APPENDIX F

Summary of Geochemical Parameters

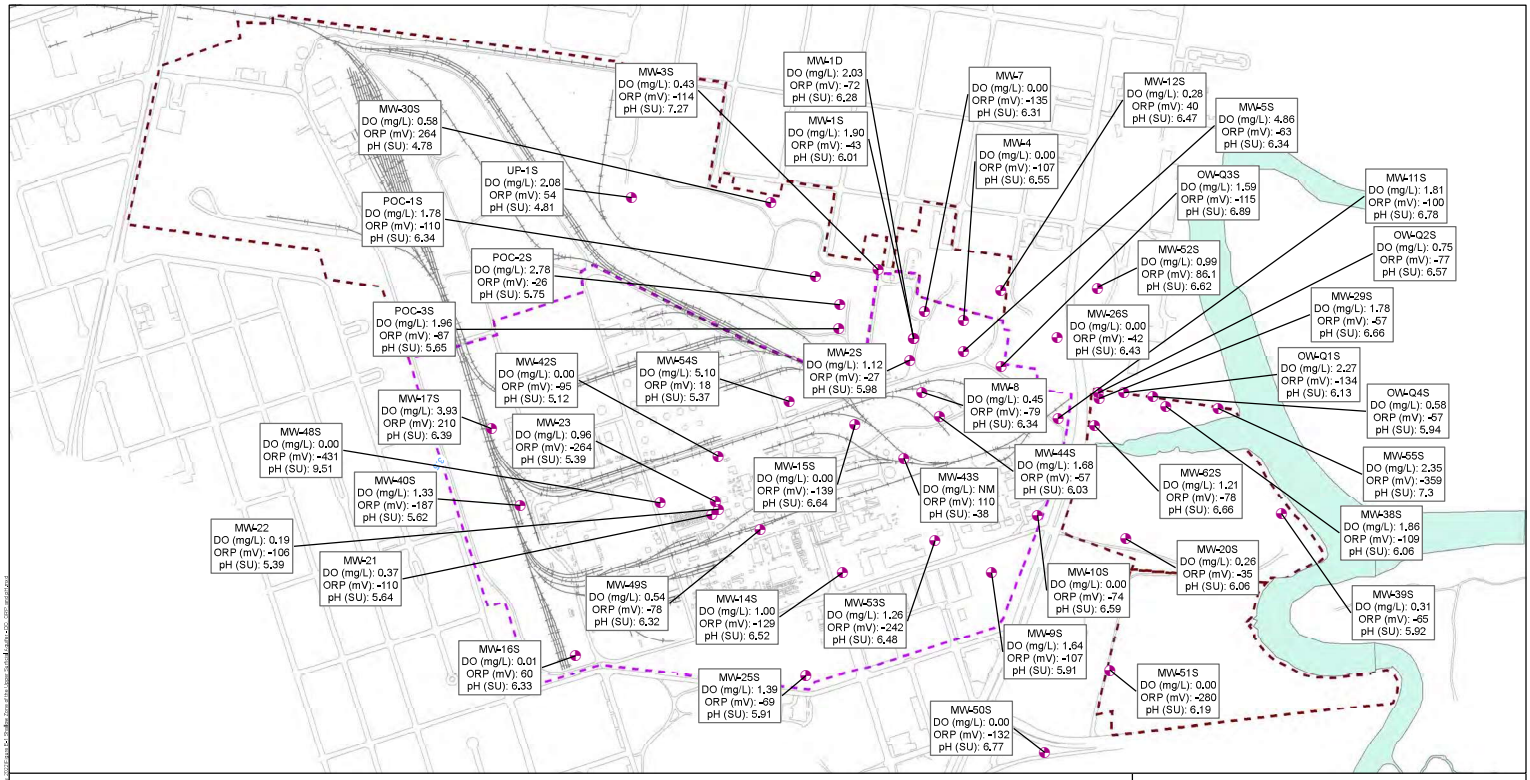
Table F-1
Summary of Geochemical Parameters
Hercules/Pinova Facility, Brunswick, Georgia

Well ID	Date	Geochemical Parameters							
		Hardness (mg/L)	Total Iron (mg/L)	Manganese (mg/L)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)	pH (SU)	Sulfate (mg/L)	Sulfide (mg/L)
POC-1S	6/10/2021	--	--	--	-110	1.78	6.34	--	3.7
POC-1D	6/9/2020	--	--	--	-84	2.24	7.74	--	0.83 U
POC-2S	6/10/2020 (sulfide); 6/10/2021 (ORP, DO, pH)	--	--	--	-26	2.78	5.75	--	1.0
POC-2D	6/10/2020 (sulfide); 6/9/2021 (ORP, DO, pH)	--	--	--	-85	1.83	6.21	--	0.85 U
POC-3S	6/10/2021	--	--	--	-87	1.96	5.65	--	6.4
POC-3D	6/10/2020 (sulfide); 6/9/2021 (ORP, DO, pH)	--	--	--	-64	1.94	6.15	--	0.86 U
PSOW-11	6/10/2021	--	--	--	-63	0.14	5.50	--	--
PSOW-12	6/10/2021	--	--	--	-75	0.40	5.57	--	--
UP-1S	6/9/2021	--	--	--	54	2.08	4.81	--	1.5
UP-1D-R	12/10/2019 (sulfide); 6/8/2021 (ORP, DO, pH)	--	--	--	158	1.98	8.36	--	0.93 U
MW-1S	12/11/2019	--	--	--	-43	1.90	6.01	--	--
MW-1D	6/10/2021	--	--	--	-72	2.03	6.28	--	0.81 U
MW-2S	12/12/2019	--	--	--	-27	1.12	5.98	--	--
MW-2D	6/10/2021	--	--	--	-64	2.16	6.34	--	0.88
MW-3S	6/8/2021	--	--	--	-114	0.43	7.27	--	--
MW-3D	12/12/2019	--	--	--	-48	0.32	6.15	--	1.0
MW-4	12/5/2018	--	--	--	-107	0.00	6.55	--	--
MW-5S	12/11/2019	--	--	--	-63	4.86	6.34	--	--
MW-5I	12/5/2018	--	--	--	-80	0.55	6.74	--	--
MW-7	12/5/2018	--	--	--	-135	0.00	6.31	--	--
MW-8	12/12/2019	--	--	--	-79	0.45	6.34	--	--
MW-9S	12/4/2018	--	--	--	-107	1.64	5.91	--	--
MW-9D	12/5/2018 (sulfate); 6/11/2020 (sulfide, ORP, DO, pH); 12/9/2020 (hardness, iron, manganese)	78	6.1	0.39	-96	0.00	6.10	5 U	0.85 U
MW-10S	6/11/2019	--	--	--	-74	0.00	6.59	--	--
MW-10D	12/5/2018 (sulfate); 6/11/2020 (sulfide, ORP, DO, pH); 12/10/2020 (hardness, iron, manganese)	8100	36	1.90	-73	0.26	5.53	5 U	1.5
MW-11S	12/4/2018	--	--	--	-100	1.81	6.78	--	--
MW-11D	12/6/2018 (iron, manganese, sulfate; 6/9/2020 (sulfide); 6/8/2021 (ORP, DO, pH)	--	12	0.25	-52	0.97	7.02	5 U	0.85 U
MW-11DD	12/6/2018 (iron, manganese, sulfate, sulfide); 6/10/2021 (ORP, DO, pH)	--	48	1.10	-34	0.95	6.1	5 U	1 U
MW-12S	6/8/2021	--	--	--	40	0.28	6.47	--	--
MW-12D	6/10/2020 (sulfide); 6/8/2021 (ORP, DO, pH)	--	--	--	-34	3.17	6.73	--	0.83 U
MW-13	6/12/2019	--	--	--	-107	0.63	7.28	--	--
MW-14S	12/10/2019	--	--	--	-129	1.00	6.52	--	--
MW-14D	12/11/2019	--	--	--	-48	0.71	7.05	--	0.86 U
MW-15S	12/5/2018	--	--	--	-139	0.00	6.64	--	--
MW-15D	12/6/2018 (sulfate, sulfide); 12/12/2019 (ORP, DO, pH); 12/10/2020 (hardness, iron, manganese)	1700	15	0.56	-78	0.71	5.74	5 U	1.6
MW-16S	12/5/2018	--	--	--	60	0.01	6.33	--	--
MW-16D	12/5/2018	--	--	--	-109	2.43	6.86	--	--
MW-17S	12/4/2018	--	--	--	210	3.93	6.39	--	--
MW-17D	12/4/2018	--	--	--	-153	0.90	12.84	--	--
MW-18	12/6/2018	--	--	--	-94	3.34	11.29	--	--
MW-19S	12/14/2006 (iron, manganese, sulfate, sulfide); 6/16/2016 (ORP, DO, pH)	--	7.1	0.17	-40	0.68	6.32	62	1.1
MW-19I	12/14/2006 (iron, manganese, sulfate, sulfide); 12/15/11 (pH)	--	7.0	0.11	-125.9	0.37	7.52 HF	2.5 U	0.5 U
MW-19D	12/14/2006 (iron, manganese, sulfate, sulfide); 6/23/2015 (ORP, DO); 6/16/2016 (pH)	--	0.44	0.02	-137.7	0.20	11.75	2.5 U	0.5 U
MW-20S	6/11/2019	--	--	--	-35	0.26	6.06	--	--
MW-20I	12/10/2019	--	--	--	-97	0.41	6.37	--	--
MW-20D	12/5/2018 (sulfate); 6/9/2020 (sulfide); 12/9/2020 (hardness, iron, manganese); 6/10/2021 (ORP, DO, pH)	180	43	1.30	-18	0.33	5.18	5 U	0.83 U
MW-21	12/13/2019	--	--	--	-110	0.37	5.64	--	--
MW-22	6/14/2018	--	--	--	-106	0.19	5.39	--	--
MW-23	6/10/2021	--	6.0	0.31	-264	0.96	5.39	5 U	7.3
MW-24	12/15/2016	--	0.61	0.09 B	-295.4	1.49	8.04	25 U	10
MW-25S	12/4/2018	--	--	--	-69	1.39	5.91	--	--
MW-25D	12/5/2018	--	--	--	-79	2.53	6.79	--	--
MW-26S	6/11/2019	--	--	--	-42	0.00	6.43	--	--
MW-26D	6/9/2020 (sulfide) 6/9/2021 (ORP, DO, pH)	--	--	--	-90	0.75	7.05	--	0.79 U
MW-27D	1/3/2007	--	3.10	0.18 B	--	--	--	2.5 U	1.7
MW-28D	12/6/2018 (sulfate); 6/10/2020 (sulfide); 12/9/2020 (hardness, iron, manganese); 6/10/2021 (ORP, DO, pH)	250	34	1.10	-41	0.36	5.9	5 U	0.77 U
MW-29S	6/8/2021	--	--	--	-58	1.78	6.66	--	--
MW-29I	12/10/2019 (sulfide); 6/8/2021 (ORP, DO, pH)	--	--	--	-80	3.20	7.11	--	0.78 U
MW-29D	12/6/2018 (sulfate); 6/10/2020 (sulfide); 4/7/2021 (hardness, iron, manganese, ORP, DO, pH)	4900	27	0.86	-5.3	0.13	6.17	--	--
MW-30S	12/4/2018	--	--	--	264	0.58	4.78	--	--
MW-30D	12/4/2018	--	--	--	-47	9.04	7.08	--	--
MW-31D	12/5/2018	--	--	--	-78	0.71	6.79	--	--
MW-32D	12/5/2018	--	--	--	-79	0.86	6.38	--	--
MW-33	12/4/2018	--	--	--	-141	1.68	7.5	--	--
MW-34	12/6/2018	--	--	--	-181	2.14	7.49	--	--
MW-35I	12/9/2020 (hardness, iron, manganese); 6/9/2021 (ORP, DO, pH)	270	1.0	0.21	-285	1.72	6.04	--	--
MW-35D	12/4/2018	--	--	--	-113	1.53	7.16	--	--
MW-36D	12/14/2006	--	0.6	0.04	--	--	--	2.5 U	0.5 U
MW-37I	6/23/2015	--	--	--	-94.6	1.65	7.47	--	--
MW-38S	6/8/2021	--	--	--	-109	1.86	6.06	--	--
MW-38I	12/10/2019 (sulfide) 6/8/2021 (ORP, DO, pH)	--	--	--	-228	2.23	7.55	--	0.78 U
MW-38D	12/6/2018 (iron, manganese, sulfate); 6/11/2020 (sulfide); 6/10/2021 (ORP, DO, pH)	--	47	1.2	-62	0.31	6.33	--	0.86 U
MW-39S	12/10/2019	--	--	--	-65	0.31	5.92	--	1.7
MW-39I	12/10/2019	--	--	--	-70	0.49	6.34	--	0.78 U
MW-39D	12/10/2019	--	--	--	-68	0.65	6.78	--	0.78 U
MW-40S	12/4/2018	--	--	--	-187	1.33	5.62	--	--
MW-40I	12/5/2018	--	--	--	-49	1.95	6.57	--	--
MW-40D	12/5/2018	--	--	--	-47	1.83	7.13	--	--
MW-41I	6/9/2021	--	--	--	-69	1.80	5.96	--	0.81 U
MW-42S	6/13/2019	--	--	--	-95	0.00	5.12	--	--
MW-42I	12/13/2019	--	--	--	-50	0.64	5.3	--	--
MW-42D	12/12/2019	--	--	--	-144	0.48	6.58	--	--

Table F-1
Summary of Geochemical Parameters
Hercules/Pinova Facility, Brunswick, Georgia

Well ID	Date	Geochemical Parameters							
		Hardness (mg/L)	Total Iron (mg/L)	Manganese (mg/L)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)	pH (SU)	Sulfate (mg/L)	Sulfide (mg/L)
MW-43S	12/5/2018	--	--	--	110	--	-38	0.0062	--
MW-43I	12/16/2013 (iron, manganese, sulfate, sulfide); 12/16/2016 (ORP, DO, pH)	--	6.8	0.11	-185.1	1.38	10.98	5 U	1.4
MW-43D	12/7/2018 (iron, manganese, sulfate, sulfide); 6/12/2019 (ORP, DO, pH)	--	26	1.60	-55	0.00	5.49	5 U	2.6
MW-44S	12/4/2018	--	--	--	-57	1.68	6.03	--	--
MW-44I	12/7/2018 (iron, manganese, sulfate, sulfide); 12/11/2019 (ORP, DO, pH)	--	18	0.33	-50	0.40	6.25	5 U	1.2
MW-44ID	12/10/2020 (hardness, iron, manganese); 12/12/2019 (ORP, DO, pH); 12/6/2018 (sulfate, sulfide)	3400	30	0.66	-50	0.87	5.21	5 U	1 U
MW-44D	12/6/2018 (iron, manganese, sulfate, sulfide); 6/13/2019 (ORP, DO, pH)	--	3.9	0.45	-99	0.00	6.71	5 U	1 U
MW-45I	12/5/2018	--	--	--	-76	1.51	5.35	--	--
MW-46I	6/8/2021	--	--	--	-269	1.32	7.16	--	--
MW-48S	6/12/2019	--	--	--	-431	0.00	9.51	--	--
MW-48I	6/13/2019	--	--	--	132	0.00	6.4	--	--
MW-48D	6/12/2019	--	--	--	-87	0.00	6.54	--	--
MW-49S	12/11/2019	--	--	--	-78	0.54	6.32	--	--
MW-49I	12/11/2019	--	--	--	-64	0.35	5.44	--	--
MW-49D	12/11/2019	--	--	--	-80	0.77	6.08	--	--
MW-50S	6/12/2019	--	--	--	-132	0.00	6.77	--	--
MW-50I	12/12/2019	--	--	--	89	0.98	7.08	--	--
MW-50D	12/10/2019	--	--	--	-118	0.84	7.37	--	--
MW-51S	6/10/2019	--	--	--	-280	0.00	6.19	--	--
MW-51I	12/10/2019	--	--	--	-105	0.68	7.08	--	--
MW-51D	12/10/2019	--	--	--	-97	1.16	7.53	--	--
MW-52S	12/14/2016	--	--	--	-86.1	0.99	6.62	--	--
MW-52I	12/14/2016	--	--	--	-131.5	1.61	7.55	--	--
MW-52D	6/14/2018	--	--	--	-92	2.81	6.52	--	1 U
MW-53S	12/4/2018	--	--	--	-242	1.26	6.48	--	--
MW-53D	12/9/2020 (hardness, iron, manganese); 6/10/2021 (ORP, DO, pH)	550	18	0.36	-314	0.60	9.1	--	--
MW-54S	12/4/2018	--	--	--	18	5.10	5.37	--	--
MW-54I	12/10/2019	--	--	--	-14	0.36	6.15	--	--
MW-54D	12/12/2019	--	--	--	-53	0.42	6.04	--	--
MW-55S	6/8/2021	--	--	--	-359	2.35	7.3	--	--
MW-55I	6/8/2021	--	--	--	-97	2.34	7.33	--	--
MW-55D	12/6/2018 (iron, manganese, sulfate, sulfide); 6/10/2021 (ORP, DO, pH)	--	48	1.10	-29	1.26	5.51	16	1 U
MW-56D	6/24/2015 (iron, manganese); 6/15/2016 (sulfide); 5/23/2017 (ORP, DO, pH, sulfate)	--	2.2	0.18	35.4	0.79	6.42	5.2 J	1 U
MW-57D	6/24/2015 (iron, manganese); 6/15/2016 (sulfide); 5/23/2017 (ORP, DO, pH, sulfate)	--	110	1.20	106.9	1.13	7.91	10 U	1 U
MW-58I	6/10/2020	--	--	--	18	1.76	6.76	--	--
MW-58D	2/5/2020 (iron, sulfate); 6/9/2021 (ORP, DO, pH)	--	33	--	-60	0.35	6.18	25	--
MW-59I	6/10/2020	--	--	--	-243	0.31	6.9	--	--
MW-59D	2/5/2020 (iron, sulfate); 6/10/2021 (ORP, DO, pH)	--	1.7	--	-117	0.41	7.92	5.8	--
MW-60I	6/9/2020	--	--	--	-147	0.05	6.3	--	--
MW-60D	2/5/2020 (iron, sulfate); 6/9/2021 (ORP, DO, pH)	--	25	--	-85	0.51	6.56	20	--
MW-61I	6/8/2021	--	--	--	-126	1.75	7.45	--	--
MW-61D	6/9/2021	--	--	--	-136	0.69	7.7	--	--
MW-62S	6/8/2021	--	--	--	-78	1.21	6.66	--	--
MW-62I	6/8/2021	--	--	--	-105	0.56	6.73	--	--
MW-62D	6/9/2021	--	--	--	-24	1.10	5.82	--	--
MW-62I	6/8/2021	--	--	--	-105	0.56	6.73	--	--
MW-62D	6/9/2021	--	--	--	-24	1.10	5.82	--	--
OW-Q1S	6/8/2021	--	--	--	-134	2.27	6.13	--	--
OW-Q1I	6/8/2021	--	--	--	-129	4.59	7.07	--	--
OW-Q1D	6/9/2021	--	--	--	-15	1.12	5.78	--	--
OW-Q2S	6/8/2021	--	--	--	-77	0.75	6.57	--	--
OW-Q2I	6/8/2021	--	--	--	-109	1.88	7.01	--	--
OW-Q2D	6/9/2021	--	--	--	-32	0.42	5.75	--	--
OW-Q3S	6/9/2021	--	--	--	-115	1.59	6.89	--	--
OW-Q3I	6/9/2021	--	--	--	-134	0.45	7.16	--	--
OW-Q4S	6/8/2021	--	--	--	-57	0.58	5.94	--	--
OW-Q4I	6/8/2021	--	--	--	-102	0.26	6.88	--	--
OW-Q4D	6/9/2021	--	--	--	-68	0.85	5.95	--	--
BS-01	3/15/2021	--	--	--	-15.9	0.00	5.45	--	--
BS-02	3/15/2021	--	--	--	-57.4	0.01	5.89	--	--
BS-OW-1	4/7/2021	5400	32	0.79	-16.6	0.12	6.26	--	--
BS-OW-2	4/7/2021	6400	51	1.2	-14.5	0.15	6.31	--	--
BS-OW-3I	3/15/2021	--	--	--	-124.8	0.03	6.95	--	--
BS-OW-3D	4/7/2021	5400	47	1.6	-31.8	0.15	6.34	--	--
PT-01	3/12/2020	5400	6.2	0.94	-27.0	6.78	6.27	5.8	--
PT-02	3/12/2020	43000	11	0.96	-53.0	2.33	6.20	4.7	--
PT-03	3/12/2020	5400	12	0.99	-51.0	2.44	6.15	3.8	--

Notes:
ID - identification
mg/L - milligram per liter
mV - millivolt
SU - standard units
HF - field parameter with a holding time of 15 minutes
U - not detected
B - Compound found in the blank and the sample
-- - Not Measured



Legend

- Surficial Aquifer, Shallow Zone of Upper Unit Wells
- Road
- Railroad
- Site Building
- Creek
- Pinova Property
- Hercules Property

0 275 550 1,100 Feet

N

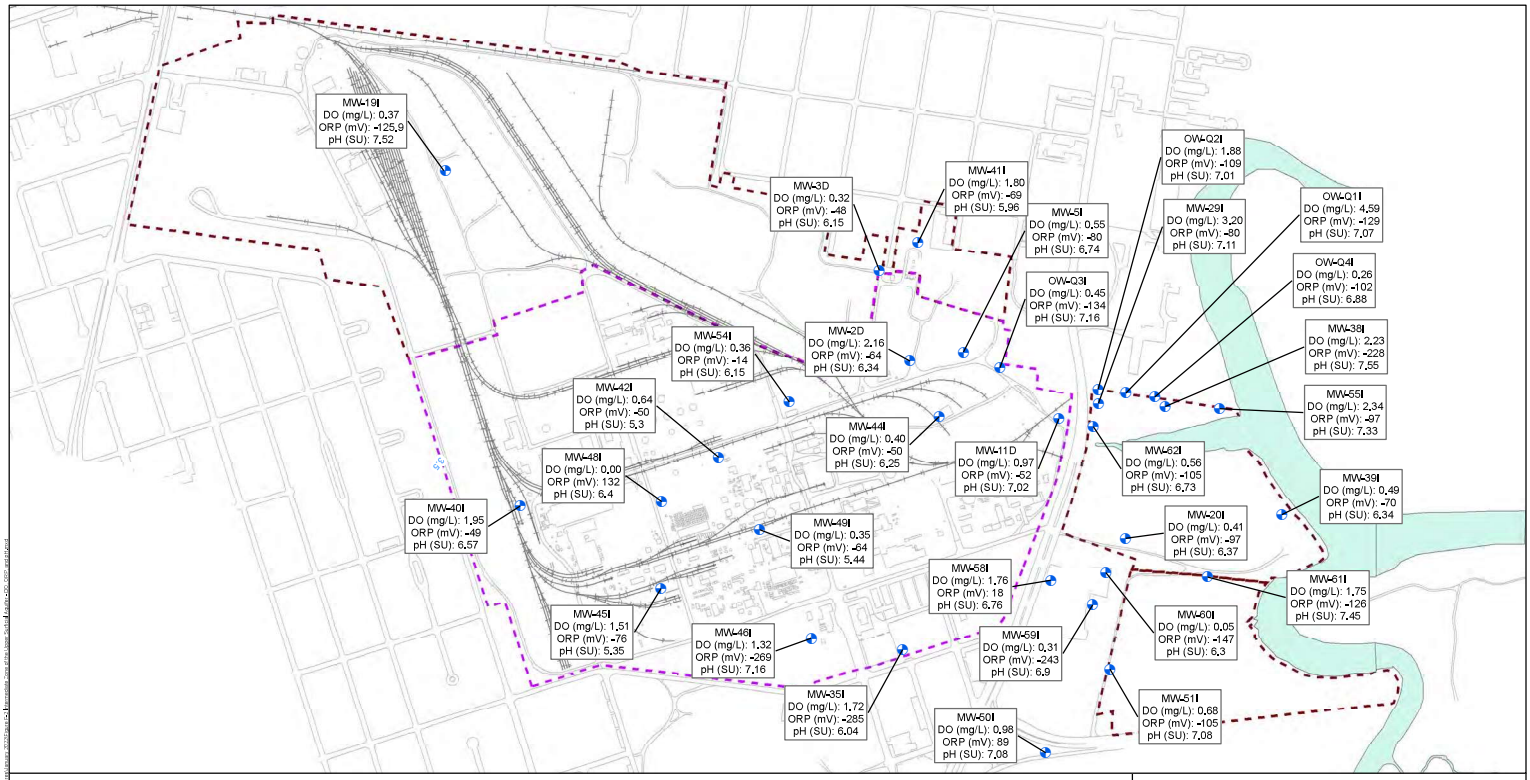
Notes:
1. For sample date refer to Table E-1 Summary of Relevant Geochemical Parameters of the Corrective Action Plan Report.
2. Most recent geochemical data is shown for each well.
3. "mg/L" - milligram per liter; "DO" - Dissolved Oxygen; "ORP" - Oxidation Reduction Potential; "SU" - standard units; "mV" - millivolt.

Shallow Zone of the Upper Surficial Aquifer
DO, ORP, and pH
Hercules/Pinova Facility, Brunswick, Georgia

Geosyntec consultants

Kennesaw, GA | January 2022

Figure F-1



Legend

- Surficial Aquifer, Intermediate Zone of Upper Unit Wells
- Road
- Railroad
- Site Building
- Creek
- Pinova Property
- Hercules Property

0 275 550 1,100 Feet

N

Notes:

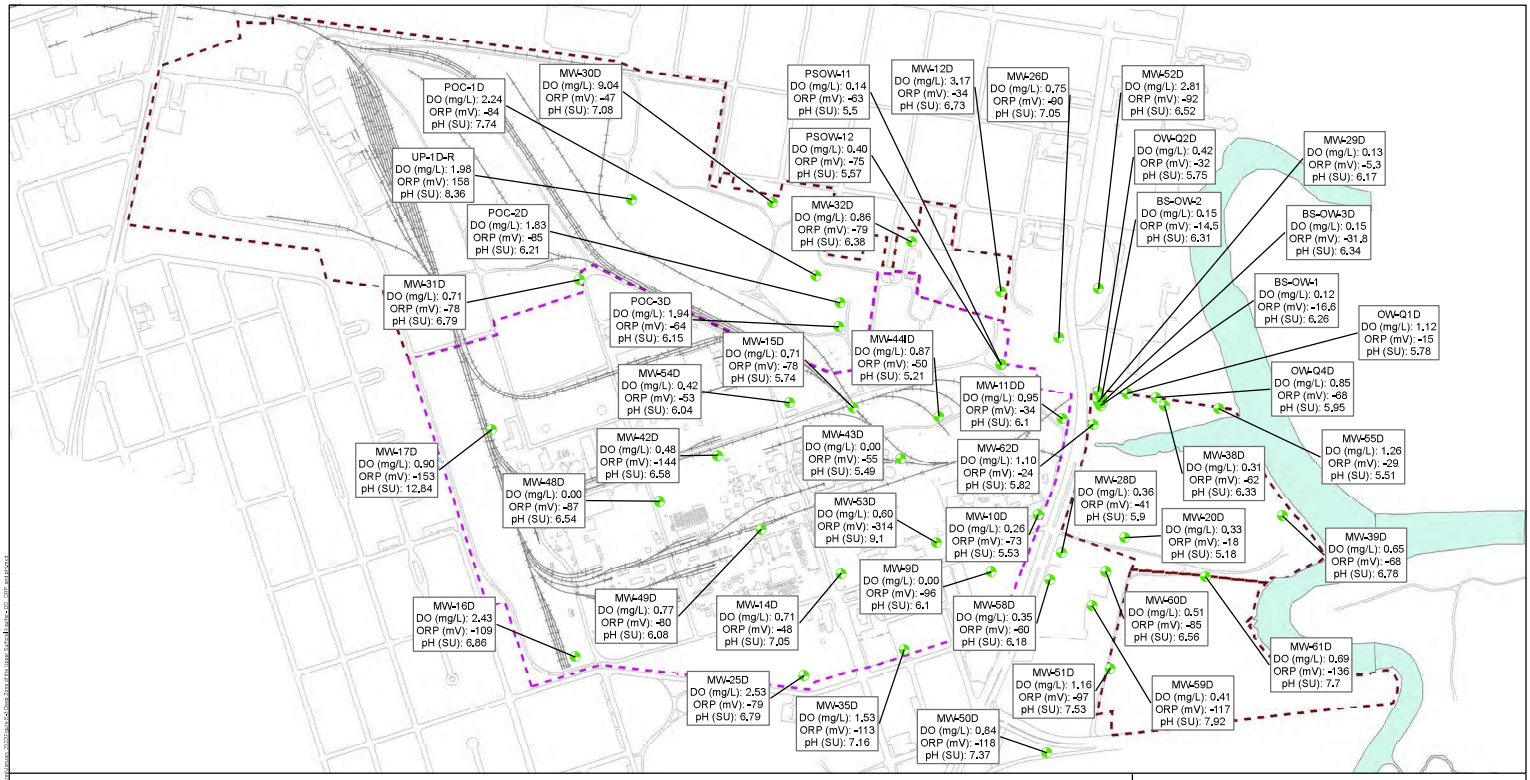
1. For sample date refer to Table E-1 Summary of Relevant Geochemical Parameters of the Corrective Action Plan Report.
2. Measurements shown are field parameter monitoring results with the exception of pH result shown for MW-19I which is a laboratory analytical result.
3. Most recent geochemical data is shown for each well.
4. "HF" - Field parameter with a holding time of 15 minutes.
5. "mg/L" - milligram per liter; "DO" - Dissolved Oxygen; "ORP" - Oxidation Reduction Potential; "SU" - standard units; "mV" - millivolt.

Intermediate Zone of the Upper Surficial Aquifer
DO, ORP, and pH
Hercules/Pinova Facility, Brunswick, Georgia

Geosyntec consultants

Kennesaw, GA | January 2022

Figure F-2



Legend

- Surficial Aquifer, Deep Zone of Upper Unit Wells
- Road
- Railroad
- Site Building
- Creek
- Pinova Property
- Hercules Property

0 275 550 1,100 Feet

N

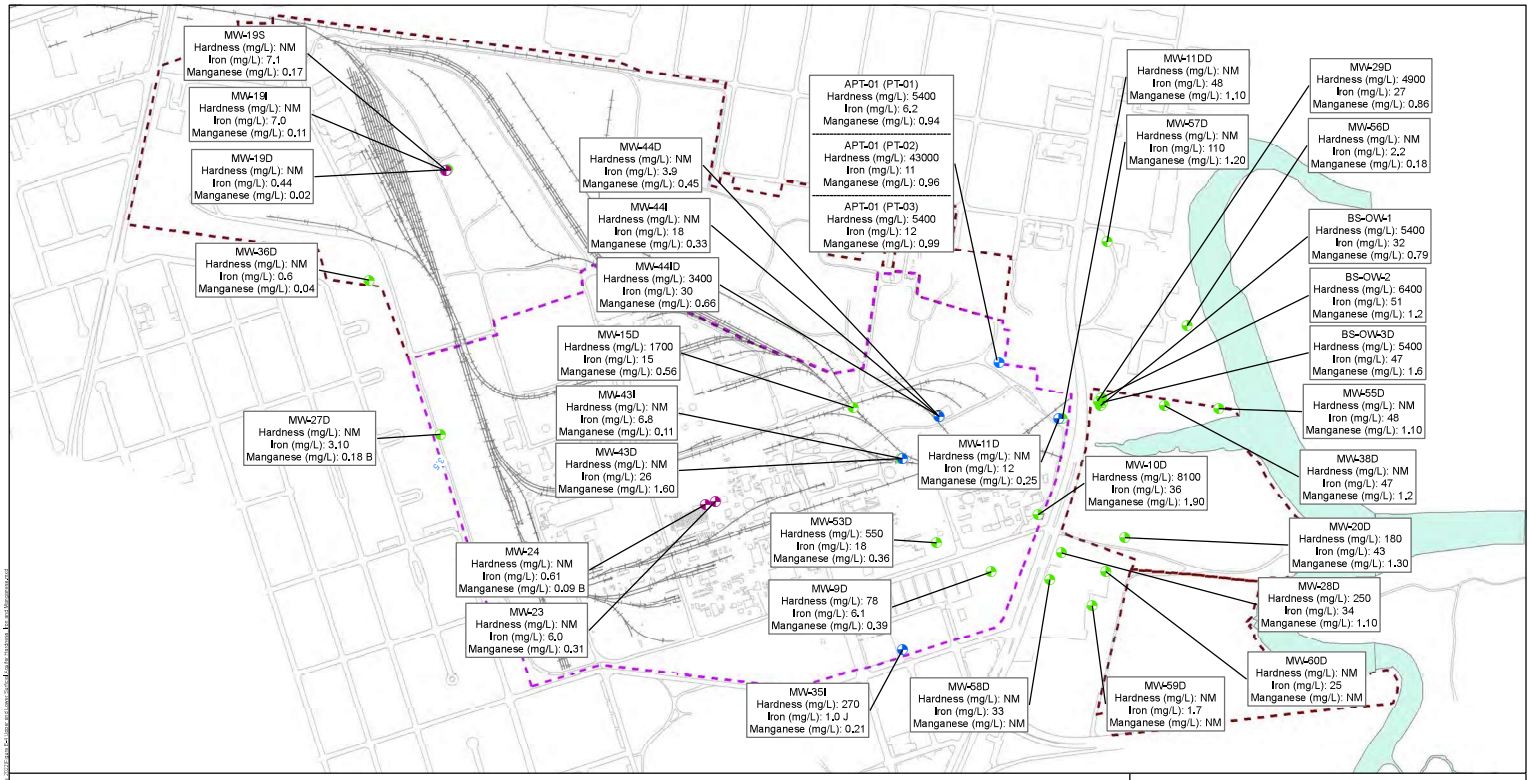
Notes:
1. For sample date refer to Table E-1 Summary of Relevant Geochemical Parameters of the Corrective Action Plan Report.
2. Most recent geochemical data is shown for each well.
3. "mg/L" - milligram per liter; "DO" - Dissolved Oxygen; "ORP" - Oxidation Reduction Potential; "SU" - standard units; "mV" - millivolt.

Deep Zone of the Upper Surficial Aquifer
DO, ORP, and pH
Hercules/Pinova Facility, Brunswick, Georgia

Geosyntec consultants

Kennesaw, GA | January 2022

Figure F-3



Legend

- Surficial Aquifer, Shallow Zone of Upper Unit Wells
- Surficial Aquifer, Intermediate Zone of Upper Unit Wells
- Surficial Aquifer, Deep Zone of Upper Unit Wells
- Surficial Aquifer, Lower Unit Wells
- Road
- Railroad
- Site Building
- Creek
- Pinova Property
- Hercules Property

0 275 550 1,100 Feet

N

Notes:

1. For sample date refer to Table E-1 Summary of Relevant Geochemical Parameters of the Corrective Action Plan Report.
2. Most recent analytical data is shown for each well.
3. PT-01, PT-02, and PT-03 were collected during aquifer testing activities conducted at APT-01 in March 2020. Groundwater samples PT-01, PT-02, and PT-03 were collected from the APT-01 discharge approximately 2 hours, 4 hours, and 7 hours, respectively, after the start of aquifer testing activities.
4. "B" = Compound was found in the blank and the sample.
5. "NM" = Not Measured; "mg/L" = milligram per liter.

Upper and Lower Surficial Aquifer
Hardness, Iron and Manganese
Hercules/Pinova Facility, Brunswick, Georgia

Geosyntec consultants

Kennesaw, GA | January 2022

Figure F-4