June 18, 2018 Reference No. 004535-62

Ms. Gina Keenan
Wisconsin Department of Natural Resources
Western District Office
1300 West Clairemont Avenue
Eau Claire, Wisconsin 54702-4001

Dear Ms. Keenan:

Re: **Wisconsin Department of Natural Resources Progress Report # 49**
**Groundwater Treatment System**
**Former Eau Claire Sanitary Landfill, Eau Claire, Wisconsin**

On behalf of the Former Eau Claire Sanitary Landfill PRP Group (Group), this letter provides the progress report required by NR 724, Section 13 for the groundwater interception system interim response measure (IRM) at the former landfill. NR 724, Section 13 initially required quarterly reporting. After consideration of the project objectives by the Wisconsin Department of Natural Resources (WDNR), reporting requirements were changed to a semiannual frequency. This Progress Report provides the results reported between October 1, 2017 and March 31, 2018.

## 1. WDNR Correspondence, Meetings, and Events

December 21, 2017 GHD Services Inc. (GHD) letter to WDNR (Keenan) providing Progress Report #48.

## 2. System Description

Groundwater is extracted from three extraction wells (EW1, EW2, and EW3) and treated using an air stripping tower to remove volatile organic compounds (VOCs). Treated water flows by gravity drain to the Chippewa River. The WPDES wastewater permit (WI 0046566-3) limits the discharge rate to no more than 500 gallons per minute (gpm).

## 3. Site Maps and Figures

A map of the Site location is provided as Figure 1. The piping schematic for the extraction and treatment system is presented on Figure 2. Figure 3 shows groundwater contours and the approximate zone of capture for the extraction system. Figure 4 shows total VOC concentrations in groundwater across the Site based on the April 2017 monitoring event. Figure 5 shows the annual average total VOC concentration at each extraction well since 2000. Figure 6 shows the cumulative mass of VOCs removed by each extraction well.

GHD
1801 Old Highway 8 Northwest Suite 114 St Paul Minnesota 55112 USA
**T** 651 639 0913 **F** 651 639 0923 **W** www.ghd.com

REGISTERED COMPANY FOR ISO 9001 ENGINEERING DESIGN

## 4. Monitoring Requirements

In accordance with the WPDES permit, discharged water was sampled for the analytes, laboratory analytical methods, and frequency listed in Table 1 of the Discharge Management Plan dated November 27, 1996, which was submitted by the Group to the WDNR as part of the permit requirements. WDNR approved the Discharge Management Plan on December 16, 1996.

By letter dated October 30, 1997, WDNR authorized a reduction in sampling of the discharge water to a monthly frequency. By memo dated November 6, 1997, WDNR formally approved that discharged sampling results can be reported with other WDNR required information in the Quarterly Progress Reports instead of monthly WPDES reporting. By letter dated November 4, 1998, WDNR formally approved a quarterly sampling schedule for wastewater discharge, rather than monthly. Wastewater discharge samples are analyzed for VOCs and select metals (lead, copper, nickel, zinc, silver, and iron). By letter dated January 20, 2004, WDNR reduced wastewater sampling frequency to semiannual.

## 5. Sample Collection and Analysis

The treatment system effluent was sampled on October 16, 2017. An unmodified grab sample was collected after treatment and prior to mixing with the receiving water (Chippewa River). Discharge flows were measured and recorded during the sampling events.

Metals and TSS analyses were performed by the City of Eau Claire and VOC analyses were performed by the Eau Claire County Health Department. Table 1 provides a summary of the effluent sample results.

## 6. Remediation System Progress

The system is in full compliance with the WPDES permit. The October 2017 effluent results indicate that there were no exceedances above discharge limits during the six months of operation. Discharge flow rates were below the maximum rate (500 gpm) specified in the permit. A summary of the system operation data for the six month period is presented in Table 2.

Since startup (June 23, 1997), 2 billion gallons of water have been discharged and approximately 744 pounds of VOCs have been removed as of March 31, 2018. These calculations are based on influent VOC concentrations provided by the City of Eau Claire. The water treatment system operated continuously throughout the period.

Groundwater extraction rates during the fourth quarter of 2017 (October – December 2017) for wells EW1, EW2, and EW3 averaged 87, 31, and 0 gpm, respectively (total = 118 gpm). ). Extraction rates during the first quarter of 2018 (January - March 2018) for wells EW1, EW2, and EW3 averaged 80, 0 and 0 gpm, respectively (total = 80 gpm). EW1 pumped continuously over the six month period. EW2 experienced a pump failure in December 2017 and did not operate for the remaining fourth quarter of 2017 and all of the

first quarter of 2018. EW3 experienced a pump failure in August 2017 and did not operate during the third quarter of 2017 and the first quarter of 2018.

## 7. Pertinent Data

Data pertinent to the system progress is provided in the attached tables and figures. Historical groundwater elevations are presented in Table 3. Elevations for the full monitoring well network are measured once per year in April. Figure 3 presents the contours for elevations measured in April 2017. Figure 5 provides a graph of total VOC concentrations at each extraction well over time. Figure 6 presents a graph showing cumulative mass of VOC removal versus time.

## 8. Laboratory Reports

The laboratory reports for treatment system discharge samples are provided in Attachment 1. Groundwater data from monitoring wells are provided to the WDNR under separate cover.

## 9. Operations and Maintenance Form

This form, which is required to be submitted on a semiannual basis, is provided in Attachment 2.

## 10. Future Activities

Sampling of the treatment system discharge will continue semiannually for VOCs, metals, and TSS. Site-wide sampling will continue in accordance with the long-term monitoring program.

Should you have any questions or comments, please do not hesitate to contact us.

Sincerely,

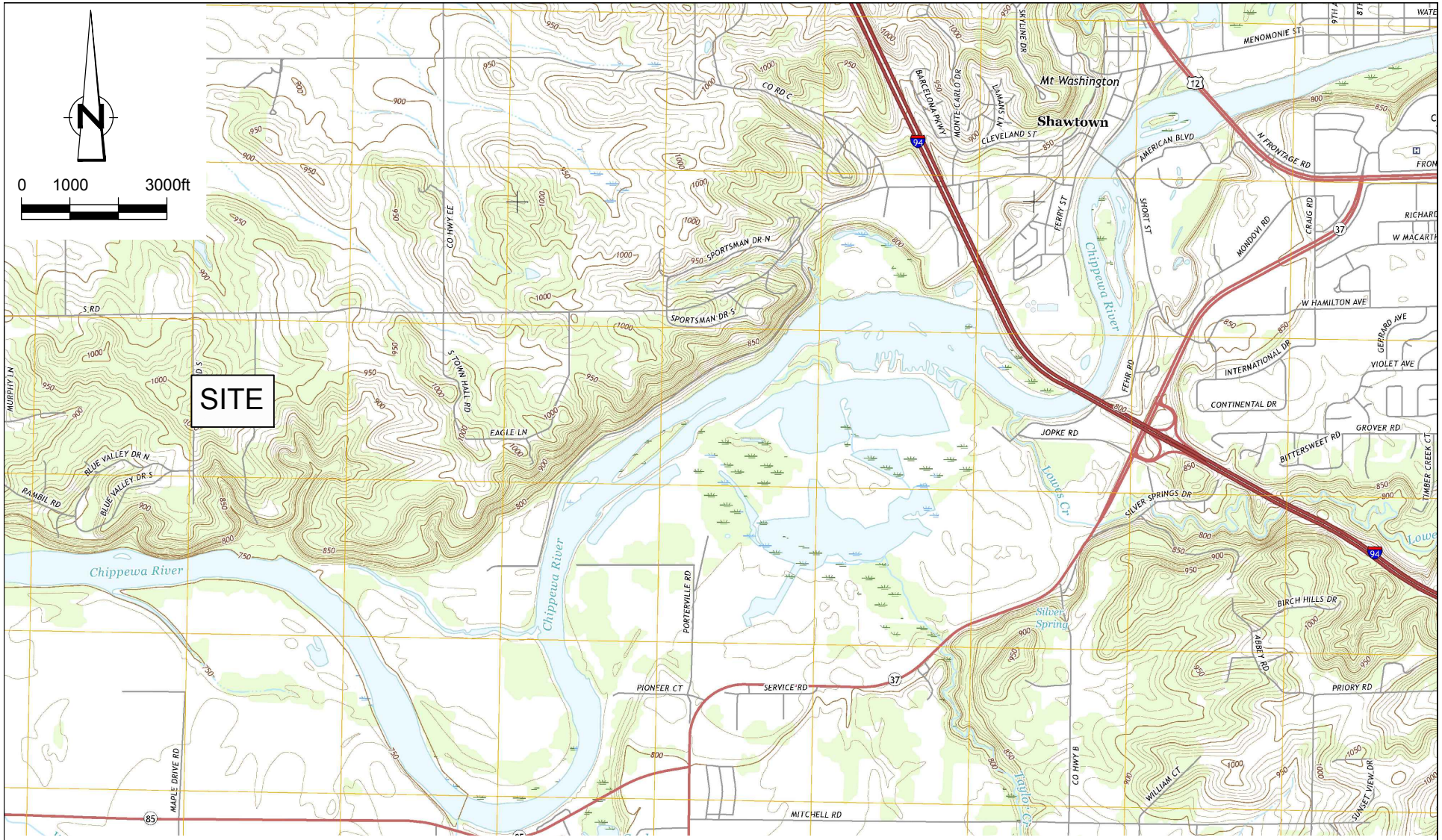
GHD

Shawn G. Horn, P.E.

CA/sb/6

Encl.

cc: Colleen Schian, City of Eau Claire

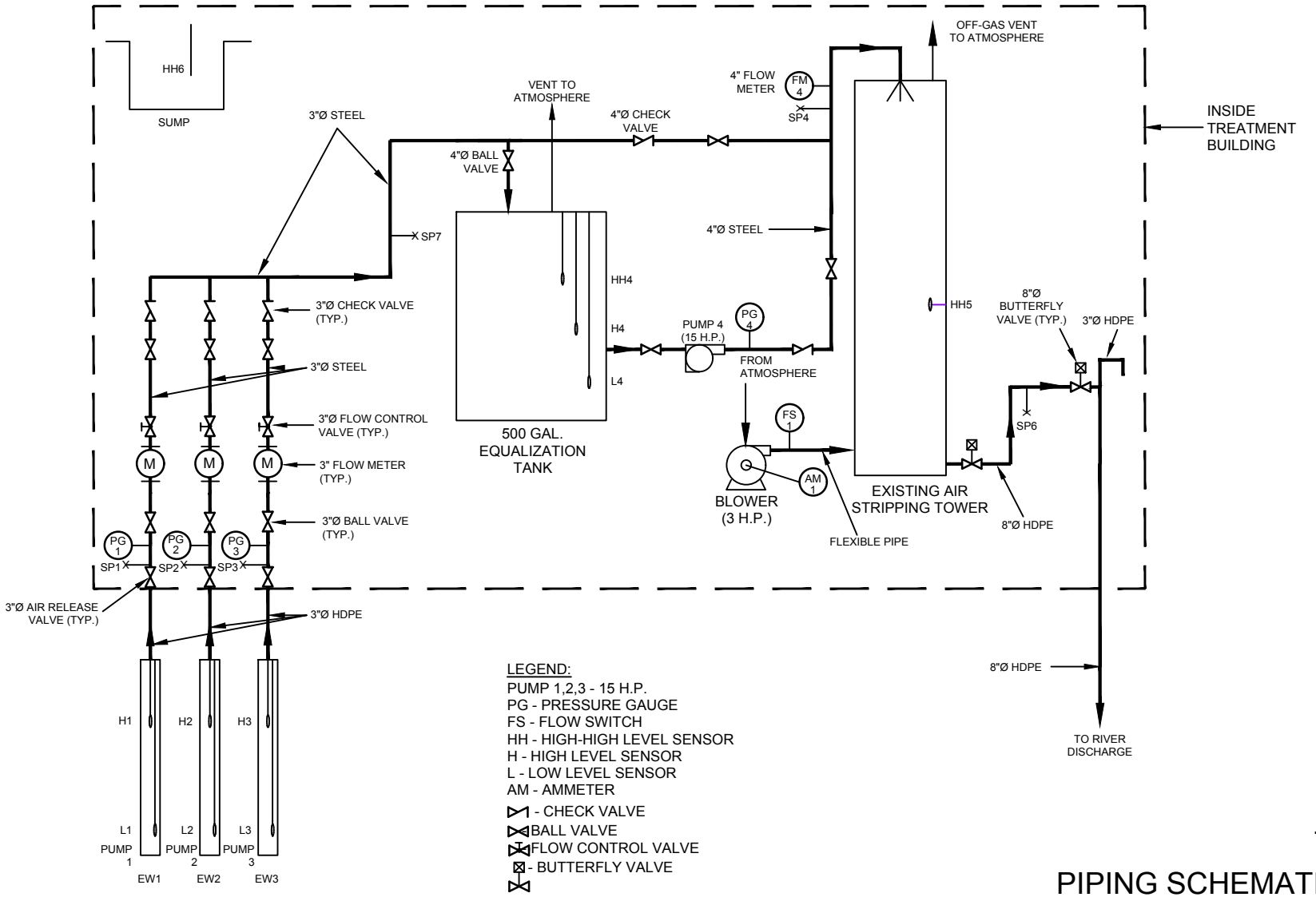



SOURCE: USGS TOPOGRAPHIC MAP
EAU CLAIRE WEST, WISCONSIN, 2015.

figure 1

SITE LOCATION
FORMER EAU CLAIRE LANDFILL
*Eau Claire, Wisconsin*

GHD



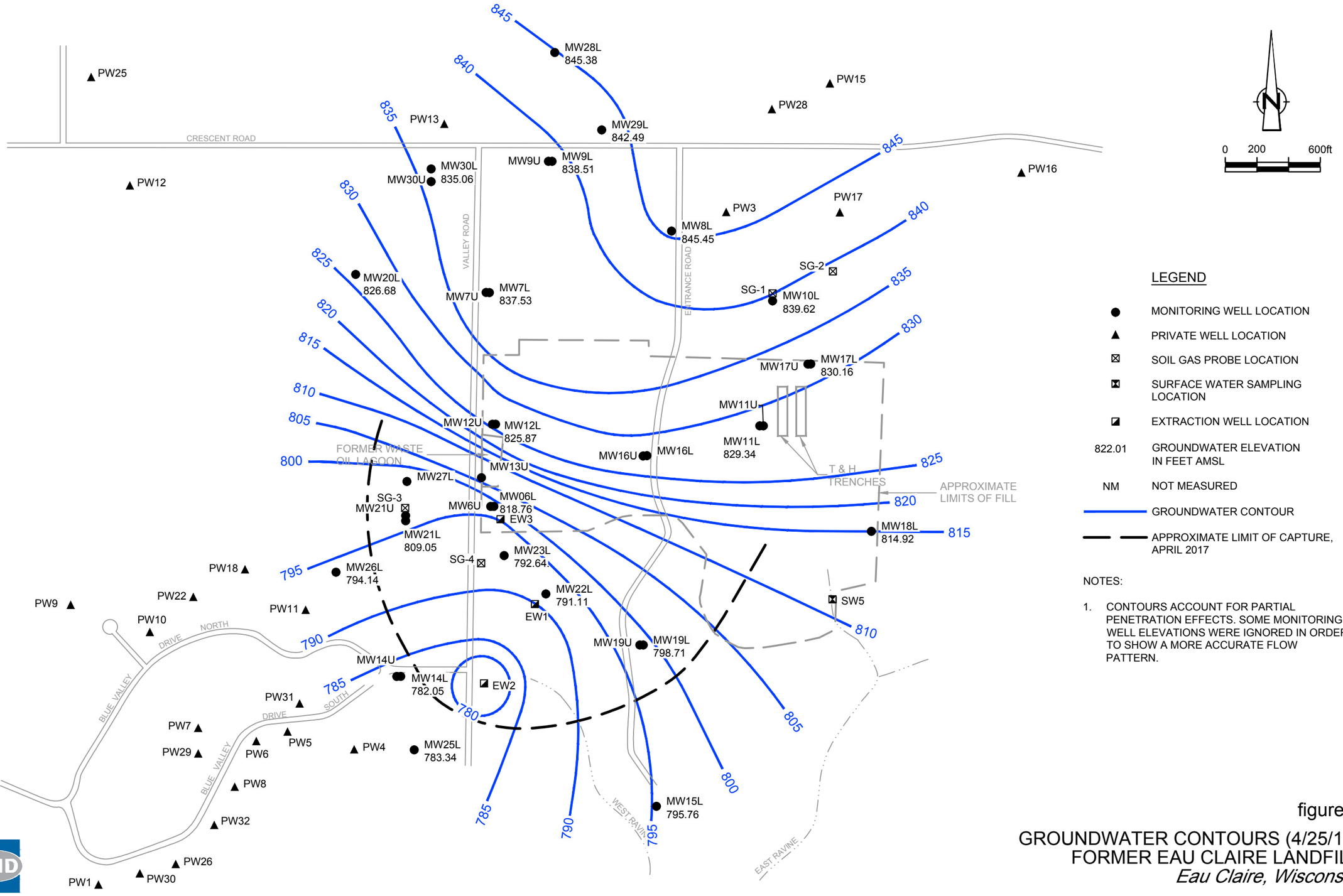

LEGEND:
PUMP 1,2,3 - 15 H.P.
PG - PRESSURE GAUGE
FS - FLOW SWITCH
HH - HIGH-HIGH LEVEL SENSOR
H - HIGH LEVEL SENSOR
L - LOW LEVEL SENSOR
AM - AMMETER
- CHECK VALVE
- BALL VALVE
- FLOW CONTROL VALVE
- BUTTERFLY VALVE

NOT TO SCALE

figure 2

# PIPING SCHEMATIC FOR EXTRACTION AND TREATMENT SYSTEM FORMER EAU CLAIRE LANDFILL

*Eau Claire, Wisconsin*




LEGEND

- MONITORING WELL LOCATION
- PRIVATE WELL LOCATION
- SOIL GAS PROBE LOCATION
- SURFACE WATER SAMPLING LOCATION
- EXTRACTION WELL LOCATION
- 822.01 GROUNDWATER ELEVATION IN FEET AMSL
- NM NOT MEASURED
- GROUNDWATER CONTOUR
- APPROXIMATE LIMIT OF CAPTURE, APRIL 2017

NOTES:

1. CONTOURS ACCOUNT FOR PARTIAL PENETRATION EFFECTS. SOME MONITORING WELL ELEVATIONS WERE IGNORED IN ORDER TO SHOW A MORE ACCURATE FLOW PATTERN.

figure 3

GROUNDWATER CONTOURS (4/25/17)
FORMER EAU CLAIRE LANDFILL
*Eau Claire, Wisconsin*

GHD

04535-62(KEEN006)GN-WA003 JUN 19, 2018

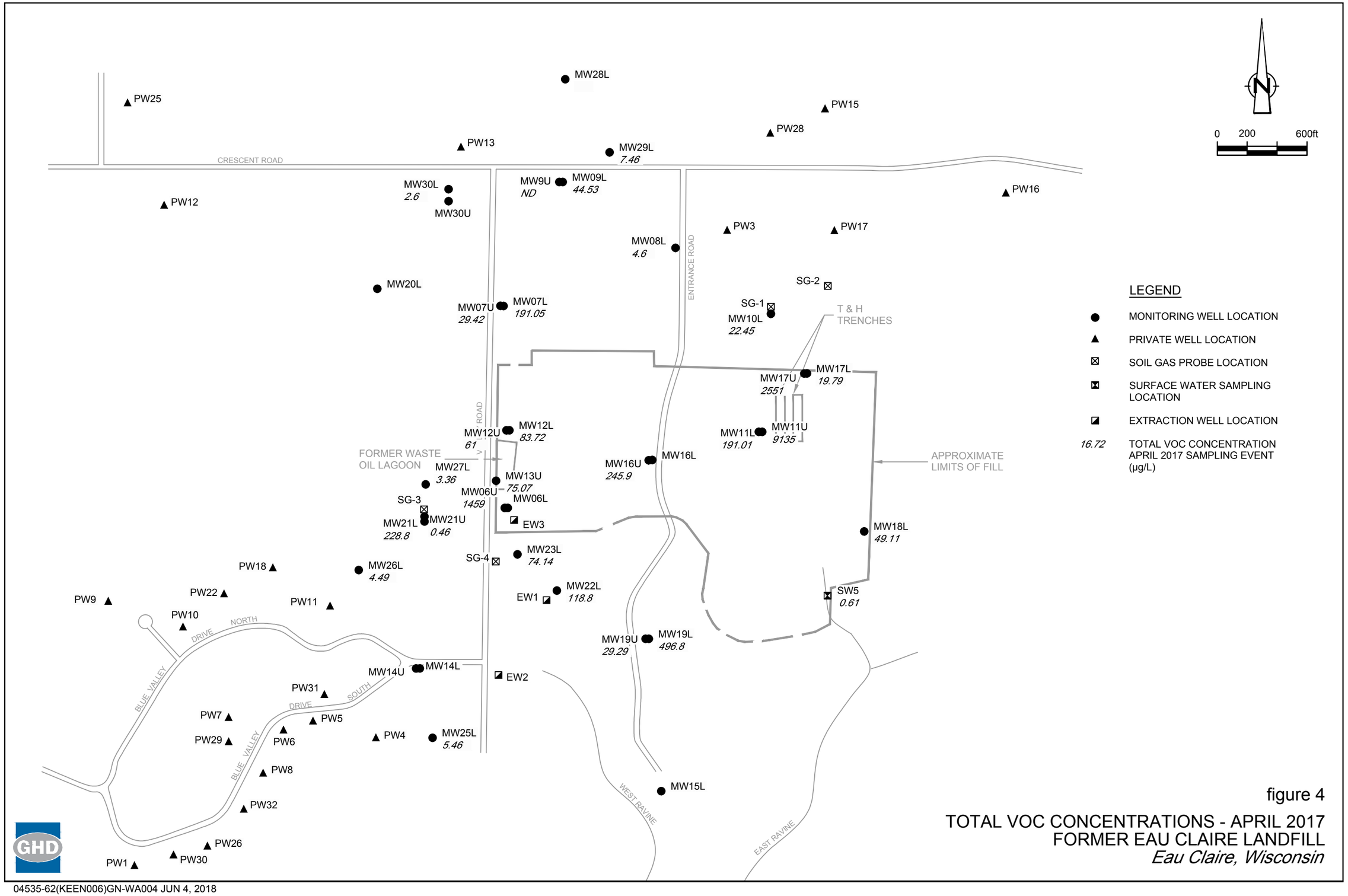



figure 4

TOTAL VOC CONCENTRATIONS - APRIL 2017
FORMER EAU CLAIRE LANDFILL
*Eau Claire, Wisconsin*

04535-62(KEEN006)GN-WA004 JUN 4, 2018

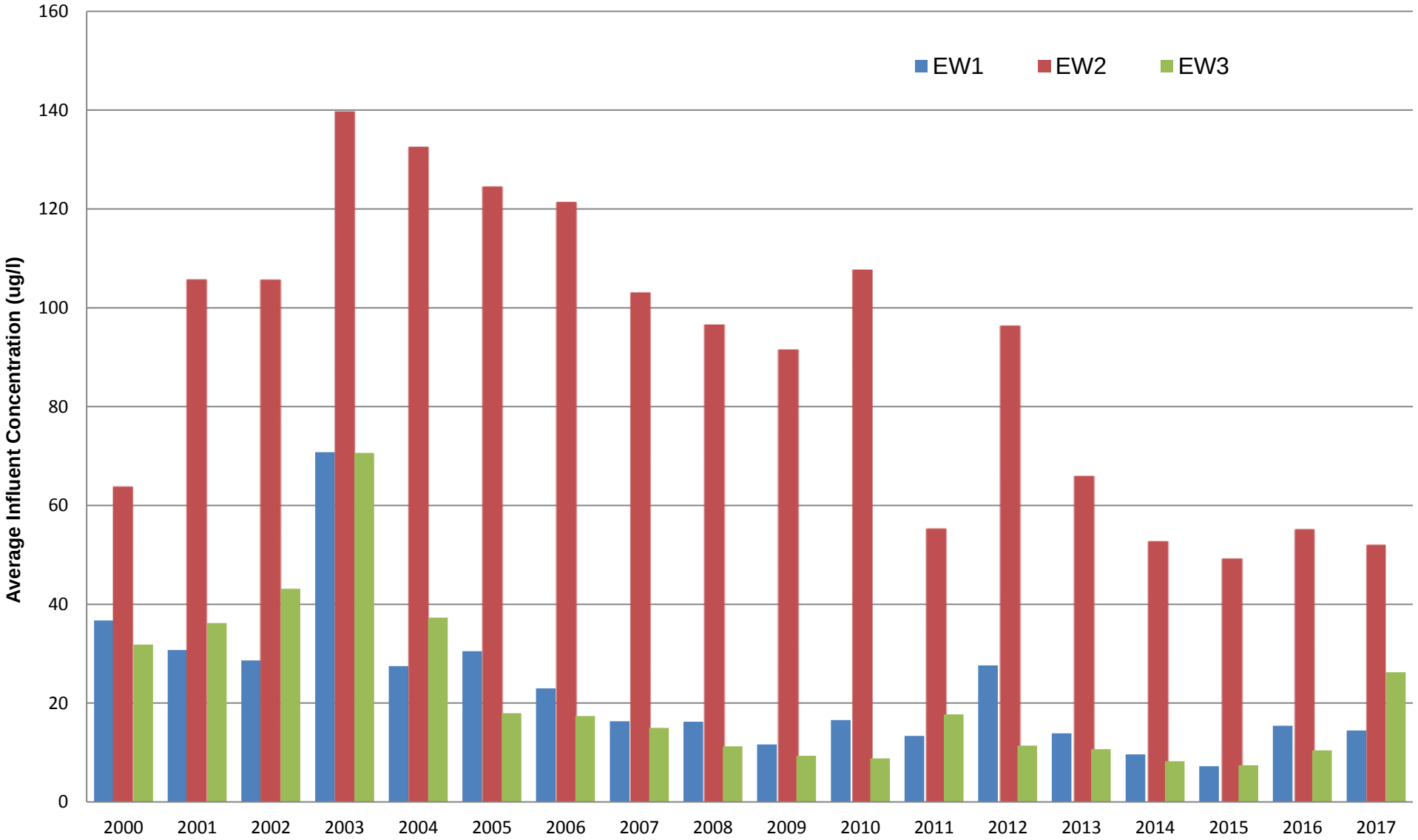



**Figure 5**

**Extraction Well Influent Average Annual Total VOC Concentrations**
**Former Eau Claire Landfill**
**Eau Claire, Wisconsin**

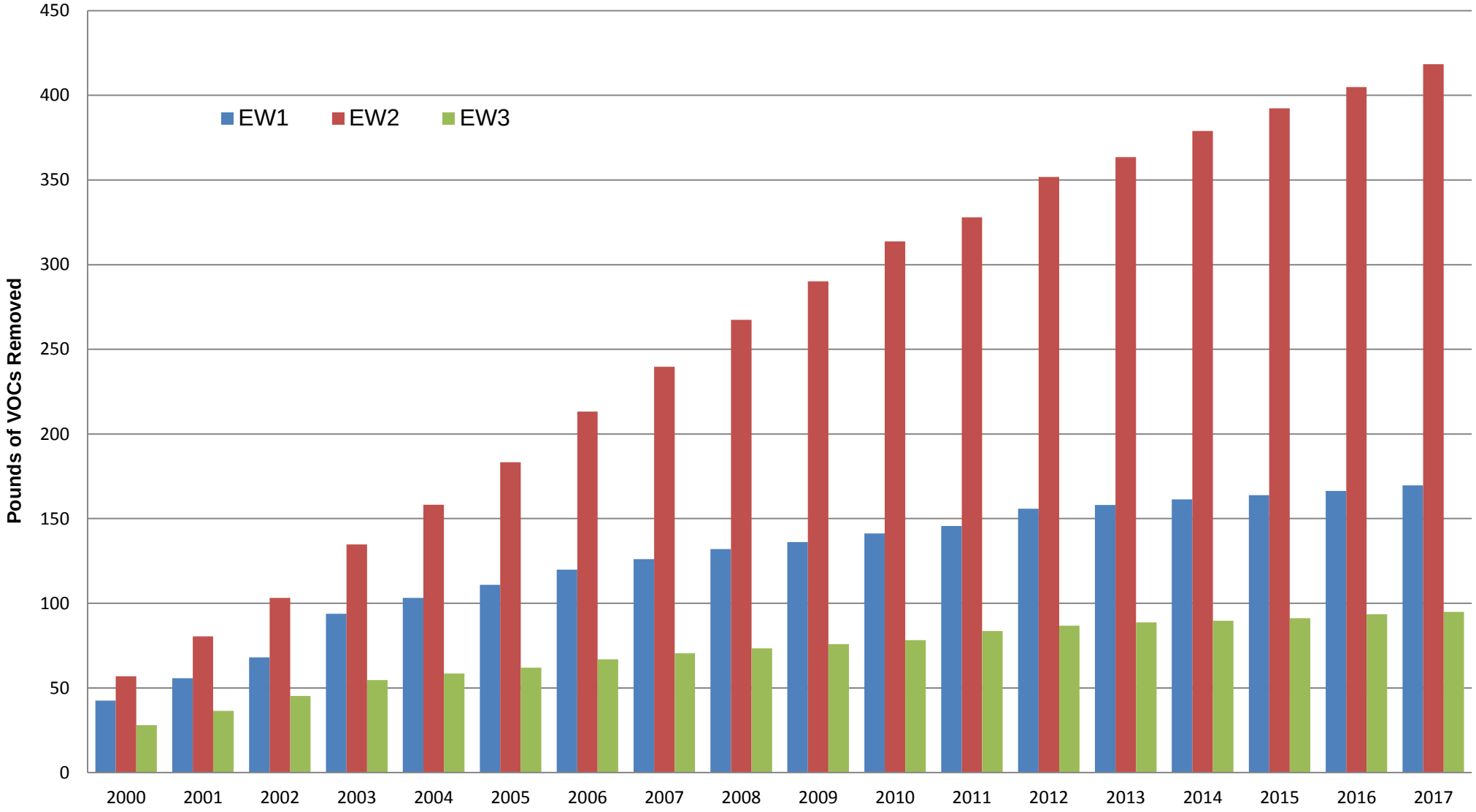



**Figure 6**

**Extraction Well Cumulative VOC Mass Removed**
**Former Eau Claire Landfill**
**Eau Claire, Wisconsin**

**Table 1**

**Summary of Results**
**Discharge Sample Results**
**Former Eau Claire Landfill**
**October 2017**

| Parameter | Units | Sampling Event 10/16/2017 | Permit Criteria |
|---|---|---|---|
| Tetrachloroethene | µg/L | <0.16 | 50 |
| 1,1,2-Trichloroethane | µg/L | <0.14 | 50 |
| Bromoform | µg/L | <0.14 | 120 |
| Carbon Tetrachloride | µg/L | <0.31 | 150 |
| Chloroform | µg/L | **0.32** | 120 |
| Bromodichloromethane | µg/L | <0.12 | 120 |
| 1,2-Dichloroethane | µg/L | **0.87** | 180 |
| 1,1-Dichloroethene | µg/L | **1.6** | 50 |
| Bromomethane | µg/L | <0.13 | 120 |
| Chloromethane | µg/L | <0.11 | 120 |
| 1,1,2,2-Tetrachlorethane | µg/L | <0.11 | 50 |
| 1,1,1-Trichloroethane | µg/L | <0.40 | 50 |
| Trichlorethene | µg/L | <0.22 | 50 |
| Vinyl Chloride | µg/L | <0.11 | 10 |
| Total Suspended Solids | mg/L | <1.0 | 40 |
| Lead | µg/L | <135 | 2536 |
| Copper | µg/L | <19 | 136 |
| Nickel | µg/L | <31 | 5055 |
| Zinc | µg/L | <41 | 617 |
| Silver | µg/L | <32 | 12.16 |
| Iron | µg/L | **255** | NL |
| Approximate Flow Rate (EW1, EW2, EW3) | gpm | 146 | 500 |

Notes:

NA - Not analyzed
NL - No limit established

**Table 2**

**System Operational Data**
**Groundwater Interception and Treatment System**
**Former Eau Claire Landfill**

| | 10/1/2017 - 12/31/2017 | 1/1/2018 - 3/30/2018 | Since 6/23/1997 |
|---|---|---|---|
| EW1 Gallons Extracted | 11,318,000 | 10,814,960 | 840,581,463 |
| EW2 Gallons Extracted | 4,898,720 | 0 | 589,409,185 |
| EW3 Gallons Extracted | 0 | 0 | 567,393,877 |
| **Total Gallons** | 16,216,720 | 10,814,960 | 1,997,384,525 |
| EW1 Average Flow Rate (gpm) | 87 | 80 | |
| EW2 Average Flow Rate (gpm) | 37 | 0 | |
| EW3 Average Flow Rate (gpm) | 0 | 0 | |
| **Average gallons per minute** | 124 | 80 | |
| Average Blower Air Flow Rate (cfm) | 750 | 620 | |

**Table 3**

**Water Table Elevations**
**Former Eau Claire Landfill**

| | Reference Elevation | 6/28/2002 | 6/16/2003 | 6/23/2004 | 6/23/2005 | 6/15/2006 | 6/26/2007 | 6/20/2008 | 3/31/09 |
|---|---|---|---|---|---|---|---|---|---|
| MW6L | 998.77 | 811.97 | 813.22 | 813.22 | 813.17 | NA | E | NA | NA |
| MW7L | 965.66 | 835.16 | 836.76 | 836.81 | 834.76 | 833.68 | 833.04 | 832.86 | 833.57 |
| MW8 | 921.03 | 843.90 | 846.88 | 843.56 | 841.21 | 838.48 | 834.68 | 837.80 | 836.71 |
| MW9L | 940.29 | 835.24 | NA | 836.85 | 834.00 | 832.29 | 828.50 | 828.04 | 829.25 |
| MW10 | 941.27 | 838.55 | 840.18 | 838.39 | 835.86 | NA | 829.99 | 830.52 | 833.46 |
| MW11L | 950.81 | 827.64 | 830.26 | 828.66 | 826.77 | 825.55 | 821.20 | 822.29 | 824.21 |
| MW12L | 977.68 | 822.31 | 822.76 | 822.83 | 822.52 | 821.23 | 821.28 | 820.88 | 821.46 |
| MW14L | 935.21 | 780.05 | 782.21 | 782.04 | 780.94 | 781.26 | 776.63 | 776.84 | 776.62 |
| MW15 | 868.55 | 795.14 | 795.81 | 794.99 | 794.37 | NA | 793.90 | 794.25 | E |
| MW16L | 963.76 | 820.35 | 822.75 | 822.36 | 820.78 | 820.61 | 813.12 | 814.51 | 815.41 |
| MW17L | 943.51 | 827.37 | 829.86 | 826.49 | 830.96 | 824.76 | 821.16 | 823.56 | 823.41 |
| MW18 | 911.33 | 814.94 | 817.90 | NA | 815.53 | NA | 807.43 | 809.10 | 808.13 |
| MW19L | 940.44 | 795.50 | 797.90 | 795.82 | 795.26 | 790.18 | 791.26 | 793.09 | 793.99 |
| MW20L | 961.90 | 823.69 | 826.09 | 826.83 | 823.84 | NA | 819.57 | 819.23 | 819.26 |
| MW21L | 962.29 | 806.59 | 811.07 | 808.65 | 807.29 | 822.30 | 804.33 | 803.86 | 803.51 |
| MW22L | 933.55 | 785.65 | 791.87 | 791.12 | 790.80 | NA | 786.82 | 786.68 | 786.89 |
| MW23L | 971.74 | 789.02 | 793.31 | 791.35 | 788.45 | NA | 785.69 | 788.04 | E |
| MW24L | 928.05 | NA | NA | NA | NA | NA | NA | NA | NA |
| MW25L | 943.78 | 773.86 | 775.31 | NA | 773.56 | NA | 770.14 | 770.36 | 769.80 |
| MW26L | 938.14 | 792.55 | 795.33 | 794.43 | 793.53 | NA | 789.06 | 788.75 | 788.90 |
| MW27L | 961.88 | NA | NA | NA | NA | 796.34 | 794.89 | 793.98 | E |
| MW28L | 899.00 | NA | NA | NA | NA | NA | NA | NA | NA |
| MW29L | 910.64 | NA | NA | NA | NA | NA | NA | NA | NA |
| MW30L | 952.36 | NA | NA | NA | NA | NA | NA | NA | NA |
| Approximate Combined Pumping Rate | | 213 | 187 | 172 | 201 | 206 | 207 | 192 | 214 |

**Table 3**

**Water Table Elevations**
**Former Eau Claire Landfill**

| | Reference Elevation | 6/25/10 | 4/15/2011 | 4/20/2012 | 4/29/2013-5/7/2013 | 4/21/2014-4/23/2014 | 4/6/2015-4/14/2015 | 4/11/2016-4/15/2016 | 4/24/2017-4/26/2017 |
|---|---|---|---|---|---|---|---|---|---|
| MW6L | 998.77 | 808.84 | 808.77 | 809.52 | 925.38 | 809.03 | NA | 810.33 | 818.76 |
| MW7L | 965.66 | 833.08 | 833.24 | 834.61 | 834.71 | 834.31 | 835.33 | 835.52 | 837.53 |
| MW8 | 921.03 | 833.06 | 838.15 | 840.03 | 826.16 | 838.26 | 841.32 | 843.45 | 845.45 |
| MW9L | 940.29 | 826.54 | 829.18 | 832.56 | 829.99 | 831.42 | 834.07 | 835.86 | 838.51 |
| MW10 | 941.27 | 830.46 | 834.05 | 837.89 | 832.01 | 833.67 | 836.58 | 837.35 | 839.62 |
| MW11L | 950.81 | 819.41 | 820.56 | 824.31 | 822.51 | 824.17 | 825.97 | 827.27 | 829.34 |
| MW12L | 977.68 | 820.73 | 818.70 | 821.87 | 822.19 | 821.88 | 824.44 | 820.98 | 825.87 |
| MW14L | 935.21 | 775.24 | 776.10 | 777.23 | NA | NA | NA | 779.67 | 782.05 |
| MW15 | 868.55 | 793.86 | 793.89 | 794.10 | NA | 793.69 | 794.22 | 794.75 | 795.76 |
| MW16L | 963.76 | 813.54 | 813.68 | 819.56 | 817.96 | 819.46 | 821.71 | 822.42 | NA |
| MW17L | 943.51 | 819.46 | 821.13 | 824.41 | 822.71 | 824.19 | 826.33 | 827.56 | 830.16 |
| MW18 | 911.33 | 805.48 | 808.67 | 809.76 | 808.91 | 810.10 | 811.84 | 812.93 | 814.92 |
| MW19L | 940.44 | 793.00 | 793.73 | 795.92 | 793.52 | 795.98 | 796.69 | 796.51 | 798.71 |
| MW20L | 961.90 | 818.40 | 817.73 | 821.3 | 820.38 | 820.42 | NA | 822.77 | 826.68 |
| MW21L | 962.29 | 802.74 | 802.53 | 804.07 | 804.39 | 804.31 | 807.42 | 806.54 | 809.05 |
| MW22L | 933.55 | E | 777.47 | 780.12 | 785.58 | 786.99 | 790.08 | 788.55 | 791.11 |
| MW23L | 971.74 | 784.26 | 784.99 | 785.78 | 786.44 | 788.08 | 791.14 | 789.36 | 792.64 |
| MW24L | 928.05 | NA | NA | NA | NA | NA | NA | NA | NA |
| MW25L | 943.78 | 769.08 | 770.14 | 770.53 | 771.2 | 771.28 | 772.82 | 772.65 | 783.34 |
| MW26L | 938.14 | 787.01 | 788.08 | 789.56 | 790.64 | 789.64 | 792.26 | 791.43 | 794.14 |
| MW27L | 961.88 | 792.44 | NA | 796.08 | 795.13 | 795.21 | 797.99 | E | E |
| MW28L | 899.00 | NA | 835.15 | 840.07 | 836.07 | 838.36 | NA | 842.77 | 845.38 |
| MW29L | 910.64 | NA | 833.02 | 836.17 | 832.37 | 834.32 | 837.38 | 839.77 | 842.49 |
| MW30L | 952.36 | NA | 825.36 | 829.13 | 827.16 | 827.25 | 830.46 | 831.56 | 835.06 |
| Approximate Combined Pumping Rate | | 208 | 193 | 190 | 214 | 198 | 129 | 190 | 125 |

Notes:

NA - Was not measured
E - Error in measurement

# Attachment 1
# Laboratory Reports

**Attachment 1**

**City of Eau Claire**
**GC/MS Volatiles**
**Stripping Tower Effluent**
**Blue Valley Landfill**

Date Sampled: 10/16/2017
Sampler: Kathy White and Ty Fadness
Analyst: Eau Claire County H.D.
Matrix: Water
Analysis Date: 11/6/17
Method: 8260

| Parameter | Detection Limit | Result | Units |
|---|---|---|---|
| Bromodichloromethane | 0.12 | ND | ug/L |
| Bromoform | 0.14 | ND | ug/L |
| Bromomethane | 0.13 | ND | ug/L |
| Carbon Tetrachloride | 0.31 | ND | ug/L |
| Chloroform | 0.17 | 0.32 | ug/L |
| Chloromethane | 0.11 | ND | ug/L |
| 2-Chlorotoluene | 0.34 | ND | ug/L |
| 1,1-Dichloroethane | 0.11 | 1.6 | ug/L |
| 1,2-Dichloroethane | 0.13 | 0.87 | ug/L |
| 1,1-Dichloroethene | 0.39 | ND | ug/L |
| 1,2-Dichloroethene (cis) | 0.16 | 0.82 | ug/L |
| 1,4-Dichlorobenzene | 0.32 | ND | ug/L |
| 1,2-Dichloropropane | 0.10 | ND | ug/L |
| 1,1,2,2-Tetrachloroethane | 0.11 | ND | ug/L |
| Tetrachloroethylene | 0.16 | ND | ug/L |
| 1,1,1-Trichloroethane | 0.40 | ND | ug/L |
| 1,1,2-Trichloroethane | 0.14 | ND | ug/L |
| Trichloroethylene | 0.22 | ND | ug/L |
| Vinyl chloride | 0.11 | ND | ug/L |
| Methylene chloride | 0.13 | 3 | ug/L |
| Hexachlorobutadiene | 0.32 | ND | ug/L |

shared/labdata/bluevalleyresults/strippingtower

**Attachment 1**

**City of Eau Claire**
**Stripping Tower Effluent**
**Blue Valley Landfill**

Date Sampled: 10/16/2017
Sampler: Kathy White and Ty Fadness
Date Received: 10/16/2017
Matrix: Groundwater
Analyst: Ty Fadness

| Parameter | Result | Detection Limit | Units | Date of Analysis | Method |
|---|---|---|---|---|---|
| Total Suspended Solids | 0 | 1.0 | mg/L | 10/16/2017 | 2540D |
| Lead | ND | 135 | ug/L | 11/21/2017 | 3111B-Pb |
| Copper | ND | 19 | ug/L | 11/21/2017 | 3111B-Cu |
| Nickel | ND | 31 | ug/L | 11/21/2017 | 3111B-Ni |
| Zinc | ND | 41 | ug/L | 11/21/2017 | 3111B-Zn |
| Silver | ND | 32 | ug/L | 11/21/2017 | 3111B-Ag |
| Iron | 255 | 50 | ug/L | 11/21/2017 | 3111B-Fe |

Note:

ND - Not Detected

shared/labdata/bluevalleyresults/metals

**Attachment 1**

**Eau Claire City-County Health Department**
**Sample Results - Volatile Organic Chemicals**
**Blue Valley Extraction Wells Testing**

Date Collected: 10/16/2017
Date Analyzed: 11/6/2017
Units - ug/l

| Parameter | Method | MDL | EW1 | EW2 | EW3 | COMB |
|---|---|---|---|---|---|---|
| 1,1,1,2-Tetrachloroethane | 8260 | 0.14 | ND | ND | ND | ND |
| 1,1,1-Trichloroethane | 8260 | 0.40 | 0.57 | 2.3 | 0.5 | 1.2 |
| 1,1,2,2-Tetrachloroethane | 8260 | 0.11 | ND | ND | ND | ND |
| 1,1,2-Trichloroethane | 8260 | 0.14 | ND | 1.3 | ND | ND |
| 1,1-Dichloroethane | 8260 | 0.11 | 4.5 | 21 | 14 | 13 |
| 1,1-Dichloroethene | 8260 | 0.39 | ND | 1.4 | ND | ND |
| 1,1-Dichloropropene | 8260 | 0.39 | ND | ND | ND | ND |
| 1,2,3-Trichlorobenzene | 8260 | 0.25 | ND | ND | ND | ND |
| 1,2,3-Trichloropropane | 8260 | 0.16 | ND | ND | ND | ND |
| 1,2,4-Trichlorobenzene | 8260 | 0.30 | ND | ND | ND | ND |
| 1,2,4-Trimethylbenzene | 8260 | 0.31 | ND | ND | ND | ND |
| 1,2-Dibromo-3-chloropropane | 8260 | 0.18 | ND | ND | ND | ND |
| 1,2-Dibromomethane | 8260 | 0.18 | ND | ND | ND | ND |
| 1,2-Dichlorobenzene | 8260 | 0.23 | ND | ND | ND | ND |
| 1,2-Dichloroethane | 8260 | 0.13 | ND | 2.6 | 2.9 | 1.5 |
| 1,2-Dichloropropane | 8260 | 0.10 | ND | ND | ND | ND |
| 1,3,5-Trimethylbenzene | 8260 | 0.31 | ND | ND | ND | ND |
| 1,3-Dichlorobenzene | 8260 | 0.28 | ND | ND | ND | ND |
| 1,3-Dichloropropane | 8260 | 0.24 | ND | ND | ND | ND |
| 1,4-Dichlorobenzene | 8260 | 0.32 | ND | ND | ND | ND |
| 2,2-Dichloropropane | 8260 | 0.29 | ND | ND | ND | ND |
| 2-Chlorotoluene | 8260 | 0.34 | ND | ND | ND | ND |
| 4-Chlorotoluene | 8260 | 0.32 | ND | ND | ND | ND |
| Benzene | 8260 | 0.16 | ND | ND | 1.2 | ND |
| Bromobenzene | 8260 | 0.25 | ND | ND | ND | ND |
| Bromochloromethane | 8260 | 0.15 | ND | ND | ND | ND |
| Bromodichloromethane | 8260 | 0.12 | ND | ND | ND | ND |
| Bromoform | 8260 | 0.14 | ND | ND | ND | ND |
| Bromomethane | 8260 | 0.13 | ND | ND | ND | ND |
| Carbon tetrachloride | 8260 | 0.31 | 0.58 | 0.78 | ND | 0.66 |
| Chlorobenzene | 8260 | 0.32 | ND | ND | 0.48 | ND |
| Chloroethane | 8260 | 0.15 | 1.5 | 3.2 | 5.3 | 1.9 |
| Chloroform | 8260 | 0.17 | ND | ND | 4.9 | 0.3 |
| Chloromethane | 8260 | 0.11 | ND | ND | ND | ND |
| cis-1,2-Dichloroethene | 8260 | 0.16 | 1.3 | 8.6 | 4.1 | 4.1 |
| cis-1,3-Dichloropropene | 8260 | 0.30 | ND | ND | ND | ND |
| Dibromochloromethane | 8260 | 0.14 | ND | ND | ND | ND |
| Dibromomethane | 8260 | 0.082 | ND | ND | ND | ND |
| Dichlorodifluoromethane | 8260 | 0.15 | 0.7 | 2.5 | 1.4 | 1.2 |

**Attachment 1**

**Eau Claire City-County Health Department**
**Sample Results - Volatile Organic Chemicals**
**Blue Valley Extraction Wells Testing**

Date Collected: 10/16/2017
Date Analyzed: 11/6/2017
Units - ug/l

| Parameter | Method | MDL | EW1 | EW2 | EW3 | COMB |
|---|---|---|---|---|---|---|
| Di-isopropyl ether | 8260 | 0.50 | ND | ND | ND | ND |
| Ethylbenzene | 8260 | 0.32 | ND | ND | ND | ND |
| Hexachlorobutadiene | 8260 | 0.32 | ND | ND | ND | ND |
| Isopropylbenzene | 8260 | 0.31 | ND | ND | ND | ND |
| m,p-xylene | 8260 | 0.42 | ND | ND | ND | ND |
| Methylene Chloride | 8260 | 0.13 | 1.5 | 2.6 | 2.9 | 3.5 |
| Methyl-t-butyl ether | 8260 | 0.50 | ND | ND | ND | ND |
| Naphthalene | 8260 | 0.44 | ND | ND | ND | ND |
| n-Butylbenzene | 8260 | 0.32 | ND | ND | ND | ND |
| o-Xylene | 8260 | 0.32 | ND | ND | ND | ND |
| para-Isopropyltoluene | 8260 | 0.30 | ND | ND | ND | ND |
| Propylbenzene | 8260 | 0.30 | ND | ND | ND | ND |
| sec-Butylbenzene | 8260 | 0.31 | ND | ND | ND | ND |
| Styrene | 8260 | 0.28 | ND | ND | ND | ND |
| t-Butylbenzene | 8260 | 0.31 | ND | ND | ND | ND |
| Tetrachloroethylene | 8260 | 0.16 | 0.82 | 2.9 | 1.6 | 1.5 |
| Toluene | 8260 | 0.30 | ND | ND | ND | ND |
| trans-1,2-Dichloroethene | 8260 | 0.13 | ND | ND | ND | ND |
| trans-1,3-Dichloropropene | 8260 | 0.30 | ND | ND | ND | ND |
| Trichlorethylene | 8260 | 0.22 | ND | 1.6 | ND | ND |
| Trichlorofluoromethane | 8260 | 0.16 | 0.44 | 0.65 | ND | 0.53 |
| Vinyl chloride | 8260 | 0.11 | 0.48 | 0.54 | 0.69 | ND |

Note:

* - Laboratory contamination (also detected in laboratory blank)
ND - Not detected

shared/labdata/bluevalleyresults/ExtwellVOC

| | | | |
|---|---|---|---|
| TVOC | 12.39 | 51.97 | 39.93 |

# Attachment 2
# Operations and Maintenance Form

# OPERATION, MAINTENANCE, MONITORING AND OPTIMIZATION REPORTING OF SOIL AND GROUNDWATER REMEDIATION SYSTEMS



**PURPOSE AND APPLICABILITY OF THIS FORM:** Completion of this form is required under s. NR 724.13(e), Wis. Adm. Code. Use of this form is mandatory. Failure to submit this form as require is a violation of s. NR 724.13, Wis. Adm. Code, and is subject to the penalties in s. 144.99, Wis. Stats. This form must be submitted every six months for active soil and groundwater remediation projects and every twelve months for passive (natural attenuation) remediation projects that are regulated under the NR 700 series of Wis. Adm. Code. Specifically, for sites meeting any of the following criteria:

- Soil or groundwater remediation projects that report progress in accordance with s. NR 700.11(1), Wis. Adm. Code.
- Soil or groundwater remediation projects that report progress in accordance with s. NR 724.13(3), Wis. Adm. Code. (Note: s. NR 724.13(3) requires progress reports for operation and maintenance of active systems to be submitted every three months however the Department considers submittal of this form every six months to satisfy the requirements of the rules, unless otherwise directed by the Department on a site specific basis.)
- Soil or groundwater remediation projects that report progress in accordance with s. NR 724.17(3), Wis. Adm. Code. (Note: s. NR 724.17(3) requires progress reports every time that samples are collected however the Department considers submittal of this form every twelve months to satisfy the requirements of the rules for monitoring natural attenuation, unless otherwise directed by the Department on a site specific basis.)

Submittal of this form is not a substitute for reporting required by Department programs such as Wastewater or Air Management. Personally identifiable information on this form is not intended to be used for any other purpose than tracking progress of the remediation by the Bureau for Remediation and Redevelopment.

Please refer to the instructions that are attached to the back of these forms starting on page INS-1. In all cases, when asked to "explain," those explanations are to be included on separate sheets of paper. Explanations must include a title that refers to the page and item number, for example: Page GI-2, C.1.a.

**A. GENERAL INFORMATION:**

1. Site name: Former Eau Claire Sanitary Landfill

2. Reporting period from: October 1, 2017 To: March 31, 2018 Days in period: 182

3. Regulatory agency (enter DNR, DCOM, DATCP and/or other): DNR

4. DNR issued site number: Facility ID 618009480

5. State reimbursement fund claim number and fund name (if not applicable, enter NA): NA

6. Site location:
   a. DNR region and county: West Central; Eau Claire County
   b. Street address and municipality: Town of Union
   c. Township, range, section and quarter section: SW 1/4, Section 33, Township 10N, Range 27W

7. Responsible party:
   a. Name: Group of Potentially Responsible Parties
   b. Mailing address: C/O Ms. Colleen Schian, City of Eau Claire
      203 South Farwell Street, Eau Claire, WI 54701-5148
   c. Phone number: (715) 839-4921

8. Consultant:
   a. Company name: GHD Services Inc.
   b. Mailing address: 1801 Old Highway 8 NW, Ste. 114
      St. Paul, MN 55112
   c. Phone number: (651) 639-0913

9. Contaminants: VOCs

10. Soil types (USCS or USDA): Clay over sandstone bedrock

11. Hydraulic conductivity (cm/sec): $2.2 \times 10^{-3}$

12. Average linear velocity of groundwater (ft/yr):

## GENERAL SITE INFORMATION, CONTINUED

**SITE NAME AND REPORTING PERIOD:**

Site name: Former Eau Claire Sanitary Landfill

Reporting period from: October 1, 2017 To: March 31, 2018 Days in period: 182

**A. GENERAL INFORMATION (CONTINUED):**

13. If soil is treated ex situ, is the treatment location off site? (Y/N) If yes, give location: NA

    a. DNR region and county:

    b. Township, range, section and quarter section:

**B. REMEDIATION METHOD:** Only submit pages that apply to an individual site. Check all that apply:

- X Groundwater extraction (submit a completed page GW-1).
- _____ Free product recovery (submit a completed page GW-1).
- _____ In situ air sparging (submit a completed page GW-2).
- _____ Groundwater natural attenuation (submit a completed page GW-3).
- _____ Other groundwater remediation method (submit a completed page GW-4).
- _____ Soil venting (including soil vapor extraction and bioventing, submit a completed page IS-1).
- _____ Soil natural attenuation (submit a completed page IS-2).
- _____ Other in situ soil remediation method (submit a completed page IS-3).
- _____ Biopiles (submit a completed page ES-1).
- _____ Landspreading/thinspreading of petroleum contaminated soil (submit a completed page ES-2).
- _____ Other ex situ soil remediation method (submit a completed page ES-3).

**C. GENERAL EFFECTIVENESS EVALUATION FOR ALL ACTIVE SYSTEMS:** If the remediation is active (not natural attenuation), complete this subsection.

1. Is the system operating at design rates and specifications? (Y/N): No
   If the answer is no, explain whether or not modifications are necessary to achieve the goal that was previously established in design.
   Pump failure occurred on two extraction wells. Replacement pumps are scheduled for installation and well rehabilitation will be performed prior to installing the new pumps.

2. Are modifications to the system warranted to improve effectiveness? (Y/N) If yes, explain: **No**

3. Is natural attenuation an effective low cost option at this time? (Y/N): Not Evaluated.

4. Is closure sampling warranted at this time? (Y/N): **No**

5. Are there any modifications that can be made to the remediation to improve cost effectiveness? (Y/N) If yes, explain: **No**

**D. ECONOMIC AND COST DATA TO DATE:**

1. Total investigation costs ($):

2. Implementation costs (design, capital and installation costs, excluding investigation costs) ($):

3. Total costs during the previous reporting period ($):

4. Total costs during this reporting period ($):

5. Total anticipated costs for the next reporting period ($):

6. Are any unusual or one-time costs listed in the reporting periods covered by D.3., D.4. or D.5. above? (Y/N) If yes explain:

7. If close out is anticipated within 12 months, estimated costs for project closeout ($):

## GENERAL SITE INFORMATION, CONTINUED

**SITE NAME AND REPORTING PERIOD:**

Site name: Former Eau Claire Sanitary Landfill

Reporting period from: October 1, 2017 To: March 31, 2018 Days in period: 182

**E. NAME(S), SIGNATURE(S) AND DATE OF PERSON(S) SUBMITTING FORM:** Legibly print name, date and sign. Only persons qualified to submit reports under ch. NR 712 Wis. Adm. Code are to sign this form.

**Registered Professional Engineers:**

I (print name) Shawn G. Horn, hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this document has been prepared in accordance with the rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Signature, title, P.E. number and date: Shawn G Horn, E-31044, 6-19-18

**Hydrogeologists:**

I (print name) Charles Ahrens, hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03(1), Wis. Adm. Code, and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Signature, title and date:

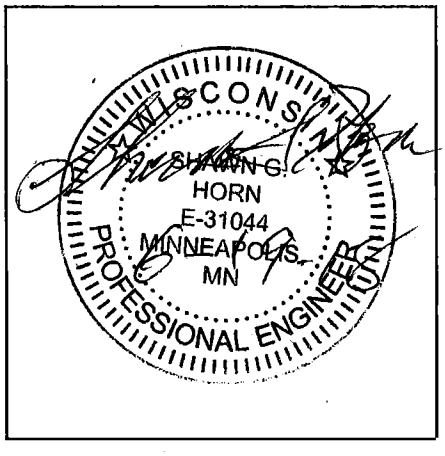
**Scientists:**

6/19/18

I (print name) _____, hereby certify that I am a scientist as that term is defined in s. NR 712.03(3), Wis. Adm. Code, and that, to the best of my knowledge, all information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Signature, title and date:

**Professional Seal(s), if applicable:**



State of Wisconsin
Department of
Natural Resources

# OPERATION, MAINTENANCE, MONITORING AND OPTIMIZATION REPORTING OF SOIL AND GROUNDWATER REMEDIATION SYSTEMS



## GROUNDWATER PUMP AND TREAT SYSTEMS AND FREE PRODUCT RECOVERY SYSTEMS

**SITE NAME AND REPORTING PERIOD:**

Site name: Former Eau Claire Sanitary Landfill

Reporting period from: October 1, 2017 To March 31, 2018 Days in period: 182

Date that the system was first started up: August 1997

**A. GROUNDWATER EXTRACTION SYSTEM OPERATION:**

1. Total number of groundwater extraction wells or trenches available and the number in use during period: 3

2. Number of days of operation (only list the number of days the system actually operated, if unknown explain): 182

3. System utilization in percent (days of operation divided by reporting time period multiplied by 100). If < 80%, explain: 100

4. Quantity of groundwater extracted during this time period (gallons): 26,035,011

5. Average groundwater extraction rate (gpm): 100

6. Quantity of dissolved phase contaminants removed during this time period in pounds: 4.1

**B. FREE PRODUCT RECOVERY SYSTEM OPERATION:**

1. Is free product (nonaqueous phase liquid) being recovered at this site? (Y/N) If yes, list method: No

2. Quantity of free product extracted during this time period (gallons, enter none if none): None

3. Average free product extraction rate (gpd): N/A

**C. SYSTEM EFFECTIVENESS EVALUATION:**

1. Is a contaminated groundwater plume fully contained in the capture zone? (Y/N) If no, explain: See Exhibit A

2. If free product is present, is the free product fully contained in capture zone? (Y/N) If no, explain: NA

3. If free product is present in any wells at the site, but free product was not recovered during reporting period, explain.

4. If free product is not present, determine the single contaminant that requires the greatest percent reduction to achieve ch. NR 140 ES and PAL. Perform this calculation for all contaminants that were present at the site that have ch. NR 140 standards. Use the highest contaminant concentration measured in any sampling points during reporting period. If free product is present, write "FREE PRODUCT" in C.4.a.

   a. Contaminant: Vinyl Chloride

   b. Percent reduction necessary to reach ch. NR 140 ES and PAL: 99

   c. Maximum contaminant concentration level in any monitoring well of that contaminant (µg/L): 28

   d. Maximum contaminant concentration level in any extraction well of that contaminant (µg/L): < 0.11 0.96

   e. If the maximum concentration in a monitoring well is more than one order of magnitude above the concentration measured in an extraction well, explain why the extracted groundwater contamination levels are significantly less than the levels at other locations within the aquifer. See Exhibit A

**D. ADDITIONAL ATTACHMENTS:** Attach the following to this form:

- Most recent report to the DNR Wastewater Program, if applicable. See Table 1
- Groundwater contour map with capture zone indicated. See Figure 3
- Groundwater contaminant distribution map (may be combined with contour map). See Figure 4
- Graph of cumulative contaminant removal, if both free product recovery and ground water extraction are used, provide separate graphs. See Figure 5
- Time versus groundwater contaminant concentration graphs for the contaminant listed in C.4.a. (above), as follows: See Exhibit A
  Graph of contaminant concentrations versus time for each extraction well in use during the period.
  Graph of contaminant concentrations versus time for the monitoring well with the greatest level of contamination.
- Groundwater contaminant chemistry table.
- Groundwater elevations table. See Table 3
- System operational data table. See Table 1

# Attachment 2 Explanations/Clarifications For Answers on Form GW 1

## 1. Item

C.1 The groundwater containment system was designed as an interim response measure (IRM) to prevent the potential for VOC migration in the regional water table aquifer toward the residential development to the southwest of the former landfill. VOC-impacted groundwater in the perched groundwater unit is not addressed by the IRM. However, the perched unit does not persist laterally and does not extend beyond the limit of capture that the extraction well system creates in the regional water table aquifer.

C.4.e Higher concentrations of vinyl chloride in the regional aquifer are limited to certain areas of the site. After migrating to the extraction well location and mixing with water drawn from other, cleaner, portions of the Site, vinyl chloride is often not detected in the extraction well samples. The extraction wells are located downgradient from the landfill as the IRM was designed as a containment remedy, not as a source area remediation system, thus the absence of vinyl chloride in the extraction wells is not surprising.

D. Graphs of vinyl chloride versus time in extraction wells and monitoring wells are not included due to the rationale explained for Item C.4.e. Also, since this is a containment rather than a remediation system, monitoring well graphs would not provide useful information regarding cleanup progress.

Groundwater monitoring data from monitoring wells have not been included because the data is routinely provided to the WDNR in electronic format under separate cover.