



ARM Group LLC

Engineers and Scientists

June 30, 2021

Ms. Barbara Brown
Project Coordinator
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

Re: Comment Response Letter:
Phase II Investigation Report
Area B: Parcel B14
Tradepoint Atlantic
Sparrows Point, MD 21219

Dear Ms. Brown:

On behalf of Tradepoint Atlantic (TPA), ARM Group LLC (ARM) is pleased to provide the following responses to the Maryland Department of the Environment (MDE) and United States Environmental Protection Agency (USEPA) for comments received from the MDE dated June 19, 2018 regarding the previous submission of the Parcel B14 Phase II Investigation Report (Revision 0 dated March 27, 2018). A full revision to the Phase II Investigation Report is not planned to be submitted, although this Comment Response Letter will serve as an Addendum to the report. Responses to specific comments are given below; the original comments are included in italics with responses following.

- 1. There is no mention of whether HI04-PZM006 was repaired or replaced during this investigation. The Work Plan stated that the well was bent at the ground surface and could not be sampled "as is". Please add details regarding this work.*

HI04-PZM006 was repaired and is currently in good condition. This location is proposed to be included as part of the future perimeter groundwater monitoring program associated with Sub-Parcel B14-1 development.

- 2. Page 12 of the Work Plan details well redevelopment and gauging activities to be conducted on all groundwater wells proposed for sampling. Where are the details regarding development of the wells and subsequent gauging?*

Attachment 1 provides the development log details for the wells that were developed prior to Parcel B14 Phase II groundwater sampling. Subsequent gauging data are provided in **Table 1**.

3. *HI02-PZM006 and HI07-PZM005 - Both of these wells were gauged as part of the Parcel B8 Phase II Investigation which occurred in 2015. At the time these wells were sampled, the analytes did not include: cyanide, dissolved metals, DRO/GRO, or hexavalent chromium. Based on the results of the Parcel B14 Phase II investigation, and the anticipated plan for additional work, it will be necessary to sample the two wells for the previously excluded contaminants to ensure compliance and comparison with all of the groundwater results in the vicinity of the former impoundment.*

While available cyanide was not sampled at these historical Parcel B8 locations, total cyanide was sampled and both results were non-detect and below the Project Action Limit (PAL). Likewise, total metals (including hexavalent chromium) were analyzed at these locations, with no PAL exceedances. Since the identified parameters sampled for at these locations are a conservative measure of the constituents and sample results indicate no concerns, additional sampling is not considered necessary to identify potential PAL exceedances or constituents of potential concern (COPCs). DRO and GRO were not sampled during the Phase II Investigation, but these parameters will be sampled at HI02-PZM006 and HI07-PZM005 prior to site development.

4. *The Department agrees with the recommendation to further investigate soil and groundwater impacts at TM04-PZM006. It is understood that a plan for this investigation will be submitted for review.*

The Parcel B14 Phase II Investigation Report recommended that, if an enclosed structure is proposed for construction in the vicinity of TM04-PZM006, further assessment or mitigation of the potential for human exposures via the vapor intrusion (VI) to indoor air pathway should be addressed in a Response and Development Work Plan (RADWP). The recently submitted Sub-Parcel B14-1 RADWP (Revision 0 dated June 8, 2021) included an evaluation of potential VI risks, and restated the concern at location TM04-PZM006. No structures are proposed for occupancy on Sub-Parcel B14-1, and the RADWP includes an additional requirement to further evaluate vapor control measures if an enclosed structure is proposed in the future on the sub-parcel.

Groundwater impacts at TM04-PZM006 will be monitored as part of the future perimeter groundwater monitoring program associated with Sub-Parcel B14-1 development. A separate Work Plan is not planned to be submitted, but the proposed approach is outlined here. Conditions at this well and the other existing shallow perimeter monitoring wells will be sampled quarterly during the construction phase, and the full perimeter network will be sampled annually following development completion. This perimeter network will ultimately be incorporated into the site-wide groundwater monitoring well network and monitoring program.



5. *Section 3.3 Groundwater Investigation - Please add language detailing whether permanent groundwater wells sampled as part of this investigation are located on the interior or exterior of the berm located on the property. Or, note if the well is located within the berm material itself.*

Based on elevation data from existing topographic contours, shown on **Figure 1**, the wells are located outside or on top of the berm structure.

6. *Table 1 - This table should provide the date that the gauging data was collected.*

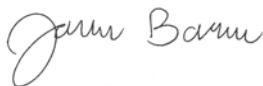
An updated **Table 1** with the gauging date is attached.

7. *Please generate a table that combines the construction details (i.e., screen depth, well depth) for historic groundwater monitoring wells with the recent gauging data. It will be necessary to convert various measurements (amsl, bgs, ft) to be comparable across the table. Monitoring well and temporary piezometer details must be presented in such a way that the Department can determine if the water level is above the top of the well screen. In the event that the well screen is submerged, the table should clearly indicate that fact (e.g., asterisk or bold notation).*

Table 2 has been generated to compare groundwater elevation to well screened interval. Note that the temporary piezometers were not formally surveyed; ground surface elevations were estimated from topographic contours.

If you have any questions, or if we can provide any additional information at this time, please do not hesitate to contact ARM Group LLC at 410-290-7775.

Respectfully submitted,
ARM Group LLC



Joshua M. Barna, G.I.T.
Staff Geologist



T. Neil Peters, P.E.
Senior Vice President





FIGURES

Parcel B14 - Humphrey Impoundment Existing Conditions

June 15, 2021

Figure
1



ARM Group LLC
Engineers and Scientists

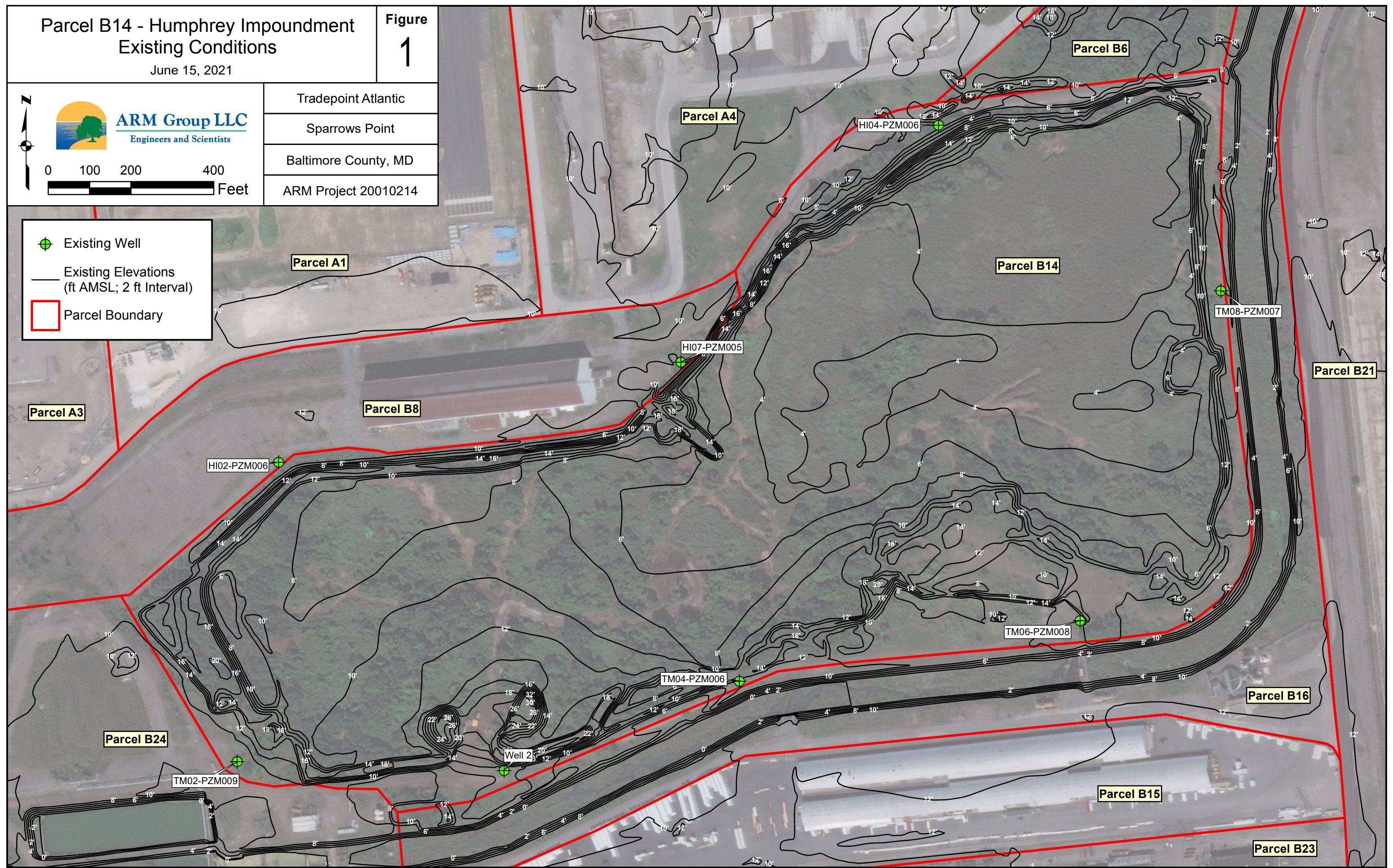
0 100 200 400
Feet

Tradepoint Atlantic
Sparrows Point
Baltimore County, MD
ARM Project 20010214

Existing Well

Existing Elevations
(ft AMSL; 2 ft Interval)

Parcel Boundary



TABLES

**TABLE 1
GROUNDWATER ELEVATION DATA**

<u>Location Name</u>	<u>TOC Elevation (ft AMSL)</u>	<u>Ground Elevation (ft AMSL)</u>	<u>Historic Well Depth (ft bgs)</u>	<u>Total Well Depth (pre-development; ft bgs)</u>	<u>Total Well Depth (post-development; ft bgs)</u>	<u>Measured DTW (ft TOC)</u>	<u>Measured DTP (ft TOC)</u>	<u>Groundwater Elevation (ft AMSL)</u>
HI02-PZM006	10.11	10.42	17	17.22	UK	8.43	NA	1.68
HI04-PZM006	12.39	10.37	17	14.13	14.83	10.97	NA	1.42
HI07-PZM005	12.66	9.64	14	14.20	UK	10.63	NA	2.03
TM02-PZM009	10.46	8.26	21	17.56	17.68	10.29	NA	0.17
TM04-PZM006	11.55	9.83	21	19.49	19.55	12.52	NA	-0.97
TM06-PZM008	13.57	11.13	19	18.49	19.26	13.34	NA	0.23
TM08-PZM007	9.72	7.11	14	13.06	14.41	9.03	NA	0.69
Well 2	12.27	9.96	23	20.79	20.83	12.17	NA	0.10

DTW = Depth to water

DTP = Depth to product

TOC = Top of casing

AMSL = Above mean sea level

NA = Not Applicable

UK = Post-development depth unknown

Measured DTW recorded December 21, 2017

**TABLE 2
GROUNDWATER ELEVATION COMPARISON**

<u>Location Name</u>	<u>TOC Elevation (ft AMSL)</u>	<u>Ground Elevation (ft AMSL)</u>	<u>Historic Well Depth/Installation Depth (ft bgs)</u>	<u>Screen Interval (ft bgs)</u>	<u>Screen Interval (ft AMSL)</u>	<u>Measured DTW (ft TOC)</u>	<u>Measured DTP (ft TOC)</u>	<u>Gauging Date</u>	<u>Groundwater Elevation (ft AMSL)</u>
HI02-PZM006	10.11	10.42	17	7 to 17	3.42 to -6.58	8.43	NA	12/21/2017	1.68
HI04-PZM006	12.39	10.37	17	7 to 17	3.37 to -6.63	10.97	NA	12/21/2017	1.42
HI07-PZM005	12.66	9.64	14	4 to 14	5.64 to -4.36	10.63	NA	12/21/2017	2.03
TM02-PZM009	10.46	8.26	21	11 to 21	-2.74 to -12.74	10.29	NA	12/21/2017	0.17*
TM04-PZM006	11.55	9.83	21	11 to 21	-1.17 to -11.17	12.52	NA	12/21/2017	-0.97*
TM06-PZM008	13.57	11.13	19	9 to 19	2.13 to -7.87	13.34	NA	12/21/2017	0.23
TM08-PZM007	9.72	7.11	14	4 to 14	3.11 to -6.89	9.03	NA	12/21/2017	0.69
Well 2	12.27	9.96	23	13 to 23	-3.04 to -13.04	12.17	NA	12/21/2017	0.10*
B14-002-PZ	8.80	6	10	5 to 10	1 to -4	4.28	3.79	2/19/2019	4.52*
B14-006-PZ	6.95	4	10	5 to 10	1 to -6	3.18	2.94	2/19/2019	3.77*
B14-007-PZ	7.70	5	15	5 to 15	0 to -10	6.63	4.80	2/19/2019	1.07*
B14-008-PZ	7.50	5	22	7 to 22	3 to -17	2.79	2.75	2/19/2019	4.71*
B14-010-PZ	13.52	10	20.58	5.58 to 20.58	4.42 to -10.58	11.20	NA	10/16/2017	2.32
B14-011-PZ	11.00	10	20	10 to 20	0 to -10	6.28	4.53	2/19/2019	4.72*
B14-012-PZ	14.05	11	20	10 to 20	1 to -9	8.31	8.18	2/19/2019	5.74*
B14-013-PZ	10.90	8	20	5 to 20	3 to -12	9.22	6.65	2/19/2019	1.68
B14-015-PZ	15.25	13	25	5 to 25	8 to -12	14.08	NA	2/19/2019	1.17
B14-017-PZ	13.25	11	17.68	7.68 to 17.68	3.32 to -6.68	12.79	NA	10/16/2017	0.46
B14-021-PZ	10.97	10	15	5 to 15	5 to -5	4.71	2.95	2/19/2019	6.26*
B14-022-PZ	14.80	14	15	5 to 15	9 to -1	4.80	NA	2/19/2019	10.00*
B14-028-PZ	14.20	11	28	13 to 28	2 to -17	16.40	NA	10/16/2017	-2.20
B14-034-PZ	12.83	10	15	5 to 15	5 to -5	8.65	NA	2/19/2019	4.18
B14-035-PZ	10.90	8	20	5 to 20	3 to -12	9.02	NA	2/1/2018	1.88
B14-036-PZ	9.76	7	20	5 to 20	2 to -13	2.12	NA	2/19/2019	7.64*
B14-037-PZ	12.96	10	20	5 to 20	5 to -10	10.53	10.50	2/19/2019	2.43
B14-038-PZ	15.69	13	20	10 to 20	3 to -7	12.59	11.14	2/19/2019	3.10*
B14-039-PZ	12.70	10	20	10 to 20	0 to -10	10.32	NA	2/1/2018	2.38*
B14-040-PZ	11.65	9	15	5 to 15	4 to -6	7.08	NA	2/19/2019	4.57*
B14-041-PZ	13.72	11	20	5 to 20	6 to -9	8.02	7.02	2/19/2019	5.70
B14-042-PZ	11.86	9	15	5 to 15	4 to -6	5.86	NA	2/19/2019	6.00*
B14-043-PZ	10.98	8	20	5 to 20	3 to -12	5.49	NA	2/19/2019	5.49*

DTW = Depth to water
DTP = Depth to product
TOC = Top of casing
AMSL = Above mean sea level
bgs = Below ground surface
NA = Not Applicable

*Indicates groundwater is above screened interval
Piezometer ground elevation estimated from topographic map

ATTACHMENT 1



ARM Group Inc.

Earth Resource Engineers and Consultants

Sparrows Point

Monitoring Well Development Form – Surge and Pump Method

Well ID: HI04-PZM006

Well Permit No.: _____

Page 1 of 2

ARM Project No.: <u>150300M</u>	Date/Time Started: <u>10/5 / 1:00</u>	Developed by: <u>R Clancy</u>
Client: EnviroAnalytics Group	Date/Time Completed: <u>10/5 / 3:00</u>	Company: <u>ARM</u>
Well Location: Area <u>B</u> , Parcel <u>14</u>	Weather/Site Conditions: <u>Sunny, 70s</u>	Checked by: _____

A. Well Construction Details

Well Cover Type: <u>Stick-up</u> or <u>Flush-Mount</u>	PVC Screen Interval: <u>7</u> to <u>17</u> (?)
Well riser/screen material: <u>PVC At surface, no casing</u>	Sandpack Interval: _____ to _____
Difference between Ground Surface and TOC: (+/-) <u>.0ft</u>	Measured Total Depth of Well When Installed (TOC) (F): (See Original Well Construction Diagram)

B. Wetted Bore Volume Determination

Well (PVC) Diameter: 2.0 in.	Well Total Depth (TOC): <u>16.15</u> ft. (B)
Well (PVC) Volume: 0.163 gal./ft. (A)	Depth to Static Water Level (TOC): <u>8.77</u> ft. (C)
Petroleum/Product Present? <u>Y</u> or <u>N</u> Thickness (ft.): _____	Height of Water Column: (B - C) <u>7.39</u> ft. (D)
Initial Thickness of Sediment in Bottom of Well (F - B): <u>.70</u> ft.	Wetted Bore Volume: (A x D) <u>1.20</u> gal. (E)

C. Surge and Pump Event Summary Data

Description of Surge Equipment: PVC, whale pump

Event No.	Screen Interval (ft.)	No. of Surge Strokes	Volume of Water Removed (gal.)	Bore Volumes of Water Removed	Qualitative Description of Color/Turbidity/Odors/Other
1	7-10	10	5	4.17	Some fuel odor
2	10-13	12	10	8.34	↓
3	14-17	12	15	12.51	
					Pump clogged repeatedly
Cumulative Totals: (Minimum of 3 Well Volumes)			30	25	

Final Depth to Water (from TOC): 8.81, 16.85

Thickness of Any Sediment Remaining in Well: _____

All depths reported are from reference notch in top of TOC.

Sparrows Point

Well ID: HL04-PZM006

Date: 10/6/17

ID Numbers of IDW Drums Generated:

1. 959 - Purge GW - 10/6/17
2. 960 - Purge GW - 10/6/17
3. _____

D. Checklists

Equipment Check List:

- Original Well Construction Diagram
- Well Development Form
- Clean Weighted Tape for Determining Total Well Depth and Depth to Any Sediment or Possible Blockages Within the Well
- Water Level Meter and/or Oil-Water Interface Probe
- Surge Block and 2-inch ID PVC Casing Extensions
- Appropriate Pump
- Disposable Pump Tubing
- Clean Paper Towels
- Alconox Detergent
- Clean Brushes for Decontamination Work
- Distilled Water for Rinsing Equipment
- 2 New, Clean Spray Bottles for Spray Distilled Water
- 2 to 3 Clean Five-gallon Buckets
- 55-gallon Drum(s) for Development Water; Drum Non-hazardous Waste Labeling Supplies
- Personal Protective Equipment Per Health and Safety Plan

Quality Control Procedures Include:

- Decon All Equipment that Goes Down-hole per Appropriate Standard Operating Procedure (SOP)
- Staging Down-hole Equipment, Tubing, etc. on Clean Plastic Sheeting
- _____

E. Notes/Comments

- Some Fuel odor

- Pump clogged with sediment

- Well missing outer casing

F. Signatures

Field Representative(s): Ryan Clancy [Signature] _____

Print Name Signature Date

Print Name Signature Date

All depths reported are from reference notch in top of TOC.
All measurements made in 10^{ths} of feet

TOC = from Top of PVC Casing
Grd = Ground Surface
TD = Total Depth



ARM Group Inc.

Earth Resource Engineers and Consultants

Sparrows Point

Monitoring Well Development Form – Surge and Pump Method

Well ID: TM 02 - PZM009

Well Permit No.: _____

Page 1 of 2

ARM Project No.: <u>150 150300M</u>	Date/Time Started: <u>10/6 / 9:30</u>	Developed by: <u>R Clancy</u>
Client: <u>EAG</u> EnviroAnalytics Group	Date/Time Completed: <u>10/6 / 10/15</u>	Company: <u>ARM</u>
Well Location: Area <u>B</u> , Parcel <u>14</u>	Weather/Site Conditions: <u>Sunny, 70s</u>	Checked by: _____

A. Well Construction Details

Well Cover Type: <u>Stick-up</u> or <u>Flush-Mount</u>	PVC Screen Interval: <u>10</u> to <u>20</u> (?)
Well riser/screen material: <u>PVC</u>	Sandpack Interval: _____ to _____
Difference between Ground Surface and TOC: (+/-) <u>~ 4 ft</u>	Measured Total Depth of Well When Installed (TOC) (F): (See Original Well Construction Diagram)

B. Wetted Bore Volume Determination

Well (PVC) Diameter: 2.0 in.	Well Total Depth (TOC): <u>19.76</u> ft. (B)
Well (PVC) Volume: 0.163 gal./ft. (A)	Depth to Static Water Level (TOC): <u>9.98</u> ft. (C)
Petroleum/Product Present? <u>Y</u> or <u>N</u> . Thickness (ft.): _____	Height of Water Column: (B - C) <u>9.78</u> ft. (D)
Initial Thickness of Sediment in Bottom of Well (F - B): <u>0.12</u> ft.	Wetted Bore Volume: (A x D) <u>1.59</u> gal. (E)

C. Surge and Pump Event Summary Data

Description of Surge Equipment: PVC (4 x 5ft), whale pump

Event No.	Screen Interval (ft.)	No. of Surge Strokes	Volume of Water Removed (gal.)	Bore Volumes of Water Removed	Qualitative Description of Color/Turbidity/Odors/Other
1	11-14	10	5	~3	Generally Clear ↓
2	15-17	10	5	~3	
3	17-19	10	5	~3	
Cumulative Totals: (Minimum of 3 Well Volumes)			15	9	

Final Depth to Water (from TOC): 10.04 / 19.88

Thickness of Any Sediment Remaining in Well: _____

All depths reported are from reference notch in top of TOC.

ID Numbers of IDW Drums Generated:

1. 959 - Purge GW - 10/6/17
2. 960 - Purge GW - 10/6/17
3. _____

D. Checklists

Equipment Check List:


- Original Well Construction Diagram
- Well Development Form
- Clean Weighted Tape for Determining Total Well Depth and Depth to Any Sediment or Possible Blockages Within the Well
- Water Level Meter and/or Oil-Water Interface Probe
- Surge Block and 2-inch ID PVC Casing Extensions
- Appropriate Pump
- Disposable Pump Tubing
- Clean Paper Towels
- Alconox Detergent
- Clean Brushes for Decontamination Work
- Distilled Water for Rinsing Equipment
- 2 New, Clean Spray Bottles for Spray Distilled Water
- 2 to 3 Clean Five-gallon Buckets
- 55-gallon Drum(s) for Development Water; Drum Non-hazardous Waste Labeling Supplies
- Personal Protective Equipment Per Health and Safety Plan

Quality Control Procedures Include:

- Decon All Equipment that Goes Down-hole per Appropriate Standard Operating Procedure (SOP)
- Staging Down-hole Equipment, Tubing, etc. on Clean Plastic Sheeting
- _____

E. Notes/Comments

F. Signatures

Field Representative(s): Ryan Clancy  10/6/17

Print Name Signature Date

Print Name Signature Date

All depths reported are from reference notch in top of TOC.
All measurements made in 10^{ths} of feet

TOC = from Top of PVC Casing
Grd = Ground Surface
TD = Total Depth



ARM Group Inc.

Earth Resource Engineers and Consultants

Sparrows Point

Monitoring Well Development Form – Surge and Pump Method

Well ID: TM04-PZM006

Well Permit No.: _____

Page 1 of 2

ARM Project No.: 150 <u>300M</u>	Date/Time Started: 0900 <u>10/11</u> / <u>0900</u>	Developed by: <u>R Clancy</u>
Client: <u>EnviroAnalytics Group</u>	Date/Time Completed: <u>10/11</u> / <u>11:00</u>	Company: <u>ARM</u>
Well Location: Area <u>B</u> , Parcel <u>14</u>	Weather/Site Conditions: <u>Overcast, wind, light rain</u>	Checked by: _____

A. Well Construction Details

Well Cover Type: <u>Stick-up</u> or <u>Flush-Mount</u>	PVC Screen Interval: <u>11</u> to <u>21</u> (?)
Well riser/screen material: <u>PVC</u>	Sandpack Interval: _____ to _____
Difference between Ground Surface and TOC: (+/-) <u>~3ft</u>	Measured Total Depth of Well When Installed (TOC) (F): (See Original Well Construction Diagram)

B. Wetted Bore Volume Determination

Well (PVC) Diameter: 2.0 in.	Well Total Depth (TOC): <u>21.21</u> ft. (B)
Well (PVC) Volume: 0.163 gal./ft. (A)	Depth to Static Water Level (TOC): <u>12.23</u> ft. (C)
Petroleum/Product Present? <u>Y</u> or <u>N</u> Thickness (ft.): _____	Height of Water Column: (B - C) <u>8.98</u> ft. (D)
Initial Thickness of Sediment in Bottom of Well (F - B): <u>.006</u> ft.	Wetted Bore Volume: (A x D) <u>1.46</u> gal. (E)

C. Surge and Pump Event Summary Data

Description of Surge Equipment: PVC, whale pump

Event No.	Screen Interval (ft.)	No. of Surge Strokes	Volume of Water Removed (gal.)	Bore Volumes of Water Removed	Qualitative Description of Color/Turbidity/Odors/Other
1	11-14	10	2.5	1.71	Sediment in water
2	15-18	12	2	1.37	Lot Lot of organic matter
3	18-21	15	1.5	1.03	Very slow to recharge
Cumulative Totals: (Minimum of 3 Well Volumes)			6	4.1	

Final Depth to Water (from TOC): 15.25 / 21.27

Thickness of Any Sediment Remaining in Well: _____

All depths reported are from reference notch in top of TOC.

ID Numbers of IDW Drums Generated:

1. 967 - Purge GW - 10/11/17
2. 968 - Purge GW - 10/11/17
3. _____

D. Checklists

Equipment Check List:

- Original Well Construction Diagram
- Well Development Form
- Clean Weighted Tape for Determining Total Well Depth and Depth to Any Sediment or Possible Blockages Within the Well
- Water Level Meter and/or Oil-Water Interface Probe
- Surge Block and 2-inch ID PVC Casing Extensions
- Appropriate Pump
- Disposable Pump Tubing
- Clean Paper Towels
- Alconox Detergent
- Clean Brushes for Decontamination Work
- Distilled Water for Rinsing Equipment
- 2 New, Clean Spray Bottles for Spray Distilled Water
- 2 to 3 Clean Five-gallon Buckets
- 55-gallon Drum(s) for Development Water; Drum Non-hazardous Waste Labeling Supplies
- Personal Protective Equipment Per Health and Safety Plan

Quality Control Procedures Include:

- Decon All Equipment that Goes Down-hole per Appropriate Standard Operating Procedure (SOP)
- Staging Down-hole Equipment, Tubing, etc. on Clean Plastic Sheeting
- _____

E. Notes/Comments

- Sediment in water
- Well repeatedly ran dry
- Bees nest inside well was removed

F. Signatures

Field Representative(s):

Ryan Clancy
Print Name

[Signature]
Signature

10/11/17
Date

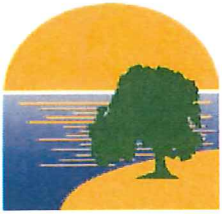
Print Name

Signature

Date

All depths reported are from reference notch in top of TOC.
All measurements made in 10^{ths} of feet

TOC = from Top of PVC Casing
Grd = Ground Surface
TD = Total Depth



ARM Group Inc.

Earth Resource Engineers and Consultants

Sparrows Point

Monitoring Well Development Form – Surge and Pump Method

Well ID: TM06-PZM008

Well Permit No.: _____

Page 1 of 2

ARM Project No.: 150 <u>300M -</u>	Date/Time Started: <u>10/6 / 10:30</u>	Developed by: <u>R Clary</u>
Client: <u>EAB</u> EnviroAnalytics Group	Date/Time Completed: <u>10/6 / 11:15</u>	Company: <u>ARM</u>
Well Location: Area <u>B</u> , Parcel <u>14</u>	Weather/Site Conditions: <u>Sunny, 70's</u>	Checked by: _____

A. Well Construction Details

Well Cover Type: <u>Stick-up</u> or <u>Flush-Mount</u>	PVC Screen Interval: <u>12</u> to <u>22</u> (?)
Well riser/screen material: <u>PVC</u> <u>WVBA</u>	Sandpack Interval: _____ to _____
Difference between Ground Surface and TOC: (+/-) <u>~3ft</u>	Measured Total Depth of Well When Installed (TOC) (F): (See Original Well Construction Diagram)

B. Wetted Bore Volume Determination

Well (PVC) Diameter: 2.0 in.	Well Total Depth (TOC): <u>20.98</u> ft. (B)
Well (PVC) Volume: 0.163 gal./ft. (A)	Depth to Static Water Level (TOC): <u>13.75</u> ft. (C)
Petroleum/Product Present? <u>Y</u> or <u>N</u> . Thickness (ft.): <u>Trace</u>	Height of Water Column: (B - C) <u>7.48</u> ft. (D)
Initial Thickness of Sediment in Bottom of Well (F - B): <u>0.77</u> ft.	Wetted Bore Volume: (A x D) <u>1.22</u> gal. (E)

C. Surge and Pump Event Summary Data

Description of Surge Equipment: PVC (5/8" x 5ft), whale pump

Event No.	Screen Interval (ft.)	No. of Surge Strokes	Volume of Water Removed (gal.)	Bore Volumes of Water Removed	Qualitative Description of Color/Turbidity/Odors/Other
1	12-15	12	5 gal	4.10	Some NAPL odor / sheen
2	16-18	12	5 gal	4.10	↓
3	19-22	12	5 gal	4.10	
Cumulative Totals: (Minimum of 3 Well Volumes)				12.3	

Final Depth to Water (from TOC): 13.75 / 21.70

Thickness of Any Sediment Remaining in Well: _____

All depths reported are from reference notch in top of TOC.

ID Numbers of IDW Drums Generated:

1. 959 - Purge GW - 10/6/17
2. 960 - Purge GW - 10/6/17
3. _____

D. Checklists

Equipment Check List:

- Original Well Construction Diagram
- Well Development Form
- Clean Weighted Tape for Determining Total Well Depth and Depth to Any Sediment or Possible Blockages Within the Well
- Water Level Meter and/or Oil-Water Interface Probe
- Surge Block and 2-inch ID PVC Casing Extensions
- Appropriate Pump
- Disposable Pump Tubing
- Clean Paper Towels
- Alconox Detergent
- Clean Brushes for Decontamination Work
- Distilled Water for Rinsing Equipment
- 2 New, Clean Spray Bottles for Spray Distilled Water
- 2 to 3 Clean Five-gallon Buckets
- 55-gallon Drum(s) for Development Water; Drum Non-hazardous Waste Labeling Supplies
- Personal Protective Equipment Per Health and Safety Plan

Quality Control Procedures Include:

- Decon All Equipment that Goes Down-hole per Appropriate Standard Operating Procedure (SOP)
- Staging Down-hole Equipment, Tubing, etc. on Clean Plastic Sheeting
- _____

E. Notes/Comments

-Mild fuel odor

F. Signatures

Field Representative(s): Ryan Clancy [Signature] 10/6/17

Print Name Signature Date

Print Name Signature Date

All depths reported are from reference notch in top of TOC.
All measurements made in 10^{ths} of feet

TOC = from Top of PVC Casing
Grd = Ground Surface
TD = Total Depth



ARM Group Inc.

Earth Resource Engineers and Consultants

Sparrows Point

Monitoring Well Development Form – Surge and Pump Method

Well ID: TM08-PZM007

Well Permit No.: _____

Page 1 of 2

ARM Project No.: <u>150300 M</u>	Date/Time Started: <u>10/6 / 11:30</u>	Developed by: <u>R Clancy</u>
Client: EnviroAnalytics Group	Date/Time Completed: <u>10/6 / 12:30</u>	Company: <u>ARM</u>
Well Location: Area <u>B</u> , Parcel <u>14</u>	Weather/Site Conditions: <u>Sunny, 70s</u>	Checked by: _____

A. Well Construction Details

Well Cover Type: <u>Stick-up</u> or <i>Flush-Mount</i>	PVC Screen Interval: <u>7</u> to <u>17</u>
Well riser/screen material: <i>PVC</i>	Sandpack Interval: _____ to _____
Difference between Ground Surface and TOC: (+/-) <u>~3 ft</u>	Measured Total Depth of Well When Installed (TOC) (F): (See Original Well Construction Diagram)

B. Wetted Bore Volume Determination

Well (PVC) Diameter: 2.0 in.	Well Total Depth (TOC): <u>15.67</u> ft. (B)
Well (PVC) Volume: 0.163 gal./ft. (A)	Depth to Static Water Level (TOC): <u>9.32</u> ft. (C)
Petroleum/Product Present? <u>Y</u> or <u>N</u> Thickness (ft.): _____	Height of Water Column: (B - C) <u>6.35</u> ft. (D)
Initial Thickness of Sediment in Bottom of Well (F - B): <u>1.35</u> ft.	Wetted Bore Volume: (A x D) <u>1.04</u> gal. (E)

C. Surge and Pump Event Summary Data

Description of Surge Equipment: PVC, whole pump

Event No.	Screen Interval (ft.)	No. of Surge Strokes	Volume of Water Removed (gal.)	Bore Volumes of Water Removed	Qualitative Description of Color/Turbidity/Odors/Other
1	7-10	10	5	4.81	<i>some fuel odor</i>
2	10-13	10	5	4.81	
3	14-17	12	15	14.43	
4	14-17	12	15	14.43	
Cumulative Totals: (Minimum of 3 Well Volumes)			40		

Final Depth to Water (from TOC): 9.30 / 17.02

Thickness of Any Sediment Remaining in Well: _____

All depths reported are from reference notch in top of TOC.

ID Numbers of IDW Drums Generated:

1. 959 - Purge GW - 10/6/17
2. 960 - Purge GW - 10/6/17
3. _____

D. Checklists

Equipment Check List:

- Original Well Construction Diagram
- Well Development Form
- Clean Weighted Tape for Determining Total Well Depth and Depth to Any Sediment or Possible Blockages Within the Well
- Water Level Meter and/or Oil-Water Interface Probe
- Surge Block and 2-inch ID PVC Casing Extensions
- Appropriate Pump
- Disposable Pump Tubing
- Clean Paper Towels
- Alconox Detergent
- Clean Brushes for Decontamination Work
- Distilled Water for Rinsing Equipment
- 2 New, Clean Spray Bottles for Spray Distilled Water
- 2 to 3 Clean Five-gallon Buckets
- 55-gallon Drum(s) for Development Water; Drum Non-hazardous Waste Labeling Supplies
- Personal Protective Equipment Per Health and Safety Plan

Quality Control Procedures Include:

- Decon All Equipment that Goes Down-hole per Appropriate Standard Operating Procedure (SOP)
- Staging Down-hole Equipment, Tubing, etc. on Clean Plastic Sheeting
- _____

E. Notes/Comments

- Mild Fuel odor

F. Signatures

Field Representative(s): <u>Ryan Clancy</u>	<u>[Signature]</u>	<u>10/6/17</u>
Print Name	Signature	Date
_____	_____	_____
Print Name	Signature	Date

All depths reported are from reference notch in top of TOC.
All measurements made in 10^{ths} of feet

TOC = from Top of PVC Casing
Grd = Ground Surface
TD = Total Depth



ARM Group Inc.

Earth Resource Engineers and Consultants

Sparrows Point

Monitoring Well Development Form – Surge and Pump Method

Well ID: Well 2 Well Permit No.: _____

Page 1 of 2

ARM Project No.: 150 <u>300M</u>	Date/Time Started: <u>10/9 / 9:30</u>	Developed by: <u>R Clancy</u>
Client: <u>EAG</u> EnviroAnalytics Group	Date/Time Completed: <u>10/9 / 10:30</u>	Company: <u>ARM</u>
Well Location: Area <u>B</u> , Parcel <u>14</u>	Weather/Site Conditions: <u>Hy Rain, windy</u>	Checked by: _____

A. Well Construction Details

Well Cover Type: <u>Stick-up</u> or <i>Flush-Mount</i>	PVC Screen Interval: <u>13</u> to <u>23</u> (?)
Well riser/screen material: <u>PVC</u> HDPE	Sandpack Interval: _____ to _____
Difference between Ground Surface and TOC: (+/-) <u>~ 3 ft</u>	Measured Total Depth of Well When Installed (TOC) (F): (See Original Well Construction Diagram)

B. Wetted Bore Volume Determination

Well (PVC) Diameter: 2.0 in.	Well Total Depth (TOC): <u>23.10</u> ft. (B)
Well (PVC) Volume: 0.163 gal./ft. (A)	Depth to Static Water Level (TOC): <u>11.85</u> ft. (C)
Petroleum/Product Present? <u>Y</u> or <u>N</u> Thickness (ft.): _____	Height of Water Column: (B - C) <u>11.27</u> ft. (D)
Initial Thickness of Sediment in Bottom of Well (F - B): <u>.04</u> ft.	Wetted Bore Volume: (A x D) <u>1.84</u> gal. (E)

C. Surge and Pump Event Summary Data

Description of Surge Equipment: PVC, Whale Pump

Event No.	Screen Interval (ft.)	No. of Surge Strokes	Volume of Water Removed (gal.)	Bore Volumes of Water Removed	Qualitative Description of Color/Turbidity/Odors/Other
1	13-16	10	5	2.72	Clear Effluent ↓
2	16-19	10	5	2.72	
3	20-23	10	5	2.72	
Cumulative Totals: (Minimum of 3 Well Volumes)			15	8.15	

Final Depth to Water (from TOC): 11.87 / 23.14

Thickness of Any Sediment Remaining in Well: _____

All depths reported are from reference notch in top of TOC.

