
To: Mr. Brian Steglitz, PE, City of Ann Arbor, Manager – Water Treatment

From: Patti McCall, CPG, PWS

Date: December 12, 2020

Subject: Hydrogeological Services – 1,4-dioxane Residential Basement Sampling

The City of Ann Arbor (City) has requested services to assist with the sampling of 1,4-dioxane in flooded basement water of residential homes in the Gelman plume footprint where groundwater is shallow. The following information describes the methodology used to determine the highest potential area where 1,4-dioxane may be present in flooded basement water.

Methodology

Tetra Tech was asked to determine where 1,4-dioxane impacted groundwater may infiltrate into residential basements near West Park. The area was determined using the following information:

- Monitoring Wells: MW-97s, MW-98s, MW-99s, Eaton-101s, Eaton-106s & Eaton-107s.
- Static Water Levels: Recovered from Potentiometric Surface Map of Unit E aquifer (March 21, 2019) by Fleis & Vandenbrink.
- 1,4-Dioxane Concentration Data: Recovered from 1,4-Dioxane Isoconcentration Map of Unit E aquifer (April 2019 – September 2019) by Fleis & Vandenbrink.
- 1,4-Dioxane 1 ppb plume boundary: Shapefile generated from Scio Resident for Safe Water (SRSW) Google Earth KMZ file.
- Topographic Data: Topographic contours generated from 1m Digital Elevation Model of Washtenaw County, Michigan from the United States Geological Survey National Elevation Dataset.
- Ground Surface Elevation Data: Department of Environment, Great Lakes and Energy Master Well List dated 8/2/2019 was used to determine ground surface and top of casing elevation data for monitoring wells.

After pulling the above information together, Tetra Tech identified the 850 foot contour as a significant topographic feature that was used to define the western boundary. After review, Tetra Tech evaluated the intersection of the following pieces of information to identify the high risk area:

- Areas where groundwater is potentially within 25 feet of the ground surface.
- Areas within the defined 1,4-dioxane plume boundary greater than 1 ppb.
- Areas at the leading edge of 1 ppb that may not have monitoring wells installed nearby.

Tetra Tech identified a residential area that may experience wet basements (**Figure 1**). This area is defined by the 850' topographic contour line to the west, the 1 ppb plume boundary to the north and surficial topographical features to the south. The area encompasses homes that are primarily within the current 1,4-dioxane plume, potentially have groundwater 25 feet below the ground surface and are in a topographical depression. If wet basements are present in this area, the floodwaters will be sampled. The process to

determine when a basement is flooded is likely to involve sending a survey to these identified homes. Once the surveys are received, a list will be compiled of the respondents who have experienced wet basements. When a wet basement occurs, it will be the responsibility of the homeowner to contact Tetra Tech to sample the water. At such time, Tetra Tech personnel will be onsite to sample and document the contents of the basement to help ascertain if 1,4-dioxane-containing materials are located in the area.

Other considerations:

- A process by which we would know if a basement is flooded after a rain event; this may be a survey of those residents; completed at the start of the project.
- Following this, there would need to be a process whereby we would contact residents to collect the floodwaters from their basement.
- Because 1,4-dioxane is in laundry detergent and other products, we should document the area in which the water is collected – near laundry supplies/appliances or a floor drain/sump, what type of floor we are collecting from (concrete, tile, laminate, etc.), evidence of staining.
- A sample of groundwater collected from a temporary monitoring well in a residential yard may be necessary to confirm if 1,4-dioxane detected in a basement is from the Gelman plume and not household or personal care products.