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Sent: Wednesday, January 16, 2019 2:58 PM
To: Neste, David E - DNR
Cc: Christopher D Behrend; Danko, Jeff; Verburg, Ben; Cobb, Michael; Alessi, Tim; Henry, Erin
Subject: Tyco FTC Marinette, Heath Lane Area Groundwater
Attachments: 2019.01.16_Fig1_Shallow_GW_Pot_Sfc_Nov_2018.pdf;
2019.01.16_Fig2_VAP_Inv_and_Priv_Well_Results_Rader-Heath.pdf

Dave,

As WDNR is aware, Tyco completed additional investigation activities in October and November 2018. Specifically, groundwater samples were collected from five vertical aquifer profiling (VAP) borings, each with three to four intervals. In addition, five temporary piezometers were installed to assess groundwater elevations and flow directions southeast of the site. This data supports the conclusion that additional delineation to the south is not warranted. These data have been discussed with WDNR; however, the data have not yet been formally submitted to WDNR, as they were generated subsequent to the September 2018 SIR. These data will be formally submitted in a forthcoming Data Summary Report. The attached figures illustrate the conditions in the Heath Lane area:

1. Figure 1. Shallow Groundwater Potentiometric Surface – November 2018. The groundwater elevation contour lines on this figure make use of the existing monitoring well, piezometer and stream gauge network, which extends as far south as Rader Road. South of Rader Road, Arcadis has extended inferred contours based on approximate surface water elevations, and historical groundwater gradient direction information from the Heath Lane Landfill.
2. Figure 2. VAP Investigation and Private Well Sampling Results – Rader Road and Heath Lane area. This figure includes perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) analytical results for sand unit VAP borings within the Rader Road and Heath Lane area. Private well sampling results and inferred shallow groundwater contours also are provided.

From these two figures, the following observations have been made:

- The inferred potentiometric surface shows that groundwater flow to the Heath Lane area most likely trends from the northwest (see attached Figure 1).
- In the Heath Lane area, all VAP sample results are non-detect or well below the United States Environmental Protection Agency (USEPA) lifetime Health Advisory Level (HAL) of 70 nanograms per liter (ng/L) for PFOA and PFOS combined. This includes VAP-36, where extensive resampling in October 2018 showed that the initial elevated detection was a sampling artifact or other anomaly.
- The 11 VAP borings in the Heath Lane area included a total of 38 sample intervals. Twenty-nine of the 38 intervals had results that were non-detect or detected below the Reporting Limit (RL; i.e., estimated values), 5 of the intervals had PFOA and/or PFOS concentrations that were between approximately 2.2 and 11 ng/L, and the 4 remaining intervals had PFOA and/or PFOS concentrations between approximately 14.8 and 24.4 ng/L. The 11 borings include VAP-36 (re-sampled), -37, -38, -40, -41, -42, -43, -48, -49, -50 and -51. It is worth noting that of the 11 borings, 6 had non-detect results or results below 5 ng/L of PFOA and/or PFOS for all intervals sampled.
- There is an arc of seven VAP borings with non-detect or very low detections northwest of the eastern end of Heath Lane and Edwards Avenue (VAP-37, -38, -42-, -43, -49, -50, and -51; 24 intervals; see attached Figure 2). Four of these borings had non-detect values or

results below the RL for all intervals; the other three borings had combined PFOA/PFOS detections between approximately 2.2 and 5.6 ng/L.

- Of the four VAP borings (total of 14 intervals sampled) where PFOA/PFOS was detected in the Heath Lane area (VAP-36, -40, -41 and -48), 9 of the 14 intervals had non-detect values or results below the RL for all intervals. One of the intervals had a detection of 2.4 ng/L for PFOA, three of the intervals had detections of approximately 14.8 to 17.7 ng/L for PFOA and/or PFOS, and one of the intervals had a combined PFOA/PFOS concentration of approximately 24.4 ng/L
- The grouping of four VAP borings in the Heath Lane area noted above is spatially isolated from areas of detections farther north. Samples from multiple upgradient VAP locations north and east of this grouping contained no PFOA/PFOS or only very low concentrations.
- Both VAP and private wells sample results from the Rader Road and Stanley Lane area show the absence of detections even farther upgradient of the Heath Lane area.
- The mixture of PFOA and PFOS detected in the Heath Lane area VAP borings is distinctly different from detections found in northern portions of the study area. In general, detections potentially associated with the Site have been PFOA-dominant. However, at three of the four VAP borings in the grouping noted above (VAP-36, VAP-41, and VAP-48), the detections are PFOS-dominant, indicating a different mixture and likely a different source.

Based on these observations, we conclude that the isolated low-level detections of PFOA and PFOS in groundwater in the Heath Lane area did not migrate there from the northwest. Therefore, these detections appear to be unrelated to the detections found farther north/northwest, and, as such, additional sampling in the Heath Lane area by Tyco is not warranted. As part of future Site investigation activities, Tyco will consider installation of additional permanent groundwater monitoring wells to further understand groundwater flow in the Town of Peshtigo.

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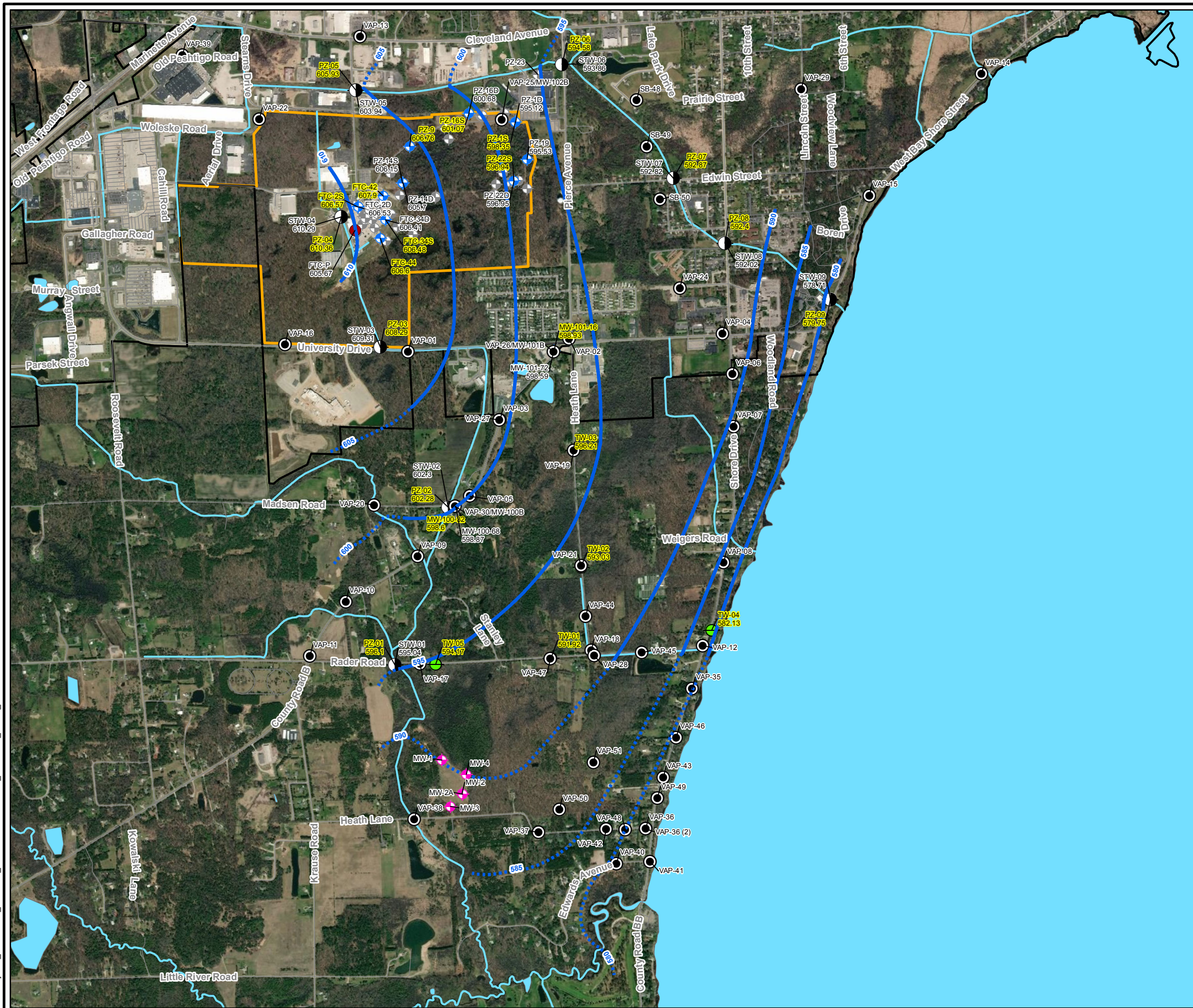
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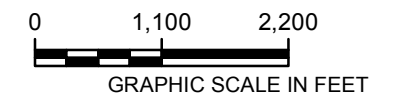
LEGEND:

- MONITORING WELL
- PIEZOMETER
- STILLING WELL
- TEMPORARY PIEZOMETER
- SITE PRODUCTION WELL
- MONITORING WELL (WATER LEVEL NOT MEASURED)
- HEATH LANE LANDFILL WELL
- APPROXIMATE SITE PROPERTY BOUNDARY
- APPROXIMATE MARINETTE CITY BOUNDARY
- ROAD
- DITCH/STREAM
- WATERBODY
- NOVEMBER 2018 GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)

1/16/2019

NOTES:

1. DEPTH TO WATER AT PIEZOMETER AND STILLING WELL PAIRS PZ/STW-01 THROUGH PZ/STW-09 WAS MEASURED ON 11/9/2018.
2. DEPTH TO GROUNDWATER WAS MEASURED AT REPRESENTATIVE PERMANENT AND TEMPORARY WELLS ON 11/15/2018. WELLS THAT ARE SHOWN IN GRAY WERE NOT GAUGED DURING THIS EVENT.
3. HIGHLIGHTED WELLS WERE USED FOR CONTOURING THE SHALLOW GROUNDWATER POTENTIOMETRIC SURFACE. THE WATER ELEVATIONS MEASURED AT STILLING WELLS AND DEEPER GROUNDWATER WELLS HAVE ALSO BEEN PROVIDED FOR REFERENCE.
4. WATER LEVEL DATA FROM DECEMBER 2013 FOR WELLS ASSOCIATED WITH THE HEATH LANE LANDFILL WERE REVIEWED AND CONSIDERED WITH RESPECT TO GRADIENT DIRECTION.
5. THE LOCATIONS OF THE HEATH LANE LANDFILL WELLS ARE APPROXIMATE.
6. CITY BOUNDARY DATA SOURCE: WISCONSIN LEGISLATIVE TECHNOLOGY SERVICES BUREAU, WISCONSIN COUNTY CLERKS AND LAND INFORMATION OFFICES, ACCESSED FALL 2017.
7. DITCH/STREAM DATA SOURCE: U.S. GEOLOGICAL SURVEY NATIONAL HYDROGRAPHY DATASET, ACCESSED FALL 2017.
8. ROAD DATA SOURCE: OPEN STREET MAP, ACCESSED FALL 2017.
9. AERIAL IMAGERY: 4/27/2016 DIGITALGLOBE, VIVID-USA



TYCO FIRE PRODUCTS, LP
 MARINETTE, WISCONSIN

SHALLOW GROUNDWATER
 POTENTIOMETRIC SURFACE
 NOVEMBER 2018



