

June 28, 2024

Mr. Michael W. Smith, P.E.
Land Quality Bureau
Iowa Department of Natural Resources
6200 Park Avenue, Suite 200
Des Moines, Iowa 50321



**RE: Request to Delay - 2024 Arsenic, Cobalt, and Nickel Delineation near MW-8 (Doc #109982)
Delaware County Sanitary Landfill 28-SDP-01-74C**

Dear Mr. Smith:

Upon receipt of the IDNR Letter dated May 29, 2024 (Doc 110158) which approved the delineation plan to the east of MW-8 but also required delineation to the west and southwest of MW-8, additional review of well construction data, available water quality data, and water elevation data was completed. The basis for further review of data is the recognition that MW-8 is frequently near dry and outside factors appear to play a role in water quality findings at MW-8

Based on the supplemental review of well data, water quality data, and water elevation data, a delay is requested in scheduling any delineation activities until supplemental data is acquired over time. Additional water quality and water elevation data is deemed warranted prior to moving forward with delineation.

Groundwater Flow Direction(s)

Figure 1, Site Plan and Figure 2, Groundwater Contour Map, based on water elevation data collected September 26, 2023, are attached. Figure 2 includes a table of water elevations utilized to construct the groundwater contours.

Based on the requirement to delineate to the west-southwest of MW-8 in the IDNR Letter dated May 29, 2024 (Doc 110158), it is presumed that a west or southwest component of flow is interpreted from review of the 1010 and 1005 water contour lines that pass near to MW-8 and MW-23 on the attached Figure 2 (in addition to the east-southeast components of flow).

The land that lies to the south of the site (and west of MW-8) is not land owned by the Delaware County Landfill Commission. It follows that there is no water elevation data available to the Commission to add to Figure 2.

However, review of the ground surface elevation contours (Figure 2) for the land lying south of the site (and west of MW-8) does not support the interpretation that a west or southwest flow direction in the groundwater surface exists. Typically, groundwater flow contours are a muted reflection of the ground surface in unconsolidated soils. The ground surface in the land lying south of the site (and west of MW-8) is a rounded hillside lobe that slopes radially away from the landfill. The ground surface slopes strongly to the east-southeast from the high point (elevation 1050 contour) towards the borrow soil pits (elevation 1000-1005) east-southeast of MW-8. The only place where a south-southwest flow direction

is anticipated in the land lying south of the site (and west of MW-8) is in the proximity of MW-6. It is noted that there are no water quality issues in the vicinity of MW-6.

It is requested that the requirement to delineate to the west and/or southwest of MW-8 be dismissed.

Observation – Water Levels

It is generally recognized that Iowa experienced ongoing drought conditions from mid-2020 through the first quarter of 2024. The impact on monitoring well MW-8 at the Delaware County Landfill is that steadily decreasing water elevations were observed (as well as at other site monitoring wells). A table and two (2) associated graphs of water elevation conditions in MW-8 are included in Attachment A.

Review of the information in Attachment A indicates that a steady decrease in the water elevation and the water column thickness has been ongoing based on the trendline included on the graphs. The graphs also indicate that the lowest water elevations (Graph 1, Attachment A) have occurred in 2022, 2023, and March 2024, leading to the least available water column available for sample collection in 2022, 2023, and March 2024.

On June 13, 2024, the water elevation in the well was measured (1014.38) and was found to be elevated compared to the water elevation on March 1, 2024 (1012.39) recorded during the spring sampling episode. A supplemental water sample was collected from MW-8 on June 13, 2024, however, the water quality results for the June 13, 2024, sample are not yet available to assess.

Typically, when there is a reduced volume of water available for sample collection it can correlate to elevated concentrations of certain compounds in that well.

Observation – Water Quality

The concentration of arsenic, cobalt, and nickel at MW-8 is plotted over time along with the corresponding water elevation during each sample collection episode (Attachment B).

Based on a review of water quality data versus water elevation data in Attachment B, it appears that the recent increasing arsenic and nickel concentrations correspond directly to the decreasing volume of available water for sample collection in MW-8 throughout the drought period. Note that on September 26, 2023, MW-8 was too dry to sample and there is no water quality data available for September 26, 2023.

Such a correlation is not readily observed related to cobalt, as cobalt concentrations appear relatively steady over time regardless of water elevation.

A supplemental water sample was collected from MW-8 on June 13, 2024, when the water elevation was found to be elevated compared to the previous two (2) sample collection episodes. We request the opportunity to review the June 13, 2024, sample data from MW-8 along with the Fall (September 2024) water quality data. The assumption is made that the water table may continue to rebound

following the last four (4) years of drought. The replenishment of the water table may have a positive impact on water quality at MW-8.

To date, elevated arsenic, cobalt, and nickel concentrations are not detected in MW-23 (to the south) or in MW-7 (deeper and clustered with MW-8).

Well Development

On June 13, 2024, MW-8 was redeveloped following the collection of the water sample. The goal of the redevelopment was to remove encrustation and/or mineral build-up from the well screen and well pack and to remove any sediment or colloidal build-up within MW-8. The well was developed using a combination of pumping, surging, and rinsing.

A Waterra® vertical displacement pump was started at 12:00 on June 13, 2024. Five (5.0) gallons of distilled water were quickly added to MW-8. The pumping action of the displacement pump surged the well screen with the clear water while removing both the distilled rinse water and formation water. The pump continued pumping and surging until 12:10, removing 7.5 gallons of water from the well.

The well was allowed to rest and recover until 12:18. At 12:18 an electric vertical submersible pump was started, and an additional 5 gallons of distilled water was added to the well. The well pump was allowed to pump until 12:37 removing 5 gallons of water.

The well was allowed to rest until 12:40 at which time the well was again pumped using the Waterra® vertical displacement pump until 12:42, removing 2.0 additional gallons of formation water. The depth to water at the end of pumping was 29.0 feet below top of casing (measured depth of well is 29.55 feet below the top of casing).

The well will rest until the sampling episode planned for September 2024.

Requests

It is requested that the requirement to delineate to the west and/or southwest of MW-8 be dismissed, based on further review of the groundwater flow pattern and ground surface characteristics.

It is requested that water quality and water elevation data continue to be collected from MW-8 over the next 3-year period to determine whether water quality (arsenic, cobalt, and nickel) returns to "normal" in MW-8 as water elevation conditions also (anticipated) return to "normal" levels. The 3-year period is proposed to run from September 2024 to September 2027.

If water elevations do return to "normal" conditions at MW-8 and water quality also returns to "normal" conditions related to arsenic, cobalt, and nickel at MW-8 over the next 3-year period, we request that the requirement to delineate be dismissed.

If water elevations do not return to "normal" over the proposed three (3) year period and/or water quality related to arsenic, cobalt, and nickel does not return to "normal" over the proposed three (3) year period, we request that delineation requirements only be initiated to the southeast as described in the previous proposal dated May 2, 2024 (Doc #109982).

The outcome of the yearly data will be reported in the Annual Water Quality Report due January 31 of each year with the final conclusions related to delineation at MW-8 being reported in the Annual Water Quality Report dated January 2028.

Please feel free to contact our office at (515) 733-4144 with any questions you may have related to this proposed delay in the delineation study and/or schedule. We seek IDNR approval of the proposed 3-year evaluation of water quality and water elevation information and approval to dismiss delineation work off-site to the west and southwest.


Sincerely,

HLW Engineering Group



Todd Whipple, CPG
Project Manager

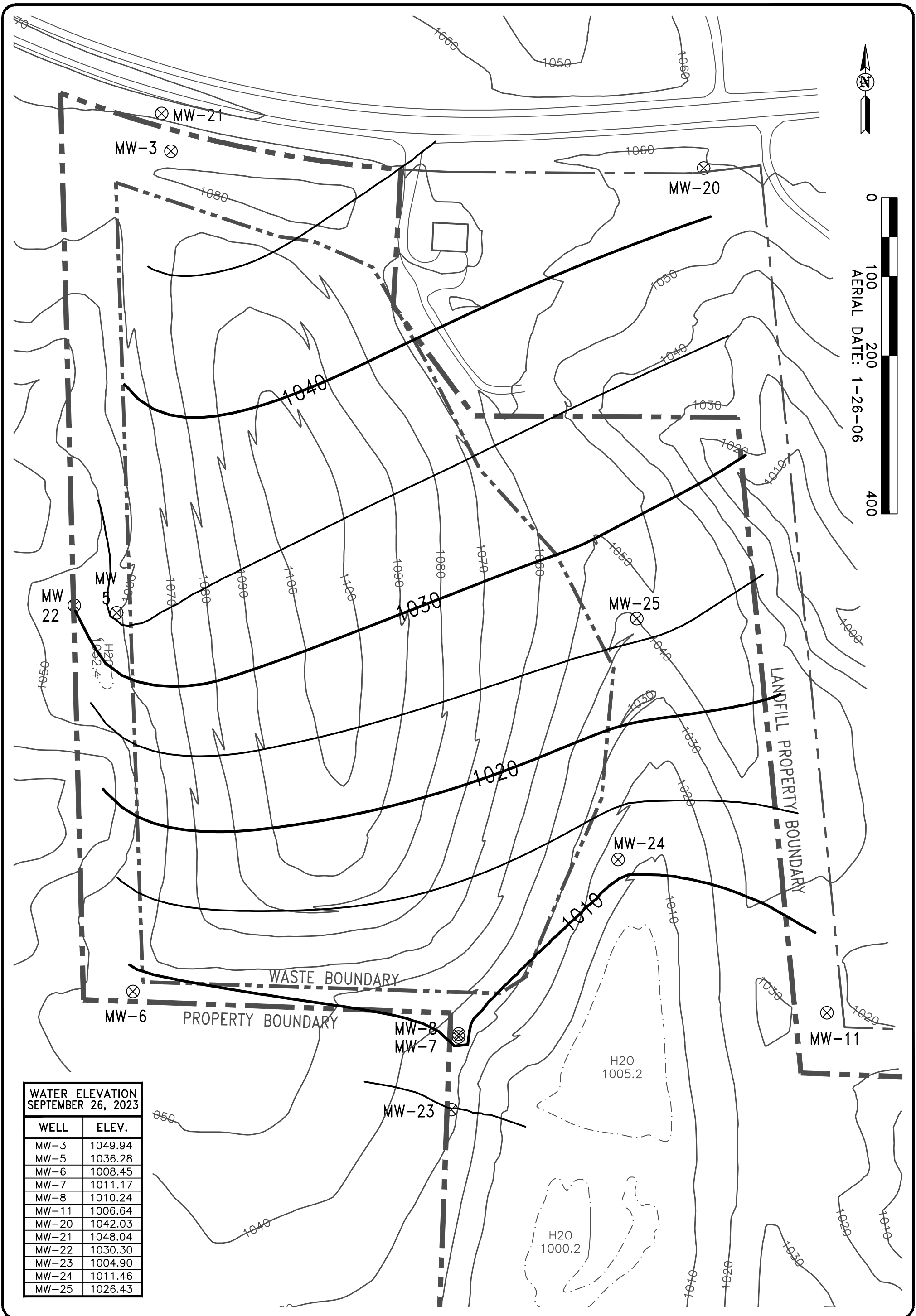
cc: Mr. Michael Schmitz, Chairman
Ms. Erin Learn
Mr. David Sands

HLW Engineering Group
 204 West Broad Street, P.O. Box 314
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SITE PLAN
 DELAWARE COUNTY SANITARY LANDFILL
 DELHI, IOWA

FIGURE:		1
REVISION	NO.	DATE
DRAWN DRA	PROJECT NO. 6039	DATE 10-31-23



**WATER ELEVATION
SEPTEMBER 26, 2023**

WELL	ELEV.
MW-3	1049.94
MW-5	1036.28
MW-6	1008.45
MW-7	1011.17
MW-8	1010.24
MW-11	1006.64
MW-20	1042.03
MW-21	1048.04
MW-22	1030.30
MW-23	1004.90
MW-24	1011.46
MW-25	1026.43



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GROUNDWATER CONTOURS
 DELAWARE COUNTY SANITARY LANDFILL
 DELHI, IOWA

FIGURE: 2	
REVISION	NO. DATE
DRAWN DRA	PROJECT NO. 6039 DATE 10-31-23

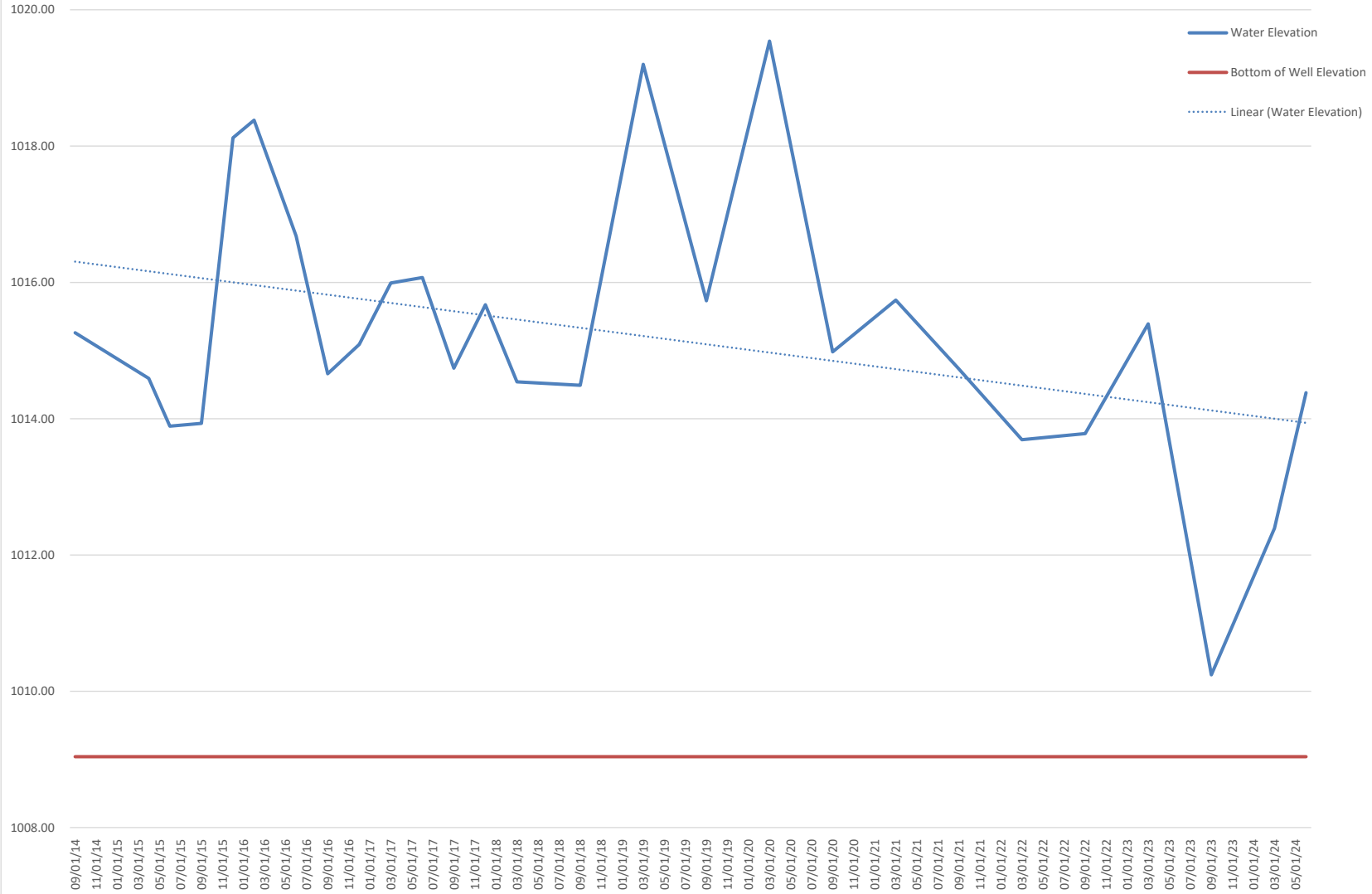
Attachment A

Water Elevation Data Over Time (MW-8)

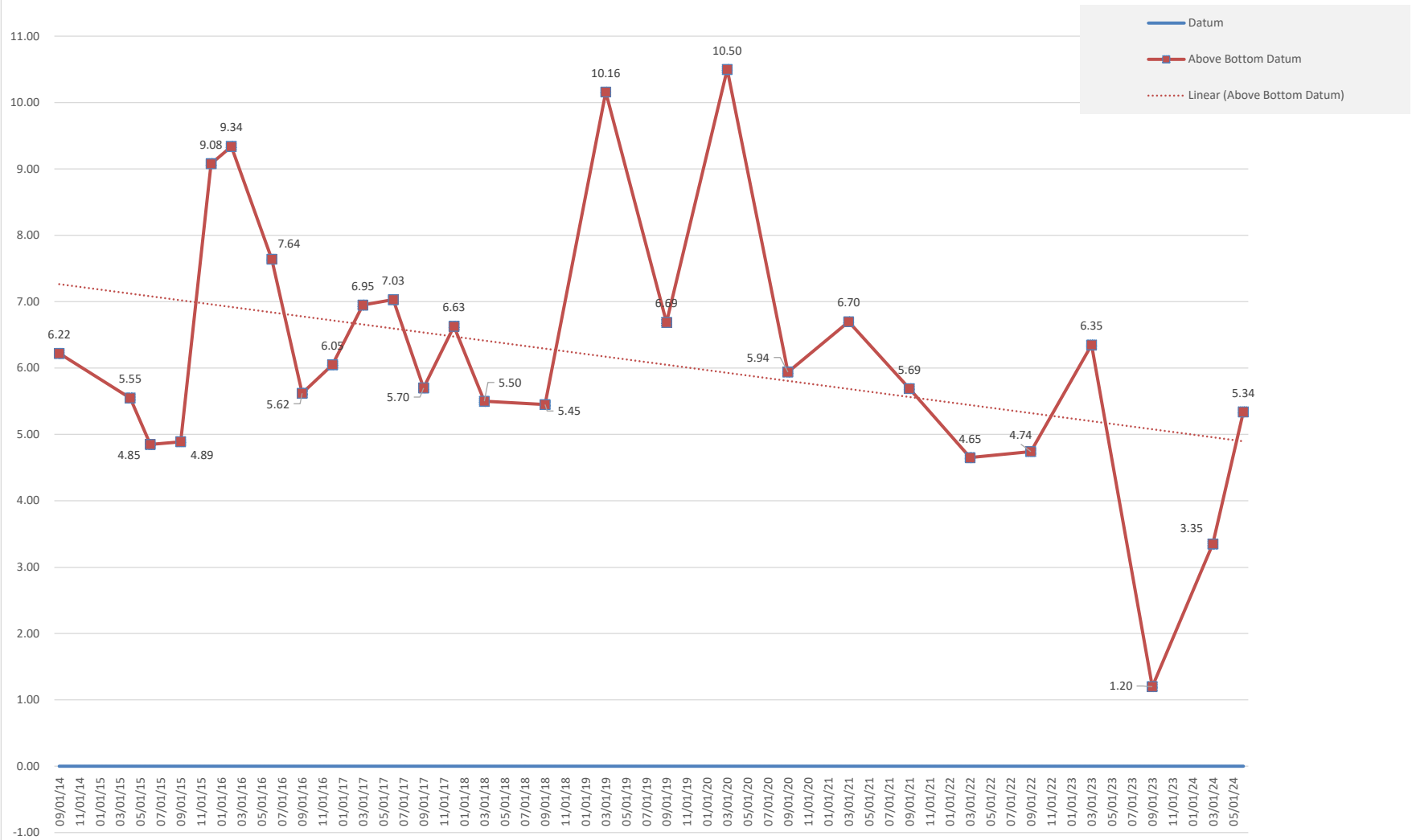
Water Elevation Data
Delaware County Sanitary Landfill
28-SDP-1-74C

Well/TOC	MW-8 1038.59						
	Date	Water Depth	TOC Elevation	Water Elevation	Measured Bottom of Well Depth	Well Bottom (ft) Datum	Measured Bottom of Well Elevation
09/22/14	23.33	1038.59	1015.26	29.55	0.00	1009.04	6.22
04/21/15	24.00	1038.59	1014.59	29.55	0.00	1009.04	5.55
06/09/15	24.70	1038.59	1013.89	29.55	0.00	1009.04	4.85
09/08/15	24.66	1038.59	1013.93	29.55	0.00	1009.04	4.89
12/30/15	20.47	1038.59	1018.12	29.55	0.00	1009.04	9.08
02/25/16	20.21	1038.59	1018.38	29.55	0.00	1009.04	9.34
06/14/16	21.91	1038.59	1016.68	29.55	0.00	1009.04	7.64
09/06/16	23.93	1038.59	1014.66	29.55	0.00	1009.04	5.62
12/19/16	23.50	1038.59	1015.09	29.55	0.00	1009.04	6.05
03/06/17	22.60	1038.59	1015.99	29.55	0.00	1009.04	6.95
06/15/17	22.52	1038.59	1016.07	29.55	0.00	1009.04	7.03
09/05/17	23.85	1038.59	1014.74	29.55	0.00	1009.04	5.70
12/05/17	22.92	1038.59	1015.67	29.55	0.00	1009.04	6.63
03/02/18	24.05	1038.59	1014.54	29.55	0.00	1009.04	5.50
09/04/18	24.10	1038.59	1014.49	29.55	0.00	1009.04	5.45
03/27/19	19.39	1038.59	1019.20	29.55	0.00	1009.04	10.16
09/07/19	22.86	1038.59	1015.73	29.55	0.00	1009.04	6.69
03/30/20	19.05	1038.59	1019.54	29.55	0.00	1009.04	10.50
09/01/20	23.61	1038.59	1014.98	29.55	0.00	1009.04	5.94
03/03/21	22.85	1038.59	1015.74	29.55	0.00	1009.04	6.70
09/10/21	23.86	1038.59	1014.73	29.55	0.00	1009.04	5.69
03/04/22	24.90	1038.59	1013.69	29.55	0.00	1009.04	4.65
09/02/22	24.81	1038.59	1013.78	29.55	0.00	1009.04	4.74
03/21/23	23.20	1038.59	1015.39	29.55	0.00	1009.04	6.35
09/26/23	28.35	1038.59	1010.24	29.55	0.00	1009.04	1.20
03/01/24	26.20	1038.59	1012.39	29.55	0.00	1009.04	3.35
06/13/24	24.21	1038.59	1014.38	29.55	0.00	1009.04	5.34
minimum	19.05		1010.24				1.20
maximum	28.35		1019.54				10.50
average							6.22

Water Elevation versus Well Bottom Elevation



Water Thickness over Bottom of Well (feet)



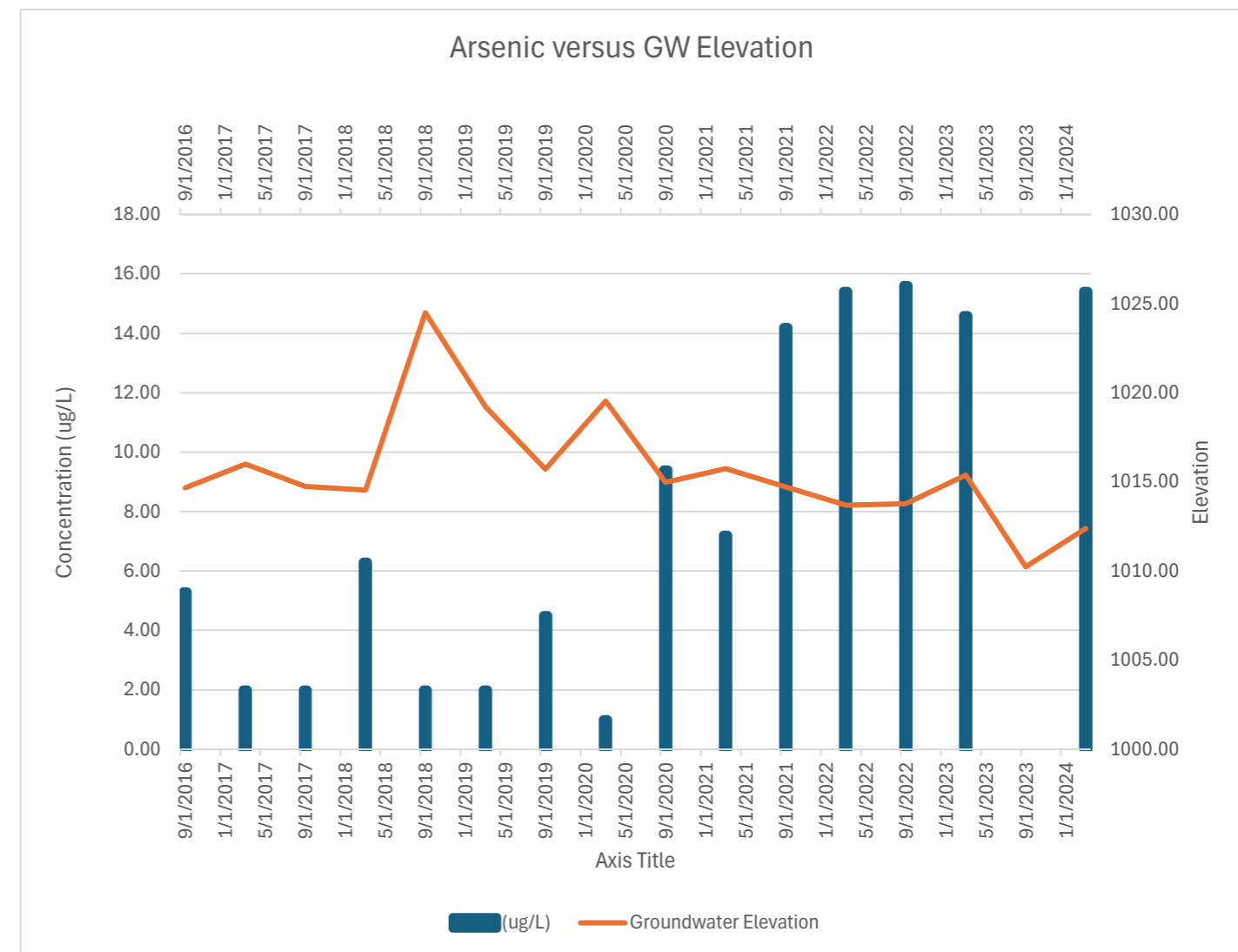
Attachment B

Water Quality Versus Water Elevation Over Time

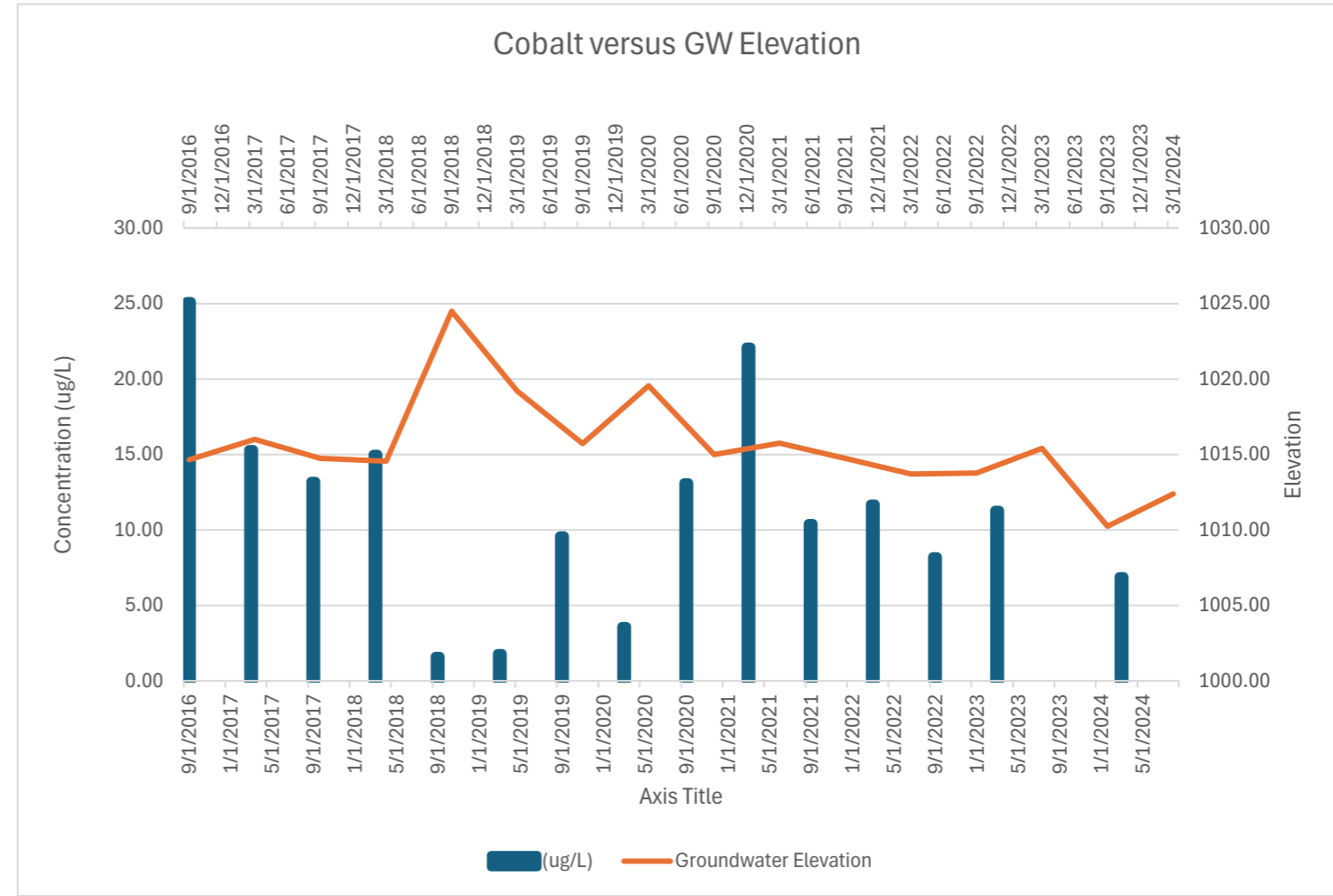
**Delaware County Sanitary Landfill
28-SDP-01-74C**

Metal Concentration Versus Groundwater Elevation - MW-8

Monitoring Well	Compound	Sample Date	Concentration (ug/L)	Groundwater Elevation	MCL
MW-8	Arsenic	9/6/2016	5.30	1014.66	10.0
MW-8	Arsenic	3/6/2017	2.00	1015.99	10.0
MW-8	Arsenic	9/5/2017	2.00	1014.74	10.0
MW-8	Arsenic	3/2/2018	6.30	1014.54	10.0
MW-8	Arsenic	9/4/2018	2.00	1024.49	10.0
MW-8	Arsenic	3/27/2019	2.00	1019.20	10.0
MW-8	Arsenic	9/7/2019	4.50	1015.73	10.0
MW-8	Arsenic	3/30/2020	1.00	1019.54	10.0
MW-8	Arsenic	9/1/2020	9.40	1014.98	10.0
MW-8	Arsenic	3/3/2021	7.20	1015.74	10.0
MW-8	Arsenic	9/10/2021	14.20	1014.73	10.0
MW-8	Arsenic	3/4/2022	15.40	1013.69	10.0
MW-8	Arsenic	9/2/2022	15.60	1013.78	10.0
MW-8	Arsenic	3/21/2023	14.60	1015.39	10.0
MW-8	Arsenic	9/26/2023	dry	1010.24	10.0
MW-8	Arsenic	3/1/2024	15.40	1012.39	10.0



Monitoring Well	Compound	Sample Date	Concentration (ug/L)	Groundwater Elevation	MCL
MW-8	Cobalt	9/6/2016	25.10	1014.66	2.2
MW-8	Cobalt	3/6/2017	15.30	1015.99	2.2
MW-8	Cobalt	9/5/2017	13.20	1014.74	2.2
MW-8	Cobalt	3/2/2018	15.00	1014.54	2.2
MW-8	Cobalt	9/4/2018	1.60	1024.49	2.2
MW-8	Cobalt	3/27/2019	1.80	1019.20	2.2
MW-8	Cobalt	9/7/2019	9.60	1015.73	2.2
MW-8	Cobalt	3/30/2020	3.60	1019.54	2.2
MW-8	Cobalt	9/1/2020	13.10	1014.98	2.2
MW-8	Cobalt	3/3/2021	22.10	1015.74	2.2
MW-8	Cobalt	9/10/2021	10.40	1014.73	2.2
MW-8	Cobalt	3/4/2022	11.70	1013.69	2.2
MW-8	Cobalt	9/2/2022	8.20	1013.78	2.2
MW-8	Cobalt	3/21/2023	11.30	1015.39	2.2
MW-8	Cobalt	9/26/2023	dry	1010.24	2.2
MW-8	Cobalt	3/1/2024	6.90	1012.39	2.2



Monitoring Well	Compound	Sample Date	Concentration (ug/L)	Groundwater Elevation	MCL
MW-8	Nickel	9/6/2016	49.80	1014.66	100.0
MW-8	Nickel	3/6/2017	34.50	1015.99	100.0
MW-8	Nickel	9/5/2017	38.90	1014.74	100.0
MW-8	Nickel	3/2/2018	45.40	1014.54	100.0
MW-8	Nickel	9/4/2018	26.10	1024.49	100.0
MW-8	Nickel	3/27/2019	25.90	1019.20	100.0
MW-8	Nickel	9/7/2019	53.10	1015.73	100.0
MW-8	Nickel	3/30/2020	32.70	1019.54	100.0
MW-8	Nickel	9/1/2020	95.10	1014.98	100.0
MW-8	Nickel	3/3/2021	152.00	1015.74	100.0
MW-8	Nickel	9/10/2021	177.00	1014.73	100.0
MW-8	Nickel	3/4/2022	213.00	1013.69	100.0
MW-8	Nickel	9/2/2022	203.00	1013.78	100.0
MW-8	Nickel	3/21/2023	200.00	1015.39	100.0
MW-8	Nickel	9/26/2023	dry	1010.24	100.0
MW-8	Nickel	3/1/2024	126.00	1012.39	100.0

