman.
4. **Continuing underground source material** — PCE as DNAPL can keep replenishing the plume even decades after the original release. This is not fully characterized and understood yet.

SECTION 6: COMMUNITY SURVEY FINDINGS

6.1 Survey Overview

As part of the EPA EJ TCGM grant project, Beautify Pullman conducted a community outreach survey (n=56) to document resident perceptions of water quality, water use behaviors, and concerns about contamination. Survey results were presented at the Water Testing Results Public Meeting on August 11, 2026, at Pullman Town Square (Beautify Pullman Public Meeting Presentation, August 11, 2026).

6.2 Key Survey Findings

Table 9: Key Findings

Finding	**Result**
Respondents who are concerned about area water and soil quality	**91%**
Respondents who believe contamination still affects the community today	**49%**
Respondents who feel there might be an effect	**47%**
Respondents who drink bottled water or use water filters	**90%**
Respondents who wanted their water tested	**35 of 56 (63%)**
Primary water source: private well	**~89%**

6.3 Community Voice: Resident Observations

In addition to structured questions, survey respondents were invited to share observations about their well water. These responses document a lived experience of water distrust that has persisted in Pullman for decades (Beautify Pullman Public Meeting Presentation, August 11, 2026):

"Smells gross every spring, it's real strong, lasts for a very long time then the smell gets lighter."

"Full of minerals and black stuff. Smelly."

"The smell of the water as it leaves the faucet or when you flush the toilet has become more pungent."

"Our water keeps getting worse. I believe it's more iron, but I don't know for sure. Also, the water smells bad and keeps getting worse."

"After a heavy rain, my water gets a bad odor."

These observations — while not laboratory results — reflect a community that has been living with water quality uncertainty for more than 30 years. The survey confirms that 90% of residents have already modified their water use behavior (drinking bottled water or using filters) in response to contamination concerns, representing a significant and ongoing quality-of-life burden. This community-level behavioral adaptation is itself evidence of the public health impact of the contamination, even absent confirmed exceedances in every tested well.

SECTION 7: CONCLUSIONS & RECOMMENDATIONS FOR NEXT STEPS

7.1 Summary of Key Findings

The 2025–2026 Beautify Pullman EPA EJ TCGM project has produced the following confirmed findings:

Finding 1 — VOC Contamination Persists in Groundwater. Monitoring well testing conducted June 17–19, 2026 confirms that TCE and PCE remain present in Pullman's groundwater at concentrations significantly exceeding Michigan residential drinking water criteria — 15 years after state monitoring ended. PCE was detected at up to $\boldsymbol{43\ \mu g/L}$ (8.6× the criterion) at MW-14I. The contamination plume has not been remediated.

Finding 2 — PFAS Are Present and Exceed Federal and State Criteria. PFAS — a class of contaminants not previously tested at this site — were detected throughout the monitoring well network, with PFOA exceeding both the EPA MCL ($\boldsymbol{4\ ng/L}$, finalized April 2024) and the Michigan screening criterion ($\boldsymbol{8\ ng/L}$) at select wells. The source of PFAS contamination is unknown and requires investigation.

Finding 3 — 4 of 25 Private Wells (16%) Show Elevated Contamination. Private well testing found elevated VOCs or arsenic in 4 of 25 tested residential wells. Arsenic was detected specifically in the deepest wells (>80 ft), raising new questions about deeper aquifer conditions.

Finding 4 — Vinyl Chloride — A Carcinogen — Is Present Near the Drinking Water Criterion. Vinyl chloride was detected at MW-11S at $1.9\ \mu g/L$, approaching the $2\ \mu g/L$ criterion. Vinyl chloride is a known human carcinogen (liver cancer) and a breakdown product of PCE and TCE, indicating ongoing subsurface degradation processes (ATSDR, 2024) [1] .

Finding 5 — Community Water Distrust Is Pervasive and Well-Founded. 91% of survey respondents are concerned about water and soil quality. 90% have already modified their water use behavior. Resident observations document ongoing sensory water quality concerns.

Finding 6 — The 15-Year Gap in State Oversight Is Unacceptable and Has Left the Community Without Critical Information. The state's last documented monitoring of this site occurred in 2011. The project was formally classified as "Approved Partial Closure" in 2008 — a status that has never been resolved. No remediation system was ever installed. The community has been left without current information about the safety of its drinking water, the current extent of the plume, or the presence of PFAS (Utset, 2026).

Finding 7 — The Contamination Picture Is More Complex Than Previously Known. The detection of PFAS, the presence of vinyl chloride (a PCE/TCE breakdown product), the DNAPL behavior of PCE, and the shallow depth of existing monitoring wells all suggest that the contamination in Pullman may be more extensive and complex than the historical record indicated (Health Effects Notes; MCE QAPP, Version 1.3).

6.2 Prioritized Recommendations

Priority 1 — Immediate Protective Action

- Engage EGLE's Contamination Investigation Program to trigger formal drinking water replacement activities under Part 201 where warranted
- Provide residents with information about the four pathways of exposure (drinking water, plume migration, vapor intrusion, and continuing source material) and the specific health risks associated with TCE, PCE, PFAS, and arsenic (Health Effects Notes; ATSDR, 2024) [1, 3]

- Connect affected residents with appropriate filtration systems immediately. Point-of-use filtration can significantly reduce exposure while longer-term solutions are pursued:
    - Reverse osmosis (RO) systems are effective for PFAS, arsenic, and many VOCs and are recommended by EPA and EGLE for households with PFAS detections above the MCL [2]
    - Granular activated carbon (GAC) filters are effective for VOCs including TCE and PCE
    - Certified NSF/ANSI Standard 58 (RO) or Standard 53 (GAC) filters should be used to ensure effectiveness
    - Beautify Pullman should pursue dedicated grant funding to provide filtration systems to affected households at no cost — potential sources include EPA EJ TCGM Tier 2/3 funding, USDA Rural Development grants, Michigan EGLE Contamination Investigation Program resources, and community foundation grants
    - The Allegan County Health Department should be engaged as a partner in connecting residents to filtration resources, consistent with its role in providing guidance on filtration options for residents with contaminated wells (Allegan County Health Department, Groundwater Education, 2025)
- Provide bottled water as an immediate interim measure to households with confirmed exceedances while filtration systems are procured and installed

Priority 2 — Engage EGLE to Reopen the Site

- File a formal request with EGLE's Remediation and Redevelopment Division to reopen or update the status of EGLE Site ID 03000163
- Submit 2026 monitoring well and private well data to the RIDE database (MCE QAPP, Version 1.3, References)
- Request a public meeting with EGLE and Allegan County Health Department
- Request an updated plume delineation study — the last plume map is from 2005 and does not reflect current conditions or PFAS contamination
- Leverage the existing relationship with EGLE's Ray Spaulding (EGLE point of contact for monitoring well access) to facilitate engagement (MCE QAPP, Version 1.3)

Priority 3 — Expanded Environmental Investigation

- **Scott Creek testing:** Assess current VOC and PFAS levels in Scott Creek, which was identified as a probable contamination receptor in 2002–2005 FTCH reports and has never been formally assessed (Utset, 2026, EGLE ID524, ID889)
- **PFAS source investigation:** Determine the source(s) of PFAS contamination detected in monitoring wells — potential sources include AFFF firefighting foam, industrial operations, or other sources unrelated to PII [5]
- **Vapor intrusion assessment:** Evaluate whether volatile contaminants (TCE, PCE, vinyl chloride) in groundwater are migrating into indoor air in nearby homes, particularly given the proximity of residential structures to the known plume (ATSDR, 2019) [3]
- **Deeper plume characterization:** Given PCE's DNAPL behavior and the shallow screened intervals of existing monitoring wells (5–35 ft bgs), additional investigation at greater depths is warranted to determine whether contamination extends below the current monitoring network (MCE QAPP, Version 1.3)
- **Additional private well testing:** Expand testing to wells not yet sampled, particularly those downgradient of the known plume and those at depths >80 ft where arsenic was detected
- **Soil testing:** Assess residual soil contamination, particularly in areas near the former PII plant site (now Bloomingdale school property)
- **1,4-Dioxane screening:** Expand 1,4-dioxane testing to private wells, as it was included in monitoring well testing due to its potential association with chlorinated solvent releases (MCE QAPP, Version 1.3)
- **Consideration of Water Supply Alternatives**: Remediation of a contaminated groundwater plume is a long-term process that can take years or decades to complete — and in Pullman's case, the state has already demonstrated that funding constraints can halt remediation efforts entirely (Utset, 2026, EGLE ID1063). The historical record for this site explicitly considered **alternative water supply approaches** as part of the response — including the installation of deeper replacement wells and the development of the Type III/Type II shared well system that now serves Pullman Elementary School and several residences (Utset, 2026, EGLE ID143, ID347). Future solutions for Pullman should therefore consider **a combination of approaches** rather than relying solely on groundwater remediation. Options to evaluate include:

- **Continued and expanded monitoring**: Regular testing of private wells and monitoring wells to track contamination trends and identify any new impacts
- **Point-of-use and point-of-entry filtration** : As described in Priority 1, filtration systems can provide immediate protection and may be appropriate as a long-term solution for some households
- **Extension of the existing Type II/III municipal well system**: The 1996 Alpha GeoSciences report identified connection to a community water supply as the "cleaner solution" for the Pullman area, though it was deemed costlier at the time (Utset, 2026, EGLE ID143). Costs and feasibility should be reassessed given current conditions and available funding mechanisms
- **New deeper community wells**: If contamination is confined to shallower aquifer zones, strategically placed deeper wells may provide a clean water source for affected households
- **Connection to a regional water supply**: Depending on feasibility and cost, connection to a municipal system outside the contamination area may be worth evaluating for the most heavily impacted properties
- **Groundwater remediation**: Active remediation remains an important goal, particularly to address the source of contamination and prevent further plume migration; options include pump-and-treat systems, air sparging/soil vapor extraction (as piloted in 2005), and monitored natural attenuation

- Any future planning process should engage the community in evaluating these options, with full transparency about costs, timelines, and trade-offs. The Allegan County Water Study Final Report (March 2025) provides a useful framework for this kind of community-engaged water supply planning at the county level and should be referenced in any future planning discussions for Pullman

Priority 4 — Advocacy & Policy Engagement

- Brief elected officials at local, state, and federal levels using this report
- Engage Michigan's Office of the Environmental Justice Public Advocate at EGLE
- Pursue **EPA EJ TCGM Tier 2 or Tier 3 funding** for community education, planning, and project implementation
- Evaluate whether the site warrants EPA Superfund National Priorities List consideration, given the 15-year gap in state oversight, the presence of PFAS, and the unresolved "Approved Partial Closure" status

- Engage the Michigan Department of Health and Human Services (MDHHS) regarding community health monitoring and the potential for a health assessment of the Pullman community

- **Strategically leverage reports, community voice, and lived experience to pursue funding opportunities for additional community engagement, technical assistance, and plan creation and implementation.** Section 5 (Health Impacts) provides scientific grounding to connect the testing data to real human health consequences. This report can be a powerful tool for briefing elected officials and EPA grantors, along with pursuing additional grants and funding opportunities. Beautify Pullman should consider contracting or collaborating with a grant writer or grant writing firm to identify these opportunities.
- **Build a coalition of advocates, practitioners, and non-profit entities to collectively address groundwater contamination and other environmental justice issues in the region.** Beautify Pullman should work to identify and engage other non-profits, advocates, and practitioners working to address water contamination and other environmental justice issues in the region to create a coalition group. Developing a coalition group that meets on a monthly basis to share information, identify funding opportunities, and understand and analyze policies, programs, and emerging issues could help with developing cohesive and effective strategies to address contamination issues and proactively prevent new ones from emerging.

Priority 5 — Develop a Monitoring Plan

- Further testing is necessary to monitor the plume in Pullman. Deeper testing is also necessary to accurately locate the plume and level of commination.

- Efforts should be made to develop a monitoring plan to regularly evaluate and test for groundwater, vapor intrusion, private wells, and residual soil contamination.

- Findings from scheduled, regular testing should be made available to the public through reports and public presentations.

Priority 6 — Develop a Remediation Plan

- Along with developing a monitoring plan, steps should be taken to develop a remediation plan to ensure the long-term safety and viability of Pullman's groundwater.

- Community engagement and technical assistance are necessary to develop site specific remediation plans.

- The remediation plan should address site specific contamination and provide clear timelines for implementation, delineation of duties and responsibilities, and objectives to measure progress.

7.3 Recommended Audiences & Actions

Table 10: Recommended Audiences

Audience	**Recommended Action**
EGLE	Formal request to reopen site; submit 2026 data to RIDE; request contamination investigation support
Allegan County Health Department	Coordinate well testing notifications; engage Contamination Investigation Program
Michigan Legislature	Brief on 15-year gap in state oversight; request appropriations for remediation
U.S. EPA Region 5	Share report; explore Superfund eligibility; pursue additional EJ grant funding
Pullman Residents	Distribute plain-language summary; hold community follow-up meeting
EPA Grantors (Great Lakes TCGM Program)	Submit as Tier 1 deliverable; use to support Tier 2/3 application

Section 8: GLOSSARY OF KEY TERMS

Table 11: Key Terms

Term	Plain-Language Definition
EGLE	Michigan Department of Environment, Great Lakes, and Energy — the state agency that regulates contaminated sites
RIDE	Remediation Information Data Exchange — EGLE's database of contaminated site records
Part 201	Michigan law governing cleanup of contaminated sites (Act 451 of 1994)
MCL	Maximum Contaminant Level — the legal limit for a contaminant in drinking water
VOCs	Volatile Organic Compounds — chemicals that evaporate easily; common industrial contaminants including TCE and PCE
TCE	Trichloroethylene — an industrial solvent and degreaser; a known human carcinogen; primary contaminant at this site
PCE	Tetrachloroethylene (also called perchloroethylene) — an industrial solvent; primary contaminant at this site; a probable human carcinogen
DNAPL	Dense Non-Aqueous Phase Liquid — a liquid denser than water that can sink through the ground; PCE behaves as a DNAPL, making it especially difficult to remediate
PFAS	Per- and polyfluoroalkyl substances — synthetic "forever chemicals" that do not break down in the environment; detected in 2026 monitoring well testing

Term	Plain-Language Definition
PFOA	Perfluorooctanoic acid — a specific PFAS compound; exceeded the EPA MCL (4 ng/L) and Michigan screening criterion at select monitoring wells
ppb / $\mu g/L$	Parts per billion / micrograms per liter — units of measurement for contaminants in water
ppt / ng/L	Parts per trillion / nanograms per liter — units of measurement for PFAS in water
Plume	The area of groundwater that has been contaminated and moves through the ground over time
Monitoring Well	A well drilled specifically to sample groundwater and track contamination
Natural Attenuation	The natural breakdown or dilution of contaminants in groundwater over time
Vapor Intrusion	The migration of volatile chemicals from contaminated groundwater into indoor air — a health risk even when contaminated water is not consumed
Vinyl Chloride	A breakdown product of PCE and TCE; a known human carcinogen associated with liver cancer; detected at MW-11S in 2026
Approved Partial Closure	MDEQ's 2008 classification of the Pullman site — meaning the project remained open but further action was contingent on additional funding
EJ	Environmental Justice — the fair treatment of all people with respect to environmental laws and policies

Term	Plain-Language Definition
RCAP	Rural Community Assistance Program — the program through which GLCAP administered private well testing
GC/MS	Gas Chromatography/Mass Spectrometry — the laboratory instrument used to detect and measure VOCs in water samples
Low-Flow Purging	A groundwater sampling technique that minimizes disturbance to the aquifer, producing samples representative of actual groundwater conditions
QAPP	Quality Assurance Project Plan — a formal document that describes how environmental data will be collected, analyzed, and validated to ensure it is scientifically defensible

Section 9: Footnotes

[1] https://www.atsdr.cdc.gov/camp-lejeune/risk-factors/health-effects-linked-with-trichloroethylene-tce-tetrachloroethylene-pce-benzene-and-vinyl.html

[2] https://waterhealthcheck.com/us/contaminants/pfoa

[3] https://wwwn.cdc.gov/TSP/PHS/PHS.aspx?phsid=171&toxid=30

[4] https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/risk-evaluation-trichloroethylene-tce-0

[5] https://www.epa.gov/pfas/our-current-understanding-human-health-and-environmental-risks-pfas

[6] https://www.atsdr.cdc.gov/pfas/hcp/clinical-overview/health-effects.html

[7] https://pmc.ncbi.nlm.nih.gov/articles/PMC10537801/

Section 10: Appendix

The following maps are included in this report to provide geographic context for all findings. Maps should be read together to understand the relationship between the historical contamination plume, current monitoring well locations, and the private wells tested in this project.

Map 1: Historical Contamination Plume Extent (1997, 2001, 2005)

Source: Xavier Utset EGLE/RIDE Record Review, May 2026 — Annexes 10a, 10b, 10c

This series of three maps illustrates the documented migration of the Pullman Industries Inc. contamination plume over time, based on engineering investigations conducted by ABB (1997), Harding ESE (2001), and FTCH (2005). Key features shown:

- Estimated plume boundary at each time period (1,200 ft × 300 ft at maximum documented extent)
- Direction of plume migration — southwestward toward Scott Creek
- Scott Creek as the southern hydraulic boundary of the plume
- Former PII facility location at 5576 109th Avenue as the confirmed contamination source
- Note: The most recent plume map available in EGLE records is from 2005 — more than 20 years ago. The current extent of the plume is unknown and must be updated as part of any future remediation planning (Utset, May 2026, EGLE ID889)

Figure 1: Annex 10a — Map of Horizontal Extent of the Plume 1997 (EGLE ID245)

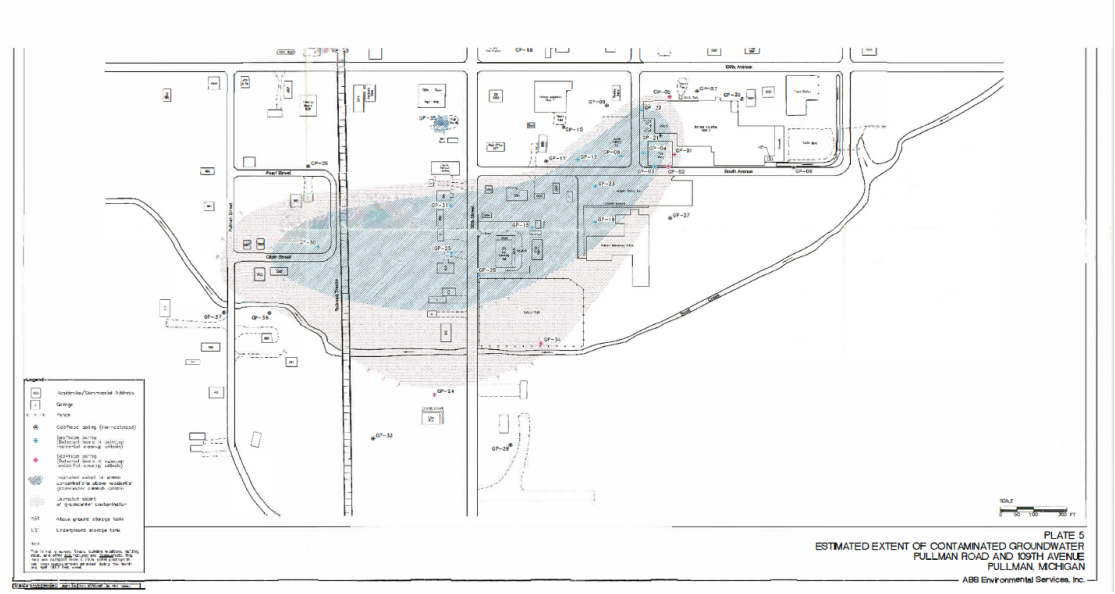
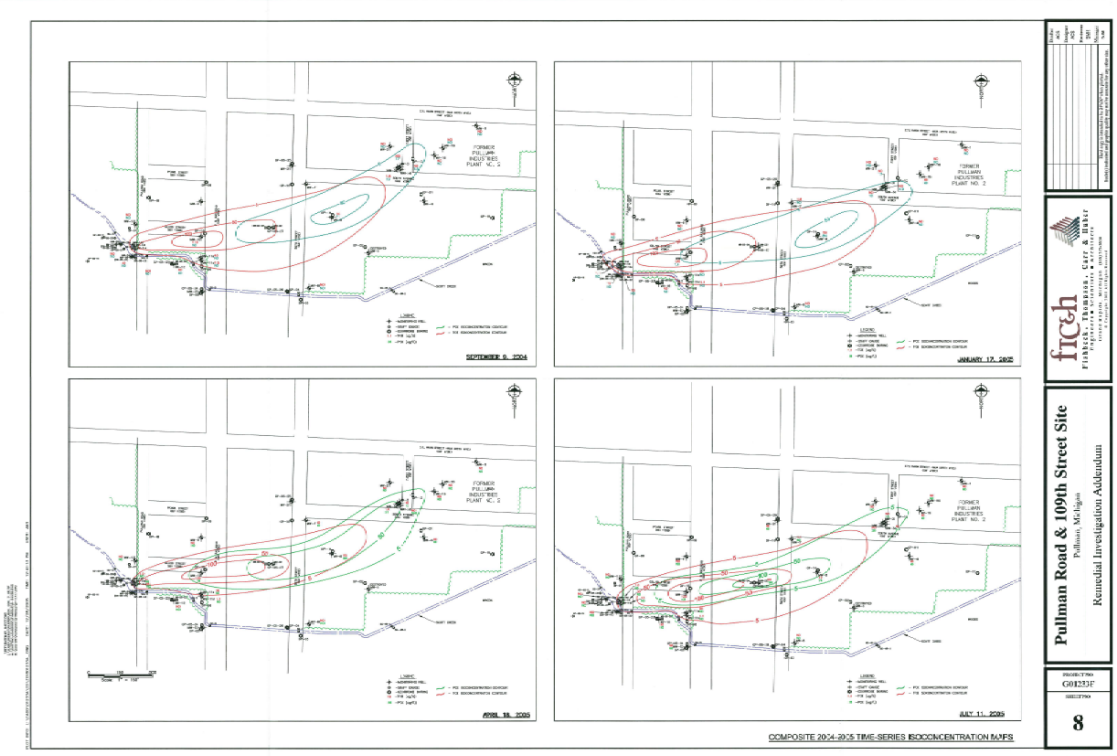


Figure 2: Annex 10b — Map of Horizontal Extent of the Plume 2001 (EGLE ID524)



Figure 3: Annex 10c — Map of Horizontal Extent of the Plume 2005 (EGLE ID889)



Map 2: Monitoring Well Locations & 2026 Analytical Results

Source: Michigan Consulting & Environmental, Site Layout Map, Project No. 51948.3, Drawing Date 2026-07-23

This map shows the locations of the existing monitoring well network sampled by MCE on June 17–19, 2026. Key features shown:

- All 11 monitoring wells sampled (MW-3S, MW-3D, MW-6, MW-7, MW-9, MW-11S, MW-11D, MW-13, MW-14S, MW-14I, MW-14D)
- Wells where contaminants exceeded Michigan Part 201 criteria — highlighted with exceedance levels noted
- Wells where PFAS exceeded EPA MCL or Michigan screening criterion — highlighted separately
- MW-5 and MW-10 — noted as abandoned/destroyed and not available for sampling
- Scott Creek Drain — shown as the southern boundary of the study area

- Former PII facility location for reference

Figure 4: MCE Figure 2 — Site Layout Map, Project No. 51948.3

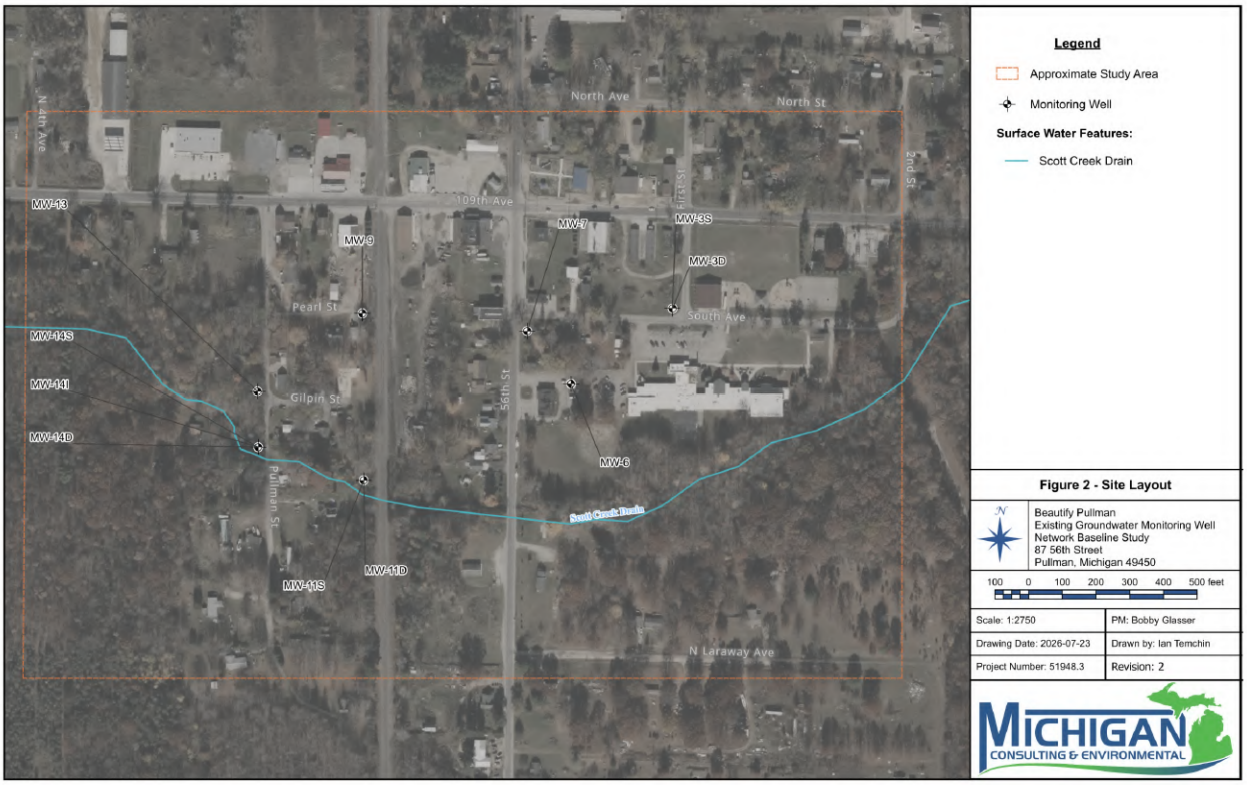


Figure 5: MCE Figure 4 — Analytical Results Map, Project No. 51948.3

