From:	Davies, Wyn
To:	Spellman, John (DEC)
Cc:	O"Connor, Maryanne (DEC); Jackson, Darrel; Johnson, Sheila T.; Banach, Katie; Goldsmith, Christopher; Stephanie Kulsha
Subject:	AVNET/Channel Master 2020 Annual Report , Ellenville NY
Date:	Monday, March 29, 2021 7:05:47 AM
Attachments:	image001.png 2020 Annual Report Channel Master.pdf

John:

Attached is the Annual Report for the 2020 Reporting Year for the former Channel Master Site. This is the THIRD annual report under the new RCRA Corrective Action and Post-Closure Care Order on Consent, dated February 6, 2018.

Please let me know of any questions or concerns.

Wyn

Wyn V. Davies, CIH | Associate Vice President | Remediation Technical Expert |
wyn.davies@arcadis.com
Arcadis | Arcadis U.S. Inc.
17-17 Route 208 North Fair Lawn NJ | 07410 | USA
T. +1 201.398.4409 | M. + 1 610.360.4895

Connect with us! www.arcadis.com | LinkedIn | Twitter | Facebook

ARCADIS Design & Consultancy for natural and built assets

Mr. John Spellman P.E.
Division of Environmental Remediation, Remedial Bureau C
New York State Dept. of Environmental Conservation
625 Broadway, 11th Floor
Albany, NY 12233-7014

Arcadis CE, Inc.
17-17 Route 208 North
Fair Lawn
New Jersey 07410
Tel 201 797 7400
Fax 201 797 4399
www.arcadis.com

ENVIRONMENT

Subject:
2020 Annual Report for Avnet, Inc. - Former Channel Master Site, Ellenville, NY
RCRA Corrective Action and Post-Closure Care Order on Consent
USEPA ID # NYD042457788
Index No. CO 3-20170802-152
Site No. 356025

Date:
March 26, 2021

Contact:
Wyn V. Davies, CIH

Phone:
610.360.4895

Email:
wyn.davies@arcadis.com

Our ref:
00395052.0000

Dear Mr. Spellman:

Enclosed is the former Channel Master Site Annual Report for the 2020 reporting year which includes a summary of the post-closure care program and the evaluation/statistical analysis of 2020 data from the two semiannual Chemical Effectiveness Monitoring Reports (CEMR) previously filed with the NYSDEC for the corrective action program.

This is the THIRD REPORT under the RCRA Corrective Action and Post-Closure Care Order on Consent, dated February 6, 2018.

If you have any questions regarding the report, please call me at 610.360.4895.

Sincerely,

Arcadis CE, Inc.

Wyn V. Davies, CIH
Associate Vice President

Copies:
Darrel Jackson, Avnet, Inc. w/encl.
Karen H. Davis, Fox Rothschild LLP
Stephanie Kulsha, AmTrust
M. O'Connor, NYSDEC Region 3

Avnet Inc.

FORMER CHANNEL MASTER SITE

ELLENVILLE, NEW YORK

ANNUAL REPORT – 2020 REPORTING YEAR

RCRA Corrective Action/Post Closure Consent Order

USEPA ID # NYD042457788
Index No. CO 3-20170802-152
Site No. 356025

March 2021

,

2020 ANNUAL REPORT

Sampling and Data Evaluation of Semi-Annual Chemical Effectiveness Monitoring Reports

Prepared for:

AVNET

Prepared by:

Arcadis of NY Inc.

17-17 Route 208 North

Fair Lawn

New Jersey 07410

Tel 201 797 7400

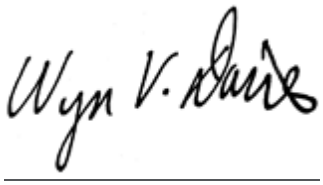
Fax 201 797 4399

Our Ref.:

00395052.0000

Date:

March 26, 2021



Wyn V. Davies, CIH

Associate Vice President

CONTENTS

TABLES

FIGURES

APPENDICES

1 Background

Channel Master owned and operated a manufacturing facility in Ellenville, New York until the facility was sold to Imperial Schrade in 1984. Channel Master, which was owned by Avnet Inc. at that time, relocated its operations out of state and agreed to retain responsibility for identified environmental conditions associated with its Channel Master Division at the Ellenville, NY site. In October 1997, Avnet sold its Channel Master Division and again retained its responsibilities associated with its former operations at the Ellenville site, including assuming the role of permittee for a former Part 373 post-closure permit originally issued by the NYSDEC to Channel Master. During 2017-18, negotiations commenced between the State of New York - Department of Environmental Conservation and Avnet to enter into a new RCRA Corrective Action and Post-Closure Care Consent Order to replace the RCRA Permit (subject to this Annual Report). A final Order on Consent (Index # CO 3-20190802-152) was prepared in January 2018 and was signed on February 6, 2018 by the parties with all workplans of the Part 373 Permit being incorporated into and becoming enforceable under the RCRA Corrective Action and Post-Closure Care Order on Consent.

During its period of operation, Channel Master treated its wastewater in a chemical treatment system within the plant building and in an outdoor surface impoundment (lagoon) on Channel Master's property (see Figure 1). The plant and the surface impoundment were decommissioned under the Resource Conservation and Recovery Act (RCRA) in accordance with Channel Master's approved Closure Plan. Groundwater beneath the building was found to be contaminated with several volatile organic compounds (VOCs), the primary of which was 1,1,1-trichloroethane (TCA), a solvent used in degreasing. A groundwater recovery and treatment system were installed and has been operating since January 1987 to remedy the groundwater contamination beneath the building. Under its obligations since 1994, Avnet has prepared an Annual Report that includes an annual summary of the post-closure care program and the analysis of data from the semi-annual Chemical Effectiveness Monitoring Reports (CEMR) to assure that significant changes could be detected, and corrective measures implemented per the data analysis.

In the third and fourth quarters of 2015 and first quarter of 2016, the current site owner (Ellenville Development Partners) performed a demolition of the former Channel Master manufacturing buildings. The demolition activities included removal of all above ground structures while maintaining the integrity of the building floor/pad to avoid potential issues of disrupting the groundwater flow patterns as well as the effectiveness of the groundwater recovery and treatment system. Arcadis monitored the progress of the demolition work to assure no disturbance of the well structures or the creation of infiltration pathways within the building pad occurred during the performance of the work. A relocation of the groundwater treatment system and the establishment of a new operational center on the building pad between the recovery well and BH-20 was performed in a manner that averted operational shutdowns beyond the Module III requirements of the site's former 373 Post Closure Permit. AVNET/Arcadis have carefully monitored the results of the semi-annual groundwater and CEMR permit activities since the demolition to assure no adverse impact on the environment or the post closure compliance obligations resulted from the building demolition activity.

2 CHEMICAL EFFECTIVENESS MONITORING PLAN

2.1 Historical Monitoring

Channel Master developed a Chemical Effectiveness Monitoring Plan (CEMR) to assess the effectiveness of the corrective action program. The purpose of the plan is to determine the rate of groundwater cleanup and verify that groundwater elevation gradients are being maintained toward the recovery well and BH-20. To satisfy these objectives, the plan proposed use of water quality and water level data collected from the recovery well, BH-20, and eight monitoring wells (BH-1, BH-2, BH-9, BH-11A, BH-11B, BH-16, BH-18, and BH-19).

Earlier evaluations of the effectiveness of the corrective action concluded that pumping the recovery well is effectively removing contaminants from the groundwater. However, during the period from 1989 to early 1992, monitoring well BH-19 had shown an increase in the concentration of TCA, which is used as the indicator parameter in this assessment. From 1993 to 1999, TCA concentrations in BH-19 generally followed a cyclical pattern before beginning a steady decrease in 1999. This monitoring well is located approximately ten feet from the recovery well and is screened deeper (41 to 51 feet below grade) than the others in the network, including the recovery well. To investigate the possibility of induced downward migration of contaminants, Channel Master proposed collecting analytical data from well BH-17 for at least one year. BH-17 is screened deeper than most wells at the site (from 22 to 32 feet below grade) and is in the area of greatest groundwater contamination. As proposed in the evaluation report, groundwater from BH-17 is being analyzed instead of BH-1 (which was originally part of the monitoring network) for comparison to groundwater data obtained from the other deep wells and to determine the significance of the earlier increase detected at BH-19. Although deep well BH-13 was also sampled during both semiannual sampling rounds in 2000 and 2001 to provide additional data on the deeper groundwater under the plant (as requested by the NYSDEC in its letter to Avnet dated January 18, 2000), the NYSDEC discontinued the requirement to sample BH-13 in 2002, since no significant concentrations of TCA were detected there in the four sampling rounds.

In September 1991, Channel Master began pumping an additional recovery well (BH-20) inside the plant building. BH-20 was installed in July 1990 approximately 70 feet west (upgradient) of the existing recovery well, near what was at that time the area of greatest groundwater contamination. BH-20 was not included in the Chemical Effectiveness Monitoring Plan, as it was not being operated at the time the plan was developed; however, the results of pumping BH-20 are evaluated in this Annual Report.

Until October 1992, groundwater samples were collected in the vicinity of both the lagoon area and the corrective action area and analyzed for selected chemical parameters on a quarterly basis, with sampling rounds typically conducted in January, April, July, and October. Several reductions in both the frequency and the number of wells to be sampled have been approved by the NYSDEC; these changes would be eventually incorporated into the Groundwater Monitoring Plan (April 1991). On January 13, 1994, the NYSDEC issued a letter to Channel Master stating that the sampling of the wells in the lagoon area would be required only semiannually; therefore, beginning in July 1994, the lagoon area wells were not sampled in January and July. However, groundwater samples were still collected quarterly from off-site monitoring well MW-14 through January 1997 because concentrations of cyanide exceeding permit limits had been detected consistently in that well since 1990.

In September 1995 and April-May 1996, Channel Master conducted two phases of a RCRA facility assessment (RFA) to investigate the cyanide issue, and the results indicated that the former lagoon area was not the source of the cyanide contamination. Therefore, the sampling frequency for the entire site was reduced to semiannual as of the sampling round for April 1997. In addition, most of the sampling requirements for the outdoor wells have been eliminated, leaving only three of the wells in the former lagoon area to be sampled semi-annually for arsenic.

NYSDEC agreed in 2004 that there was no longer a need for any of the three off-site wells. In April 2004, personnel from the Town of Wawarsing and the NYSDEC were present to observe Avnet remove off-site monitoring wells MW-12S, MW-12D, and MW-14 in accordance with NYSDEC well decommissioning guidelines.

2.2 Current Monitoring Requirements

Water levels are now measured semi-annually in all sub-slab locations (former “Building Indoor Wells”) and outdoor lagoon monitoring wells. Groundwater quality data, water level data, and groundwater elevation contour maps are submitted to the NYSDEC on a semi-annual basis. The semi-annual CEMR reports for the 2020 sampling year which were previously submitted to the NYSDEC (May and November sampling rounds) are included in this report as **Appendices A** and **B**. [Note: The groundwater chemical data for all detected contaminants determined in the 2020 sampling events is presented in **Appendix C**.]

This report covers the period January 1 through December 31, 2020 which is the third report under the new RCRA Corrective Action/Post Closure Order on Consent [Note: This Annual Report represents the thirtieth year of monitoring data collected after the effective date of the original Part 373]. This report is also being submitted in compliance with the annual assessment requirements of 6NYCRR 373-2.5(e).

As part of the assessment, water level measurements have been examined to identify seasonal groundwater level fluctuations and to characterize groundwater flow direction. Groundwater velocity has been characterized using previously reported values of hydraulic conductivity and effective porosity. In addition, measurements of water levels in the corrective action wells have been used to evaluate the influence of the pumping wells on the hydraulic gradient.

Chemical monitoring data for the former surface impoundment have been used to determine if any specific compound is increasing in concentration. Chemical monitoring of the groundwater beneath the former plant slab has been used to assess the effectiveness of the corrective action (pump and treat) program. For clarity, the results of the post-closure monitoring and the corrective action monitoring are discussed separately.

3 POST CLOSURE MONITORING OF THE FORMER SURFACE IMPOUNDMENT

3.1 Hydrology

Monitoring well locations for the lagoon area are shown on **Figure 2-1**.

Hydrogeologic characteristics in the area of the former surface impoundment remain relatively unchanged since 1986. Groundwater elevations typically show little seasonal variation. Historically, the highest water level elevations generally have been observed in the spring months and the lowest in the late summer. This seasonal variability is a typical response to greater evapo- transpiration and less groundwater recharge in the summer months.

Monitoring Well	Groundwater Elevation May 2020	Groundwater Elevation Nov 2020	Difference (ft)
MW-2S	290.99	290.47	0.52
MW-2D	291.28	290.63	0.65
MW-3	288.60	287.99	0.61
MW-4	294.31	292.24	2.07
MW-6	294.18	293.72	0.46
MW-7	294.08	291.25	2.83
MW-8S	289.29	288.60	0.69
MW-8D	289.04	288.54	0.50
MW-10S	295.32	292.89	2.43
MW-10D	295.50	292.91	2.59
MW-11S	293.49	292.42	1.07
MW-11D	293.63	292.39	1.24
MW-13S	288.12	287.80	0.32
MW-13D	288.58	287.83	0.75
MW-18	284.03	282.84	1.19

As presented above, the groundwater level variations in the shallow monitoring wells between the May and November 2020 sampling rounds as presented above ranged from 0.32 feet in MW-13S to 2.83 feet in MW-7. The groundwater level variations in the deep monitoring wells between the May and November 2020 sampling rounds as presented above ranged from 0.65 feet in MW-2D to 2.59 feet in MW-10D. Therefore in 2020, the “typical seasonal trend” of higher groundwater elevations in both the shallow and deep monitoring wells in the former surface impoundment area during spring was experienced.

Groundwater flows to the southeast in the area of the former surface impoundment are presented in **Figure 2-1A** for the May 2020 sampling event and in **Figure 2-1B** for the November 2020 sampling event. Farther downgradient, in the vicinity of the MW-8D and MW-8S well cluster, the flow direction turns eastward. This flow pattern was consistent through both rounds of measurements completed for the 2020 reporting period and agrees with the assessments of groundwater flow presented in the First Determination Groundwater Analysis, submitted by Malcolm Pirnie for Channel Master in April 1986.

Groundwater flow velocity was estimated using hydraulic gradients from both the May and November 2020 monitoring events, as shown in **Table 2-1**. The gradients were calculated using the current water level elevations at wells on common flow paths. The hydraulic conductivity values used to calculate velocity were determined by in situ hydraulic conductivity tests (slug tests) in 1985 and were presented in the First Determination Groundwater Analysis. The effective porosity was assumed to be 0.3 for all calculations, as was done for all previous velocity determinations for the shallow groundwater at this site. This porosity value is representative of the silty sand that comprises most of the material in the shallow water-bearing zone.

In the immediate area of the former lagoon, the groundwater flow velocity was calculated to be approximately 60.8 feet per year in the May event and 34 feet per year in November event. This value is based on a flow vector across the former impoundment from MW-10S to MW-2S (groundwater elevation measurements have consistently indicated this to be the approximate direction of groundwater flow in this area). The groundwater flow velocity in the floodplain area downgradient of the former impoundment can no longer be calculated, since off-site monitoring wells MW-14, MW-12S, and MW-12D were removed in April 2004. The last such calculation, using 2003 data, indicated a flow velocity of 373 feet per year using the flow vector from MW-13S to former well MW-14. Calculations and input values are presented in **Table 2-1** and the flow velocities results over the past 18 years have decreased approximately 9-fold. Based upon the estimated flow velocities, the time for groundwater to flow from the southern extent of the former surface impoundment to Sandburg Creek would be in the range of six to seven years.

Contaminants that exited the surface impoundment prior to closure in 1986 should have reached Sandburg Creek before 1990, assuming that the contaminants moved at the same rate as the groundwater. However, even though the source of the contamination was removed, the concentrations of some contaminants decreased very slowly since monitoring began in 1987, indicating that the migration of contaminants in the groundwater had been strongly attenuated, as the rate of contaminant movement was significantly slower than groundwater flow. Retardation of contaminant movement is common in media such as the silty sand in the area of the former impoundment.

3.2 Chemical Monitoring Results

3.2.1 Historical Basis

Beginning in May 1997, groundwater sampling and analyses were eliminated for all monitoring wells in the former lagoon area except for MW-3, MW-8D, and MW-10S, which continue to be sampled semiannually and analyzed only for arsenic. The purpose of this monitoring is to determine if the concentration of dissolved arsenic in these wells continues to exceed the NYSDEC groundwater protection concentration (GWPC) for arsenic and to determine if arsenic concentrations exhibit a

statistically significant increasing trend over time. Groundwater samples from the lagoon area are no longer analyzed for cyanide or volatile organic compounds (VOCs).

3.2.2 Current Monitoring Data Results

The new RCRA Corrective Action and Post-Closure Care Order on Consent requires an annual assessment of the sampling data as previously performed under the former Part 373 permit. As part of this assessment, annual mean concentrations have been calculated for dissolved arsenic detected in monitoring wells MW-3, MW-8D, and MW-10S. **Table 2-2** summarizes the semiannual sampling results for dissolved arsenic in these wells and the annual mean concentration for each well. Mean concentrations along with semiannual results for all wells and analytical parameters are shown in the tables of **Appendix C**. Upper and lower bounds of annual mean concentrations were calculated as follows: the lower bounds were calculated using zero for values reported as estimated below the detection limit (J) and values reported as not detected (ND); the upper bounds were calculated using the "J" values as reported and one-half the laboratory detection limit for values reported as not detected. Compounds that were also detected in the associated blank sample are marked "B." The upper bounds were calculated using the "B" values as reported and the lower bounds used "B" as zero.

As presented in **Table 2-2**, dissolved arsenic in MW-10S was below the detection limit during both the May and November sampling events in 2020. The dissolved arsenic concentrations in MW-3 range from below the detection limit to 21 µg/l with the median concentration (13 µg/l) being below the GWPC of 25 µg/l for dissolved arsenic. MW-8D dissolved arsenic concentrations were below the detection limit during both the May and November sampling events in 2020. Linear regression analysis of historic sampling data (discussed in detail in Section 5.3 and presented in **Tables 4-8** and **4-9**) revealed no statistically significant decreasing trend in MW-8D for dissolved arsenic concentrations for all sampling events since January 1987 (most likely related to the decreasing trend in groundwater flow velocities allowing for more natural attenuation) as well as no statistically significant decreasing trend for MW-3. For the most recent 10 years (2011 to 2020), there was a statistically significant decreasing trend in concentration of dissolved arsenic calculated for MW-3 and no statistically significant decreasing trend in concentration of dissolved arsenic in MW-8D over the past decade.

4 CORRECTIVE MEASURE MONITORING BENEATH THE PLANT BUILDING SLAB

4.1 Hydrogeology

Monitoring well locations for the Plant Building/Slab Area are shown on **Figure 3-1**.

As was the case with the former lagoon area wells, the water levels in the shallow and deep wells located in the former building slab area showed higher water levels in the springtime (generally about one foot) than the fall which has been the historically typical seasonal variation. The groundwater levels beneath the building slab are also affected by variations in the rate of pumping in the recovery well and BH-20 but do not appear to have had a significant impact related to the demolition of the building structures

Monitoring Well	Groundwater Elevation May 2020	Groundwater Elevation Nov 2020	Difference (ft)
BH-1	298.95	297.42	1.53
BH-2	298.84	297.31	1.53
BH-3	299.56	298.06	1.50
BH-4	301.17	300.03	1.14
BH-7	299.88	298.51	1.37
BH-9	298.73	297.30	1.43
BH-10	298.59	297.28	1.31
BH-11A	302.07	301.05	1.02
BH-11B	298.87	297.33	1.54
BH-12	298.72	297.18	1.54
BH-13	298.60	296.86	1.74
BH-14	300.20	298.81	1.39
BH-15	298.93	297.40	1.53
BH-16	300.59	299.10	1.49
BH-17	302.02	301.00	1.02
BH-18	299.62	298.18	1.44
BH-19	302.04	300.99	1.05
BH-20	298.88	295.50	3.38
REC WELL	293.26	293.45	-0.19
PZ-1	298.83	297.30	1.53
PZ-2	298.69	297.16	1.53
PZ-3	298.62	297.10	1.52

Seasonal water level changes in the shallow monitoring wells (BH-2, BH-3, BH-4, BH-7, BH-9, BH-10, BH-11B, BH-12, BH-14, BH-16, and BH-18) during 2020 ranged from 1.14 feet in well BH-4 to 1.54 feet in well BH-11B Seasonal water level changes in the deep monitoring wells (BH-11A, BH-13, BH-17, and BH-19) during 2020 ranged from 1.02 feet in well BH-17 to 1.74 feet in well BH-13. Therefore in 2020, the "typical seasonal trend" - higher groundwater elevations in both the shallow and deep monitoring wells in the former surface impoundment area during spring - was experienced.

Groundwater flow beneath the plant building has remained generally constant since the recovery well began pumping in January 1987 as well as since the 2015-16 demolition of the building structures. The current configuration of the contour lines indicates that groundwater beneath the plant building is drawn toward the recovery well and BH-20 as presented in **Figure 3-1A** for the May 2020 sampling event and **Figure 3-1B** for the November 2020 sampling event. Groundwater from the area around shallow wells BH-11B and BH-16, which generally contains the highest contaminant concentrations at the site, flows directly towards the recovery well and BH-20.

BH-20 has been pumped intermittently (due to low sustainable yields) from September 1991 to April 2001 and from October 2002 to the present. During pumping tests in the well after installation in July 1990, drawdown was observed in neighboring wells BH-14, BH-16 and BH-18, indicating that the pumping of BH-20 also induced groundwater flow from the area of greatest contamination. However, the area of greatest contamination in recent years has moved somewhat away from BH-20 and toward the recovery well. BH-20 was not pumped from April 2001, when its pump failed, until October 2002, when BH-20 and its pump were rehabilitated.

The depiction of water level contours in the area of the recovery well is generally consistent from one monitoring event to the next, and the groundwater flow velocities also remain generally consistent with time. The groundwater flow velocity typically increases as the gradient increases toward the pumping wells. [Note: Prior to pumping, groundwater contours indicated groundwater flow toward the east. These contours were relatively parallel and straight, indicating no external influences.]

4.2 Chemical Monitoring Results

4.2.1 Historical Basis

In January 1987, Channel Master began operating a groundwater recovery and treatment system to remedy groundwater contamination beneath the former manufacturing building slab. This corrective action program was developed to remove organic compounds that had been released from leaks in process sewer lines. Groundwater beneath the plant had been sampled on a quarterly basis; however, the NYSDEC approved semi-annual sampling starting in May 1997. Beginning in 2001 per NYSDEC approval, groundwater samples have been collected using passive diffusion bag (PDB) samplers. Although field parameter measurements for temperature, pH, and conductivity are generally not necessary when the PDB method of groundwater sampling is used, measurements of these field parameters continued to compare the historical data with current data.

The RCRA Corrective Action and Post-Closure Care Order on Consent requires Avnet/Channel Master to evaluate monitoring data semiannually to determine the effectiveness of the corrective action program. Many of the analyses required as part of the annual report are also required as part of the semiannual

Chemical Effectiveness Monitoring Reports (CEMRs) which are presented in **Appendices A** and **B** for 2020.

Monitoring the shallow groundwater is a key indicator on the effectiveness of the remedy while continuing to monitor the water quality of the deeper groundwater (BH-11A, BH-17, and BH-19) assists in identifying trends in movement of contaminants vertically.

4.2.2 Current Monitoring Data Results

The annual means of field parameters measured in the building sub-slab (formerly the "building indoor wells") wells are summarized in **Table 3-1**. The calculated annual mean concentration values for the VOCs observed in the 2020 sampling events are summarized in **Table 3-2**. **Appendix C** presents the individual tables that were constructed for each well to calculate annual mean concentrations for each contaminant in that well as described in Section 3.2.2. **Table 3-3** presents the groundwater protection concentrations (GWPC) for the VOCs that are listed in the new RCRA Corrective Action and Post-Closure Care Order on Consent [adopted from the former Part 373 Permit] which are used for comparing the groundwater contaminants results.

An iso-concentration map (**Figure 3-2**) was constructed using the annual mean concentrations of TCA in BH-2, BH-9, BH-11B, BH-16, BH-18, BH-20, and the recovery well. This map also shows that the recovery well and BH-20 are positioned near the area of greatest TCA concentrations.

Table 3-2 presents the mean groundwater results from the shallow monitoring wells BH-2, BH-9, BH-11B, BH-16, and BH-18. 1,1,1-trichloroethane is the key chemical contaminant of concern with monitoring wells BH-11B and BH-16 at annual mean concentrations exceeding the GWPC of 5 µg/l. Monitoring well BH-2 had an annual mean concentration of 3.0 µg/l, BH-9 had an annual mean concentration of 2.83 µg/l, BH-11B had an annual mean concentration of 32.0 µg/l and BH-16 had an annual mean concentration of 355 µg/l. Shallow monitoring wells BH-11B and BH-16 also contained other degradation products of 1,1,1-trichloroethane. Groundwater from these wells (BH-11B and BH-16) consistently contains the highest concentrations of all contaminants, and the contaminants that appear most frequently and at the highest concentrations are 1,1,1-trichloroethane (TCA) and its degradation products1,1,2-trichloroethane, 1,1-dichloroethane (DCA), 1,2-dichlorobenzene, 1,1-dichloroethene (DCE), chloroethane, chloroform, tetrachloroethene, and trichloroethene. Monitoring wells BH-11B and BH-16 both contained 1,1-dichloroethane at annual mean concentrations exceeding their respective GWPC of 5 µg/l with monitoring well BH-11B having an annual mean concentration of 14 µg/l and BH-16 having an annual mean concentration of 128 µg/l. Monitoring wells BH-16 contained 1,1,2-Trichloroethane at annual mean concentrations exceeding its respective GWPC of 1 µg/l with having an annual mean concentration of 3.6 µg/l. Annual mean contaminant concentrations did not exceed GWPC in the other shallow wells sampled.

Table 3-2 presents the mean groundwater results from the deeper monitoring wells BH-11A, BH-17, and BH-19. No detectable contaminants were found in the deep wells during either sampling event in 2020.

TCA is used as the indicator of the effectiveness of the Channel Master cleanup because of its frequent occurrence at high concentrations in the groundwater. Although high concentrations of TCA remain, sampling results indicate that pumping the recovery well is effectively removing the mass of contaminants from the groundwater. Linear regression analyses applied to the overall historic groundwater quality data show statistically significant decreasing trends (i.e., with at least 95% confidence) in TCA concentrations

for samples collected from wells BH-2, BH-9, BH-11A, BH-11B, BH-16, BH-17, BH-18, BH-19, BH-20, and the recovery well. A discussion of linear regression analysis and statistical significance is presented in Section 5. The decreasing trends are evidence that the corrective action program is effectively reducing the concentrations of the key contaminant - 1,1,1-trichloroethane.

5 EVALUATION

5.1 Influence of Pumping on Groundwater Flow

Groundwater elevations were measured in the monitoring wells beneath the building slab (former "Indoor Wells") on May 5 and November 24, 2020. These data have been used to generate two groundwater contour maps which are presented in **Figures 3-1A** and **3-1B** as well as contained in the semiannual CEMRs presented in **Appendices A** and **B**. Before the recovery well began operating in 1986, shallow groundwater contours indicated flow toward the east. These contours were parallel and relatively straight. The current bending of the contour lines around the recovery well indicates that shallow groundwater beneath the former plant building slab is drawn toward the recovery well. Groundwater from the area around monitoring wells BH-11B and BH-16, which is the most highly contaminated groundwater at the site, flows generally toward the recovery well as shown on the groundwater elevation contour maps. The recovery well does not appear to have a significant effect on the deeper groundwater beneath the former plant building slab.

A comparison of the most recent groundwater contour maps in **Figures 3-1A** and **3-1B** and the annual mean iso-concentration map (**Figure 3-2**) indicate that the contaminant plume appears to be contained by the capture zone when the recovery well is operating. The water elevation contour map for the springtime event (May 2020 as presented in **Figure 3-1A**) indicates a trend of steeper gradient towards the recovery well while the fall event (November 2020 as presented in **Figure 3-1B**) shows a drawdown at the recovery well that is also influenced (more gradual) by the seasonal lower water experienced in 2020. The results of both water elevation surveys continue to support the conclusion that the groundwater recovery system is effectively controlling the contamination in the shallow groundwater.

5.2 Quantities of Contaminant Recovered and Removal Rates

TCA has been used in the Annual Report and the CEMRs as the indicator of contamination beneath the former Channel Master Plant building. As discussed in the Chemical Effectiveness Monitoring Plan, TCA has been detected in every groundwater monitoring well within the building although not necessarily during every sampling event. TCA has been detected consistently at concentrations higher than other contaminants.

TCA concentrations in the recovery well have been monitored since 1986. TCA concentrations in BH-20 have been monitored since installation of the well in July 1990. TCA concentration data on the recovery well are presented in **Table 4-1**, and data on BH-20 are presented in **Table 4-2**.

To estimate the mass of TCA recovered from the recovery well and from BH-20, the concentration of TCA in the groundwater was multiplied by the volume of water pumped during the period of time between that sampling date and the preceding sampling date (the volume of groundwater pumped from the wells is recorded weekly) using the following equation:

cvA = Mass of TCA removed, in pounds

Where: c = Concentration of TCA, in µg/l

v = Volume of groundwater pumped, in gallons

A= 8.34 x 10^{-9} (pounds/µg)(l/gallon), a conversion factor

Estimates of the mass of TCA recovered from each well since the start of pumping are presented in **Tables 4-1** and **4-2**. The total amount of TCA removed from the recovery well and BH-20 from January 1987 through December 2020 is calculated to be approximately 868.15 pounds, with approximately 1.58 pounds removed in 2020. The year with the greatest removal was 1991, which accounted for more than 170 pounds.

5.3 Determination of Water Quality Trends

5.3.1 Plant Area

5.3.1.1 Historical Basis

In accordance with the RCRA Corrective Action and Post-Closure Care Consent Order, Channel Master has evaluated groundwater sampling data as part of the corrective action program to assess the effect of TCA removal on groundwater quality beneath the plant building. Although the original permit required the sampling of eight monitoring wells (BH-1, BH-2, BH-9, BH-11A, BH-11B, BH-16, BH-18, and BH-19), concentrations of TCA have been monitored in ten wells since 1986. Six of the wells (BH-1, BH-2, BH-9, BH-11B, BH-16 and BH-18) are approximately 20 feet deep and are monitored for both chemical constituents as well as the water table elevations. Four of the wells (BH-11A, BH-13, BH-17, and BH-19) are screened in the deeper zones of the water-bearing formation and are 38, 32, 32, and 51 feet deep, respectively. Before October 1991, deep well BH-17 was only sampled twice: in September 1985 and August 1986. This well is now being sampled instead of BH-1 to investigate the possibility of downward migration of contaminants as discussed later in this section. Deep well BH-13 was sampled twice in 2000 and twice in 2001 to provide additional information about the TCA detected in deep wells BH-11A, BH-17, and BH-19. Since TCA was not detected above GWPC in any of the four samples from BH-13, the well is no longer sampled.

In October 1991, to further investigate the then-increasing concentrations of TCA at BH-19, Channel Master began sampling deep monitoring well BH-17 during quarterly sampling events. BH-17 is in the area of highest groundwater contamination, between wells BH-11B and BH-16, but is screened deeper in the water-bearing zone (22 to 32 feet below ground level). Until 2002, TCA concentrations in BH-17 typically had been at least an order of magnitude less than those detected in BH-16 and BH-11B. However, the TCA concentrations in BH-17 in 2002 and 2003 were of the same order of magnitude as those found in BH-16 (largely because of the significant decrease in TCA concentrations in BH-16 in recent years), although they were still at least an order of magnitude lower than those in BH-11B. In 2006, the historic linear regression analysis for the first time indicated a slight decreasing trend in BH-17, although it was not statistically significant. Even though TCA was detected in the October 2007 sample at 77 µg/l (the first-time TCA had exceeded GWPC in BH-17 since 2003), analysis of historic TCA data through 2020 still indicates a statistically decreasing trend in BH-17. Concentrations in BH-19 have been steadily decreasing since 1992, and TCA has not exceeded GWPC in BH-19 since 2000.

Water quality data collected before the start of the corrective action program were used to determine the average background concentration of TCA in the monitoring wells. Generally, two or three values are available from each well, as shown on **Table 4-3**. These values have been used as initial concentrations for comparison of quarterly sampling results since 1987.

TCA data collected since the start of the corrective action program (January 1987) to the present (shown in **Table 4-4**) were used to determine trends in the water quality. Linear regression analysis, a statistical analysis method considered acceptable by the NYSDEC for this purpose, was used to analyze for trends in the changes in concentration of TCA in each of nine monitoring wells and the two pumping wells from January 1987 through the present (**Table 4-5**). Although contaminant concentrations generally do not vary in accordance with a linear relationship over a long period of time (in fact, they are often best represented by first-order equations of the form $C=Coe^{-Kt}$), linear regression analysis can nonetheless provide a good qualitative indication of whether concentrations are increasing or decreasing and whether or not such trends are statistically significant. Typically, in the case of a contaminant that is attenuating over time, the rate of decrease in concentration is greatest in the beginning but then grows smaller as the concentration starts to level off after some time. Because of this, linear regression analyses using all historic data can obscure recent concentration trends caused by changing conditions. Therefore, to better identify any recent concentration trends, additional linear regression analyses were performed for each well using sampling results from only the most recent 10 years (**Table 4-6**).

The Linear Regression Analysis was performed using a Microsoft Excel 2020 add-in statistical modeling program (Analysis ToolPak) which contains advanced features – correlation, one-sample, independent samples, and paired samples t-tests; chi square; repeated and single factor ANOVA, and regression. For the statistical analysis of the Channel Master wells, the key features utilized included the use of correlation, analysis of variance (single factor), hypothesis testing, and regression. The Data Analysis ToolPak report was then interpreted as its information applied to the specific well data obtained in the two sampling events conducted in 2020.

Linear regression analysis produces a number of results, three of which are of particular interest: a correlation coefficient, the equation of the regression line expressed as a slope and Y intercept, and the statistical significance of the analysis. The correlation coefficient (R) is the measure of strength of the linear relationship between the two variables. The value of R ranges from +1 to -1. A value of R equal to +1 indicates a perfect linear relationship between the two variables, while a value of R equal to -1 indicates a perfect inverse relationship between the two variables. A value of R equal to zero indicates no correlation at all between the two variables, meaning that the closer R is to zero, the less likely it is that the two variables are related to each other in a predictable manner.

For the linear regressions performed on the monitoring well data, the y-axis represents TCA concentration while the x-axis represents time. Assuming the relationship is linear, the equation of the regression line allows the estimation of one variable from another. The y-intercept for a given well represents the initial TCA concentration as predicted by the linear regression line (not necessarily equal to the actual initial concentration) while the slope of the regression line represents the time rate of change in the concentration of TCA. However, because groundwater contaminant concentrations generally do not change over time in a linear manner (as explained above), the rate of change calculated in the linear regression analysis should be considered only a rough approximation of the significance of concentration change over time.

The significance factor is a function of both R and the number of data points. Statistically, it is equal to the probability that the null hypothesis has been falsely rejected and, therefore, that the trend indicated by the linear regression is not significant. For the purposes of this evaluation, a five-percent significance level was used (a commonly used value), meaning that the trend for a given well is considered to be statistically significant if the significance factor was less than or equal to 0.05 (i.e., a 95% or greater confidence level).

5.3.1.2 Linear Regression Analyses for Building Sub-Slab (Former Indoor) Wells – Historic to Present Data

The results of the linear regression analyses for the TCA contaminant in building sub-slab (former indoor) plant wells using all historic data and data from only the most recent 10 years are presented in **Tables 4-5** and **4-6**, respectively.

As shown in **Table 4-5**, the linear regression trends are statistically significant at a five-percent level for the recovery well, pumping well BH-20, and all monitoring wells BH-2, BH-9, BH-11A, BH-11B, BH-16, BH-17, BH-18, and BH-19. **Figures 4-1 through 4-10** show the linear regressions and data plots of TCA concentration versus time for all data through 2020 for BH-2, BH-9, BH-11A, BH-11B, BH-16, BH-17, BH-18, BH-19, BH-20, and the recovery well.

Shallow Zone

Linear regression analysis of data from the highest contaminant level shallow monitoring well, BH-16, produces a slope of approximately -10.85 µg/l/year, suggesting that the concentration of TCA has been decreasing at a rate of 3,962 µg/l per year since pumping began (**Table 4-5**). The analysis also indicates that this decreasing trend is statistically significant, although TCA concentrations in BH-16 are now much lower (the annual average for 2020 was 355 µg/l), and the actual rate of decrease is not nearly as significant as it was initially (see **Figure 4-5**). Groundwater from this well had exhibited the highest annual average concentrations of TCA in any well until 1991, after which shallow well BH-11B had consistently exhibited the highest concentrations up to 2011. Since the fall of 2006, the concentrations in both wells have not exceeded the 1000 µg/l level and have been generally fluctuating in the 100 - 400 µg/l range. See **Figure 4-4** for this statistically significant decreasing trend.

Statistically significant decreasing concentration trends were also revealed in other shallow wells. Analyses of data from BH-2 (see **Figure 4-1**), BH-9 (see **Figure 4-2**), and BH-18 (see **Figure 4-7**), indicate that the concentration of TCA is decreasing in those wells at approximate rates of 2.38 µg/l/year, 0.90 µg/l/year, and 50 µg/l/year through 2020, respectively, as shown in **Table 4-5**. **Table 4-5** also indicates that the x-intercept for most wells occurs at a date earlier than this year. This demonstrates that the linear regression analysis, although a good qualitative indicator of increasing/decreasing trends, is not truly indicative of the quantitative relationship between concentration and time, especially when using all the historic data since pumping began.

Deeper Zone

Linear regression analysis of data indicates that the TCA concentration in deep well BH-19 (see **Figure 4-8**), which had exhibited a slight increasing trend through 1999, now exhibits a decreasing trend that is statistically significant. The TCA concentration began to increase in 1989, peaked in early 1992, and then decreased throughout 1992. Since 1993, sampling results essentially followed a stable, cyclical pattern

through late 1998. Since then, concentrations have been decreasing steadily, and TCA has not been detected above GWPC in BH-19 since 2000.

TCA concentrations in deep wells BH-11A, and BH-17 are typically below GWPC and no sample has exceeded GWPC since 2001 for BH-11A and since 2011 for BH-17. Linear regression analysis of data indicates a slight decreasing trend for both wells (see **Figures 4-3** and **4-6**) with BH-11A statistically significant and BH-17 statistically significant.

Recovery Wells

Linear regression analysis of BH-20 and the recovery well indicates statistically significant decreasing concentration trends (see **Figures 4-9** and **4-10**). The concentration of TCA is decreasing in those wells at approximate rates of 77 µg/l/year and 28.4 µg/l/year through 2020, respectively, as shown in **Table 4-5**.

5.3.1.3 Linear Regression Analyses for Building Sub-Slab (Former Indoor) Wells – Data from Last 10 Years

As shown in **Table 4-6**, the linear regression trends over the last 10 years are significant at a five-percent level for the monitoring well BH-11B, BH-17, and BH-18 which exhibit statistically significant decreasing concentration trends while BH-19 no longer exhibits a statistically significant increasing trend over the 2011-2020 period (as in previous annual report evaluations) – it is neutral at a zero-change rate. The significant trends observed in wells BH-2, BH-9, BH-11A, BH-16, and BH-19 and the recovery well and BH-20, using historic concentrations is no longer significant when the analysis includes only the results from the last ten years. **Figures 4-11 through 4-20** show the 10-year linear regression data plots of TCA concentration versus time for 2011 data through 2020 for BH-2, BH-9, BH-11A, BH-11B, BH-16, BH-17, BH-18, BH-19, BH-20, and the recovery well.

Shallow Zone

Linear regression analysis **(see Table 4-6)** of the past 10 years of data from the highest contaminant level shallow monitoring well, BH-16, produces a slope of approximately 0.060 µg/l/year, suggesting that the concentration of TCA has been increasing at a rate of 23 µg/l per year over the 10-year period 2011-2020; however, the linear regression analysis indicates that this increasing trend is not statistically significant over the 10-year period 2011-2020 (see **Figure 4-15**). Linear regression analysis of past 10 years of data from the second highest contaminant level shallow monitoring well, BH-11B, produces a slope of approximately -0.0102 µg/l/year and continues to exhibit a statistically significant decreasing trend at a rate of 4 µg/l per year over the 10-year period 2011-2020 (see **Figure 4-14**). BH-18 produces a slope of approximately -0.0014 µg/l/year and continues to exhibit a statistically significant decreasing trend at a rate of 0.51 µg/l per year over the 10-year period 2011-2020

Statistically significant decreasing concentration trends were not revealed in the other two shallow wells using data over the 10-year period 2011-2020. Linear regression analyses of data from BH-2 indicate that the concentration of TCA is decreasing in BH-2 wells at a rate of 0.13 µg/l/year over the 10-year period 2011-2020 (see **Figure 4-11**). However, BH-9 is showing a slight increase in concentration status over the 10-year period 2011-2020 (see **Figure 4-12**) at 0.2 µg/l/year.

Deeper Zone

Linear regression analysis of the past 10 years of data from the deeper wells BH-11A and BH-19 is showing a neutral to slight increase status over the 10-year period 2011-2020 (See **Figure 4-13** and **4-18**). **Table 4-6** suggests that the concentration of TCA has been increasing at a rate of 0.19 µg/l per year for BH-11A and no rate change of 0.00 µg/l per year for BH-19 over the 10-year period 2011-2020. BH-17 revealed a statistically significant decreasing trend over the 10-year period 2011-2020 at a rate of 0.30 µg/l per year.

Recovery Wells

Linear regression analysis of the past 10 years of data from the recovery well and BH-20 did not reveal a statistically significant decreasing trend over the 10-year period 2011-2020 (See **Table 4-6** and **Figure 4-20**) even though the overall historic data showed a statistically significant decrease. A more detailed evaluation of the recovery well (**Figure 4-20**) suggests that the TCA data had been approaching more neutral trend near 0.003 µg/l; however, an abnormal high result in the second half of 2013 (66 µg/l) impacts the 10-year trend. It should be noted that the recovery well shows a neutral to slight decreasing trend in concentrations at a rate of 0.9 µg/l per year over the 10-year period 2011-2020 but is not statistically significant and potentially biased by the 2013 result. Linear regression analysis of the past 10 years of data from BH-20 did not reveal a statistically significant trend in this well over the 10-year period 2011-2020 (See **Table 4-6** and **Figure 4-19**) even though there is a significant decreasing trend over all historic data. However, the linear regression trend for BH-20 is showing a potential decrease in contaminant concentrations reaching this well at a rate of 1 µg/l per year.

5.3.2 Lagoon Area

5.3.2.1 Historical and Statistical Basis

The annual average groundwater concentrations of dissolved arsenic did not exceed GWPC in any of the monitoring wells during the 2020 events (see **Table 2-2**). When the annual mean concentration of a contaminant exceeds GWPC in a particular well in the post-closure monitoring program, the RCRA Corrective Action and Post-Closure Care Order on Consent requires a statistical analysis to be performed on the water quality data from that well to determine if a statistically significant increasing trend exists. If a significant increasing trend is indicated, the need for a change in the monitoring approach must be evaluated, possibly resulting in a permit modification. The permit requires that this determination be made using a statistical method acceptable to the NYSDEC. Because the NYSDEC has approved the use of linear regression analyses for this determination in previous annual reports, this method was again used for this purpose. Concentrations measured in wells were assessed individually as a function of time. When a parameter was not detected, a value of one half of the detection limit, as specified in the RCRA Corrective Action and Post-Closure Care Order on Consent, was used in the calculation.

For the linear regressions performed on the former Lagoon Area monitoring well data, the y-axis represents dissolved arsenic concentration while the x-axis represents time. Assuming the relationship is linear; the equation of the regression line allows the estimation of one variable from another. The y-intercept for a given well represents the initial dissolved arsenic concentration as predicted by the linear regression line (not necessarily equal to the actual initial concentration) while the slope of the regression

line represents the time rate of change in the concentration of dissolved arsenic. However, because groundwater contaminant concentrations generally do not change over time in a linear manner (as explained above), the rate of change calculated in the linear regression analysis should be considered only a rough approximation of the significance of concentration behavior over time.

The Linear Regression Analysis was performed using a Microsoft Excel 2020 add-in statistical modeling program (Analysis ToolPak). The linear regression interpretations were performed using the same procedures as those used for the plant sub-slab (formerly indoor wells), and a significance level of five percent was again used to determine if a given trend was statistically significant. The dissolved arsenic data from 1987 to the present is in **Table 4-7**.

5.3.2.2 Linear Regression Analyses for Lagoon Area – Historic to Present Data

The annual mean dissolved arsenic concentrations (see **Table 2-2**) in MW-3 and MW-8D were 13 µg/l and 5 µg/l, respectively, with both below the 25 µg/l GWPC for dissolved arsenic. Linear regression analysis of historic dissolved arsenic data from 1987 to the present is shown in **Table 4-8** and was performed on both wells even though not required by the permit. **Table 4-8** indicates a slight decreasing trend in MW-3 at a rate of 0.17 µg/l/year over all historical data (see **Figure 4-21**) which is not statistically significant and a slight decreasing trend in MW-8D at a rate of 0.90 µg/l/year over all historical data (see **Figure 4-22**) which is not statistically significant.

5.3.2.3 Linear Regression Analyses for Lagoon Area – Data from Last 10 Years

Linear regression analysis using the dissolved arsenic data over the 10-year period 2011-2020 reveals a decreasing trend in MW-3 (see **Figure 4-23**) and in MW-8D (see **Figure 4-24**). **Table 4-9** reveals that the decreasing at rate of 5.76 µg/l/year in MW-3 and decreasing rate of 2.49 µg/l/year in MW-8D. Therefore, modification of the monitoring plan is not necessary under the permit conditions. In addition, the background dissolved arsenic concentration, as determined from the upgradient well MW-10S, has been variable at times and has exceeded GWPC on three occasions since 1987 (no detection of dissolved arsenic was determined in 2020), indicating that arsenic concentrations in groundwater both upgradient and downgradient of the former lagoon may be affected by a source other than the former lagoon.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Shallow Zone and Recovery Wells

Water quality data and water level data collected from wells located beneath the building sub-slab (formerly the “inside wells”) of the former plant building continue to indicate that pumping from the recovery well is removing contaminants from the groundwater and preventing the plume from migrating off-site. Groundwater quality in BH-16 and BH-11B, the two most contaminated shallow wells, has improved significantly as a result of the pumping. A comparison of the most recent groundwater contour maps (**Figures 3-1A** and **3-1B**) and the annual mean iso-concentration map (**Figure 3-2**) indicate that the contaminant plume is effectively contained within the capture zones of the recovery well and pumping well BH-20. There appears to be no statistical significance of the recent elevated levels in the downgradient well BH-9 and over the entire history still show a statistically significant decreasing trend. In 2020, TCA was detected in BH-9 slightly above GWPC of 5 ug/l at 5.10 ug/l in May and was estimated slightly above the detection level at 0.56 ug/l in November. Also, there has not been any significant changes in the contaminated well network concentration profile or groundwater elevation contours which indicates that the shallow zone is not being affected by the demolition of the building structures. These facts continue to support the conclusion that the current corrective action program is effectively controlling the contaminant plume and therefore should continue.

Linear regression analysis of the shallow groundwater monitoring wells and the two recovery wells indicates that all wells show a statistically significant decreasing TCA trend when evaluating the historic groundwater data. Considering the most recent 10-year period of 2011 to 2020, BH-11B and BH-18 show statistically significant decreasing trends when evaluating the TCA data over the 10-year period while all other shallow wells neither show a statistically significant increasing nor decreasing trend when evaluating the TCA data over the 10-year period.

Shallow wells BH-2, BH-9, BH-11B, BH-16, and BH-18 will continue to be sampled semiannually as required under the as required by the RCRA Corrective Action and Post-Closure Care Order on Consent. In addition, the recovery well and pumping well BH-20 will continue to be sampled semiannually in 2021 in accordance with the SPDES discharge permit, and this data will also be used to help assess groundwater conditions beneath the former plant building especially since the demolition of the building that occurred in the second half of 2015 and the first quarter of 2016.

6.2 Deeper Zone

Historic sampling results from the deeper wells indicate that downward contaminant migration might have occurred to some degree, although TCA concentrations in the deep wells now appear to be stabilizing below GWPC since 2001 in BH-11A and since 2000 in BH-19. TCA was detected above GWPC in BH-17 since 2003 only once marginally in 2009.

Linear regression analysis of the deeper groundwater monitoring wells indicates that BH-11A, BH-17 and BH-19 show statistically significant decreasing TCA trend when evaluating the entire historic groundwater data. When evaluating the 10-year data from 2011 to 2020, BH-11A and BH-19 do not indicate a

statistically significant trend when evaluating the TCA data over the 10-year period 2011 to 2020 and BH-17 indicates a statistically significant decreasing trend when evaluating the TCA data over the 10-year period 2011 to 2020.

Deep wells BH-11A, BH-17, and BH-19 will continue to be sampled semiannually in 2021 to monitor contaminant concentrations in the deep groundwater as required by the RCRA Corrective Action and Post-Closure Care Order on Consent.

6.3 Lagoon Area

Annual mean dissolved arsenic concentrations in monitoring well MW-3 and MW-8D are below the GWPC of 25 µg/l for 2020 events.

Linear regression analysis of historic dissolved arsenic data indicates a slight decreasing trend in both MW-3 and MW-8D which is not statistically significant. Linear regression analysis over the 10-year period 2011 to 2020 reveals a statistically significant decreasing trend in MW-3 and a decreasing trend in MW-8D that is not statistically significant.

Arsenic concentrations will continue to be monitored in MW-3 and MW-8D as well as the upgradient well MW-10S in 2021, as required by the RCRA Corrective Action and Post-Closure Care Order on Consent.

TABLES

TABLE 2-1

CALCULATION OF GROUNDWATER VELOCITIES BETWEEN WELL PAIRS AT FORMER SURFACE IMPOUNDMENT AREA 2020 Former Channel Master Site Ellenville, NY

Former Lagoon Area

DATE	GROUNDWATER ELEVATION (ft msl)			Horizontal Separation (ft)	I (ft/ft)	K (ft/day)	N	V (ft/day)	V (ft/year)
	MW-10S	MW-2S	Difference (ft)						
May 4, 2020	295.32	290.99	4.33	260	0.0167	3.0	0.3	0.167	60.8
November 23, 2020	292.89	290.47	2.42	260	0.0093	3.0	0.3	0.093	34.0

Downgradient Floodplain Area (2003) *

DATE	GROUNDWATER ELEVATION (ft msl)			Horizontal Separation (ft)	I (ft/ft)	K (ft/day)	N	V (ft/day)	V (ft/year)
	MW-13S	MW-14 *	Difference (ft)						
May 29, 2003	288.39	284.50	3.89	190	0.0205	15.0	0.3	1.02	374
October 23, 2003	288.26	284.38	3.88	190	0.0204	15.0	0.3	1.021	373

Notes:

I = Hydraulic gradient

N = Effective Porosity

V = KI/N

Values for hydraulic conductivity (K) and effective porosity (N) are from the First Determination Groundwater Analysis, 1987

* MW-14 decommissioned and removed April 2004

TABLE 2-2

ANNUAL MEAN CONCENTRATIONS OF DISSOLVED ARSENIC IN LAGOON WELLS (ug/L)
2020
Former Channel Master Site
Ellenville, NY

DATE	MW-3	MW-8D	MW-10S	GWPC
May 4, 2020	21	10U	10U	25
November 23, 2020	10U	10 U	10 U	
Annual Mean - High *	13.0	5.0	5.0	
Annual Mean - Low	5.0	0.0	0.0	

GWPC - Groundwater Protection Concentration
ND - Not detected (detection limit)

* In computing the high annual mean for each well, one-half of the detection limit was used for nondetects, while "J" and "B" values were used as reported. Low annual means were calculated using zero for nondetects and values qualified with "J" or "B."

TABLE 3-1

ANNUAL MEANS OF FIELD PARAMETERS IN PLANT WELLS
2020
Former Channel Master Site
Ellenville, NY

MONITORING WELL NUMBER	TEMPERATURE (degrees celsius)	pH (std units)	CONDUCTIVITY (umhos)
BH-2	16.0	7.3	484
BH-9	16.1	7.4	348
BH-11A	16.2	7.9	420
BH-11B	16.2	8.3	302
BH-16	16.2	7.7	405
BH-17	16.5	7.6	659
BH-18	16.9	7.9	641
BH-19	15.9	7.9	89

TABLE 3-2

ANNUAL MEAN CONCENTRATIONS OF VOLATILE ORGANIC COMPOUNDS HALOCARBONS IN PLANT WELLS (ug/L)
2020
Former Channel Master Site
Ellenville, NY

PARAMETER	GWPC	MDL	WELL NUMBER							
			BH-2	BH-9	BH-11A	BH-11B	BH-16	BH-17	BH-18	BH-19
1,1,1-Trichloroethane	5.0	0.24	3.0	2.83	0.70 J	**32**	**355 D**	0.22 J	0.53 J	0.27 J
1,1,2,2-Tetrachloroethane	*	0.50	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,1,2-Trichloroethane	1	0.20	0.1 U	0.1 U	0.1 U	0.21 J	**3.6**	0.1 U	0.1 U	0.1 U
1,1-Dichloroethane	5	0.27	0.54	2.55	0.14 U	**14**	**128 D**	0.14 U	0.14 U	0.14 U
1,1-Dichloroethene	*	0.27	0.14 U	0.14 U	0.14 U	0.21 J	3.15	0.14 U	0.14 U	0.14 U
1,2-Dichlorobenzene	5	0.18	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U
1,2-Dichloroethane	0.6	0.30	0.15 U	0.41	0.15 U	0.15 U	**1.7**	0.15 U	0.15 U	0.15 U
1,2-Dichloroethene (total)	5	0.30	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,2-Dichloropropane	1	0.30	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
1,3-Dichlorobenzene	5	0.20	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,4-Dichlorobenzene	5	0.20	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Chloroethylvinylether	*	0.31	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
Bromoform	*	0.21	0.11 U	0.11 U	0.11 U	0.11 U	0.23 J	0.11 U	0.11 U	0.11 U
Bromomethane	5	0.27	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
Carbon tetrachloride	5	0.30	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Chlorobenzene	5	0.26	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Chlorodibromomethane	*	0.22	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U
Chloroethane	*	0.50	0.25 U	0.25 U	0.25 U	0.25 U	3.78 J	0.25 U	0.25 U	0.50 U
Chloroform	7	0.19	0.1 U	0.1 U	0.1 U	0.16 J	0.58 J	0.1 U	0.1 U	0.1 U
Chloromethane	*	0.39	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
cis-1,3-Dichloropropene	0.4	0.18	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U
Dichlorobromomethane	*	0.29	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Dichlorodifluoromethane	5	0.34	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
Methylene chloride	5	0.27	0.14 U	0.14 U	0.23 J	0.33 J	2.47	0.14 U	0.14 U	0.14 U
Tetrachloroethene	*	0.31	0.16 U	0.16 U	0.16 U	0.29 J	1.75	0.16 U	0.16 U	0.16 U
trans-1,3-Dichloropropene	0.4	0.29	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Trichloroethene	5	0.28	0.14 U	0.14 U	0.14 U	0.24 J	2.15	0.14 U	0.14 U	0.14 U
Trichlorofluoromethane	5	0.25 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Vinyl chloride	2	0.15	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U

GWPC - Groundwater Protection Concentration, from Table III-3 of NYSDEC Post-Closure Permit

* - Well is screened deeper than other wells

** - From New York State Water Quality Regulations - Title 6, Chapter 10 Parts 700-705, as amended August 1999

U - Compound undetected at the specified detection limit.

Mean value uses full J values and one-half of the detection limit for ND to calculate mean.

Blank - indicates that compound was not detected (ND) in all sampling events.

TABLE 3-3

GROUNDWATER PROTECTION CONCENTRATIONS FOR VOLATILE ORGANIC COMPOUNDS
Former Channel Master Site
Ellenville, NY

PARAMETER	CONCENTRATION (ug/L)
Benzene	ND [1]
Chlorobenzene	5
Chloroform	7 [2]
1,2-Dichlorobenzene	3 [2]
1,3-Dichlorobenzene	3 [2]
1,1-Dichloroethane	5
1,2-Dichloroethane	5
1,1-Dichloroethylene	5
Trans-1,2-Dichloroethylene	5
Methylene Chloride	5
1,1,2,2-Tetrachloroethane	5
Toluene	5
1,1,1-Trichloroethane	5
Trichloroethylene	5

NOTES:

(1) Not Detected using EPA Method 602

(2) GWPC listed is from New York State Water Quality Regulations - Title 6, Chapter 10 Parts 700-705, as revised March 1999

TABLE 4-1

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN RECOVERY WELL
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
3/18/1986	19	0		
12/3/1986	7500	0		
12/8/1986	3100	81000	2.1	0.419
1/14/1987	2300	180910	3.5	0.094
2/20/1987	920	941560	7.2	0.195
3/20/1987	630	873500	4.6	0.164
4/29/1987	860	1120240	8.0	0.201
5/27/1987	150	608350	0.76	0.027
6/11/1987	1100	295070	2.7	0.180
7/28/1987	710	966190	5.7	0.122
8/18/1987	520	569900	2.5	0.118
9/15/1987	670	732400	4.1	0.146
10/12/1987	1100	751920	6.9	0.255
11/19/1987	860	944670	6.8	0.178
1/20/1988	1900	1611970	26	0.412
2/17/1988	1300	227410	2.5	0.088
3/18/1988	2200	620380	11	0.379
4/7/1988	840	556180	3.9	0.195
5/18/1988	450	571190	2.1	0.052
6/7/1988	660	0	0.0	0.000
7/12/1988	620	0	0.0	0.000
8/30/1988	730	569960	3.5	0.071
9/30/1988	640	164950	0.88	0.028
10/27/1988	460	439310	1.7	0.062
11/30/1988	360	1225510	3.7	0.108
12/22/1988	750	462160	2.9	0.131
1/17/1989	470	446290	1.7	0.067
2/8/1989	670	475070	2.7	0.121
3/29/1989	330	1199950	3.3	0.067
5/2/1989	170	319080	0.45	0.013
5/22/1989	5.1	262740	0.011	0.001
6/30/1989	470	464420	1.8	0.047
7/6/1989	320	0	0.0	0.000
8/2/1989	370	363790	1.1	0.042
9/12/1989	260	1680180	3.6	0.089
10/4/1989	320	985570	2.6	0.120
10/25/1989	380	975570	3.1	0.147
12/13/1989	290	1739400	4.2	0.086
1/9/1990	480	431730	1.7	0.064
2/6/1990	1000	528180	4.4	0.157
3/3/1990	1100	426570	3.9	0.157
4/2/1990	640	923500	4.9	0.164
5/10/1990	460	1152430	4.4	0.116
6/4/1990	380	1419860	4.5	0.180
7/1/1990	290	0	0.0	0.000
8/7/1990	250	3049880	6.4	0.172

TABLE 4-1

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN RECOVERY WELL
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
9/4/1990	220	1703420	3.1	0.112
10/8/1990	320	2054910	5.5	0.161
11/6/1990	250	1261917	2.6	0.091
12/10/1990	280	1791263	4.2	0.123
1/9/1991	640	8086540	4.2	0.140
2/9/1991	330	1093430	3.0	0.097
3/6/1991	310	862420	2.2	0.089
4/20/1991	290	2432100	5.9	0.131
7/24/1991	270	2639010	5.9	0.063
10/15/1991	5000	3464990	144	1.741
12/21/1991	430	3211800	12	0.172
6/19/1992	890	7858630	58	0.322
12/7/1992	310	5733730	15	0.087
7/9/1993	195	4164728	6.8	0.032
12/6/1993	300	3789014	9.5	0.063
10/25/1994	970	8423700	68	0.211
3/28/1995	2000	4139800	69	0.448
7/12/1995	970	3354600	27	0.256
12/5/1995	200	4766100	7.9	0.054
6/11/1996	780	4398500	29	0.151
12/17/1996	1800	4297700	65	0.341
6/10/1997	160	3151400	4.2	0.024
12/16/1997	120	4643400	4.6	0.025
4/28/1998	360	4258800	13	0.096
12/10/1998	160	5930800	7.9	0.035
6/24/1999	66	3907100	2.2	0.011
12/28/1999	170	5397900	7.7	0.041
6/13/2000	340	4098800	11.6	0.069
12/29/2000	270	5491500	12.4	0.062
6/12/2001	170	5710200	8.1	0.049
12/26/2001	36	6573900	2.0	0.010
6/25/2002	36	4680800	1.4	0.0078
12/31/2002	26	5184000	1.1	0.0059
6/24/2003	40	5627400	1.9	0.011
12/30/2003	140	5525800	6.5	0.034
6/29/2004	130	6198100	6.7	0.037
12/28/2004	0	5540600	0.0	0.000
6/28/2005	32	5317700	1.4	0.0078
12/27/2005	0	4438700	0.0	0.000
6/28/2006	23	4667300	0.90	0.0049
12/27/2006	41	5061500	1.7	0.010
6/26/2007	16	5288400	0.71	0.0039
12/24/2007	15	5007800	0.63	0.0035
6/24/2008	19	4378500	0.69	0.0038
12/30/2008	39	3677500	1.20	0.0063
6/30/2009	13	3752500	0.41	0.0022

TABLE 4-1

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN RECOVERY WELL
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
12/30/2009	16	4403800	0.59	0.0032
6/29/2010	12	3898500	0.39	0.0022
12/28/2010	19	4132300	0.65	0.0036
6/15/2011	11	4750000	0.44	0.0026
12/28/2011	9.4	4941900	0.39	0.0020
6/30/2012	14	4951000	0.58	0.0031
12/26/2012	22	5283500	0.97	0.0054
6/28/2013	16	5503000	0.73	0.0040
12/31/2013	66	5214300	2.87	0.0154
6/25/2014	22	4860400	0.89	0.0051
12/30/2014	18	4812400	0.72	0.0038
6/5/2015	14	4427300	0.52	0.0033
12/29/2015	18	5227600	0.78	0.0038
6/30/2016	19	3794107	0.60	0.0033
12/30/2016	26	4926193	1.07	0.0058
6/30/2017	23	4090300	0.78	0.0043
12/27/2017	14	3594000	0.42	0.0023
6/30/2018	13	4158500	0.45	0.0024
12/31/2018	14	5078800	0.59	0.0032
6/3/2019	14	4241800	0.50	0.0032
12/1/2019	15	2691900	0.34	0.0019
6/30/2020	16	3011700	0.40	0.0019
12/31/2020	6	4571400	0.23	0.0012
TOTALS		329,379,242	829.28	

Notes:
* Gallons pumped is measured from previous sampling date.
Updated 3/2021

TABLE 4-2

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN BH-20
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
7/13/1990	4300	12,487	0.45	0.090
7/25/1990	270	0	0.00	0.000
10/17/1990	860	0	0.00	0.000
1/9/1991	2100	0	0.00	0.000
10/15/1991	2700	16,410	0.37	0.018
12/21/1991	4800	88,290	3.5	0.053
1/15/1992	2800	32,880	0.77	0.031
6/19/1992	4100	201,990	6.9	0.044
12/7/1992	1800	182,170	2.7	0.016
7/7/1993	740	330,450	2.0	0.010
12/6/1993	790	118,620	0.78	0.0051
10/25/1994	3000	324,410	8.1	0.025
3/28/1995	1700	124,490	1.8	0.011
7/12/1995	930	85,160	0.66	0.0062
12/5/1995	850	124,840	0.88	0.0061
6/11/1996	630	217,360	1.1	0.0060
12/17/1996	1400	192,540	2.2	0.012
6/10/1997	560	190,070	0.89	0.0051
12/16/1997	600	153,750	0.77	0.0041
4/28/1998	370	156,550	0.48	0.0036
12/10/1998	350	226,630	0.66	0.0029
6/24/1999	190	194,730	0.31	0.0016
12/28/1999	130	146,970	0.16	0.0009
6/13/2000	410	250,780	0.86	0.0051
12/29/2000	240	266,290	0.53	0.0027
12/31/2002	0	209,410	0.00	0.0000
6/24/2003	34	226,960	0.064	0.00037
12/30/2003	170	296,080	0.42	0.0022
6/29/2004	75	239,060	0.15	0.00082
12/28/2004	21	108,140	0.019	0.00010
6/28/2005	48	254,480	0.10	0.00056
12/27/2005	130	189,520	0.21	0.00113
6/28/2006	110	192,330	0.18	0.00096
12/27/2006	160	200,010	0.27	0.00147
6/26/2007	41	234,690	0.080	0.00044
12/24/2007	59	104,060	0.051	0.00028
6/24/2008	84	196,380	0.14	0.00075
12/30/2008	350	68,170	0.20	0.00105
6/30/2009	65	84,360	0.05	0.00025
12/30/2009	71	84,380	0.05	0.00027
6/29/2010	45	137,270	0.05	0.00028
12/28/2010	83	70,630	-1.80	-0.00991
6/15/2011	45	138,690	1.06	0.00626
12/28/2011	50	206,800	0.08	0.00043
6/30/2012	52	66,660	0.03	0.00015
12/26/2012	65	61,170	0.03	0.00019
6/28/2013	55	89,650	0.04	0.00022
12/31/2013	63	96,070	0.05	0.00027
6/25/2014	17	88,060	0.01	0.00007
12/30/2014	133	63,340	0.07	0.00037
6/5/2015	41	67,840	0.02	0.00013
12/29/2015	32	40,990	0.067	0.00003
6/30/2016	13	31,590	0.003	0.00002
12/30/2016	160	19,400	0.026	0.00014
6/30/2017	92	54,880	0.042	0.00023
12/27/2017	26	47,610	0.010	0.00006
6/30/2018	14	71,340	0.008	0.00005
12/31/2018	15	61,310	0.008	0.00004
6/3/2019	46	62,980	0.024	0.00016
12/1/2019	20	28,440	0.005	0.00003
6/30/2020	110	62,620	0.057	0.00027
12/31/2020	29	40,650	0.010	0.00005
TOTALS		7,933,887	38.87	

Notes:
* Gallons pumped is measured from previous sampling date.
Pumping of BH-20 ceased in April 2001 and was continued in July 2002.

Updated 3/2021

TABLE 4-3

INITIAL 1,1,1-TCA CONCENTRATIONS
Former Channel Master Site
Ellenville, NY

SAMPLING EVENT DATE

Well Screen Interval (ft bgl)	BH-1 10-20	BH-2 10-20	BH-9 10-20	BH-11A 28-38	BH-11B 10-20	BH-16 10-20	BH-17 22-32	BH-18 10-20	BH-19 41-51
1985									
13-Jun	0.5 *	19.5	17.0						
17-Jul	2.0	17.0	4.0						
17-Sep				0.5 *	37,800	276,000	226	19,930	
17-Dec					13,300				
1986									
18-Mar				30.0					18.0
20-Jun		0.5 *	0.5 *						
16-Sep	9.3		38.0		140,000	900,000	0.8 *	9,200	0.8 *
03-Dec						170,000			
Sample average (1985-86)	3.9	12.3	14.9	15.3	63700.0	448667	113	14565	9.4

NOTES: Blank space indicates well was not sampled
* indicates a value of one-half the detection limit for samples in which TCA was not detected
ft bgl = feet below grade level
All concentrations presented in units of ug/l.

TABLE 4-4

1,1,1-TCA CONCENTRATION HISTORY
Former Channel Master Site, Ellenville, NY
Chemical Effectiveness Monitoring Network

Well No.		BH-1	BH-2	BH-9	BH-11A	BH-11B	BH-16	BH-17	BH-18	BH-19
Well Screen Interval (ft bgl)		10-20	10-20	10-20	28-38	10-20	10-20	22-32	10-20	41-51
Average Initial Concentration (data collected 1985-1986)		3.9	12.3	14.9	15.3	63,700	448,667	113	14,565	9.4
1987	20-Feb						304,000			
	29-Apr					24,000	90,000			9.4
	27-May					100,000	470,000			14.0
	18-Aug		94	30	0.15 *	41,000	170,000		1,600	93.0
average			94	30	0.15 *	55,000	258,500		1,600	39
1988	20-Jan		57	65	0.15 *	46,000	69,000		560	1.1
	07-Apr		260	23	2.5	39,000	150,000		950	4.8
	21-Jul		380	8.3	1.2	3,500	66,000		990	0.55
	27-Oct		31	17	2.7	11,000	210,000		410	0.95
average			182	28	1.6	24,875	123,750		728	1.9
1989	17-Jan		38	7.4	1.9	17,000	370,000		1,300	2.5
	01-May	1.5	17		1.2	12,000	48,000		120	0.4
	05-Jul	2.1	200	180	0.33	22,000	26,000		660	130.0
	25-Oct	8.8	79	16	11.0	20,000	110,000		330	92.0
average		4.1	84	68	3.6	17,750	138,500		603	56
1990	23-Jan	100	50	6.2	0.15 *	36,000	78,000		450	46
	10-May	100	160	19	1.6	18,000	63,000		150	54
	25-Jul	8.3	43	11	1.1	18,000	28,000		3,600	47
	17-Oct	3.2	16	7.4	1.0	25,000	59,000		490	190
average		53	67	11	0.96	24,250	57,000		1,173	84
1991	09-Jan	10	58	7.0	1.4	13,000	12,000		700	130
	24-Apr	3.2	54	11	3.4	6,100	16,000		310	170
	24-Jul	4.4	32	9.7	0.48	28,000	12,000		160	70
	15-Oct		41	4.8	4.8	19,000	19,000	11	12	190
average		5.9	46	8	2.5	16,525	14,750	11	296	140
1992	16-Jan		32	10	0.2 *	31,000	2,400	1.6	1,100	250
	07-Apr		14	7.8	5.4	17,000	6,100	1.5	1,700	250
	22-Jul		12	7.3	6.8	18,000	11,000	89	1,900	140
	20-Oct		8.0	5.3	0.7	6,700	13,000	2.8	160	160
average			17	7.6	3.3	18,175	8,125	24	1,215	200
1993	26-Jan				5.7	14,000	4,200	0.75	2,300	68
	07-Apr		9.0	300.0	2.0	180	5,500	0.80	4.1	14
	06-Jul		14	6.8	0.25 *	11,800	3,270	18.4	13	21
	02-Nov		0.25 *	0.25 *	0.25 *	13,000	12,000	160	150	93
average			7.8	102	2.1	9,745	6,243	45	617	49
1994	01-Feb		6.3	17	7.2	9,000	4,900	62	450	41
	13-Apr		4.5	21	6.0	9,000	5,000	0.25 *	120	23
	06-Jul		32	1.2	2.9	10,000	4,000	190	180	18
	12-Oct		21	3.2	2.1	5,300	8,400	110	300	90
average			16	11	4.6	8,325	5,575	91	263	43
1995	10-Jan		7.7	3.6	0.25 *	5,800	2,300	2.7	620	37
	11-Apr		25	1.9	2.5	5,600	1,500	6.4	120	13
	12-Jul		12	3.8	0.25 *	5,400	7,900	120	3.5	35
	25-Oct		17	2.6	4.6	2,900	13,000	39	19	140
average			15	3.0	1.9	4,925	6,175	42	191	56
1996	25-Jan		17	1.2	2.3	1,900	4,300	0.25 *	4.5	26
	03-Apr		16	1.3	3.2	3,100	1,700	14	9.5	18
	10-Jul		28	1.1	0.80	6,800	4,800	32	9.0	42
	08-Oct		46	0.90	2.4	6,500	4,000	28	10	67
average			27	1.1	2.2	4,575	3,700	19	8.3	38
1997	14-Jan		12	1.8	0.25 *	7,500	1,200	75.0	110	49
	29-May		12	2.5	0.32	6,800	1,100	3.4	10	5.1
	22-Oct		19	1.4	1.7	690	4,910	260	2.9	76
average			14	1.9	0.76	4,997	2,403	113	41	43
1998	28-Apr		22	1.0	1.7	3,900	1,700	135.0	260	37
	27-Oct		30	1.0	4.3	1,800	2,200	360.0	0.24	110
average			26	1.0	3.0	2,850	1,950	248	130	74
1999	08-Apr		3.7	2.0	1.4	3,000	360	22	130	64
	20-Oct		26	1.7	4.9	6,300	2,300	180	2.5	38
average			15	1.9	3.2	4,650	1,330	101	66	51

TABLE 4-4

1,1,1-TCA CONCENTRATION HISTORY
Former Channel Master Site, Ellenville, NY
Chemical Effectiveness Monitoring Network

Well No. / Well Screen Interval (ft bgl)		BH-1 10-20	BH-2 10-20	BH-9 10-20	BH-11A 28-38	BH-11B 10-20	BH-16 10-20	BH-17 22-32	BH-18 10-20	BH-19 41-51
2000	19-Apr		16	0.99	1.1	4,300	380	5.9	6.9	20
	17-Oct		9.9	0.59	2.9	5,900	1,600	67	2.0	21
average			13	0.79	2.0	5,100	990	36	4.5	21
2001	31-May		8.1	1.3	12	4,200	840	62	1.6	4.1
	29-Oct		2.3	0.79	9.6	1,600	960	79	1.4	0.17
average			5.2	1.0	11	2,900	900	71	1.5	2.1
2002	18-Apr		6.6	0.73	4.7	2,900	420	110	1.4	0.24
	09-Oct		3.0	1.1	3.7	730	700	140	1.4	0.11 *
average			4.8	0.92	4.2	1,815	560	125	1.4	0.18
2003	29-May		9.8	1.3	4.3	3,000	210	120	1.3	0.37
	23-Oct		23	0.7	3.3	900	120	75	1.3	0.13 *
average			16	1.0	3.8	1,950	165	98	1.3	0.25
2004	07-Apr		11	0.71 J	3.0	1,200	75	0.5 *	3.1	0.5 *
	22-Oct		27	1.8	3.0	2,800	120	0.5 *	5.6	0.5 *
average			19	1.3	3.0	2,000	98	0.5	4.4	0.5
2005	29-Apr		3.1	0.94	3.4	300	170	0.5 *	2.6	0.5 *
	21-Oct		4.0	18	3.6	240	390	0.5 *	2.0	0.5 *
average			3.6	9.5	3.5	270	280	0.5	2.3	0.5
2006	20-Apr		12	0.76 J	2.3	1,500	110	0.84 J	1.3	0.55 J
	10-Oct		17	0.55	2.3	33	120	0.5 *	0.95 J	0.5 *
average			14.5	0.66	2.3	767	115	0.7	1.1	0.5
2007	21-Apr		4.4	0.94 J	2.0	140	160	0.5 *	4.2	0.5 *
	30-Oct		9.5	1.7	0.5 *	530	120	77	0.78 J	0.5 *
average			7.0	1.32	1.3	335	140	38.8	2.5	0.5
2008	03-Apr		3.9	1.3	0.5 *	77	490	2.1	3.0	0.5 *
	22-Oct		6.8	0.28 J	0.5 *	240	210	0.36 J	0.80 J	0.5 *
average			5.4	0.79	0.5	159	350	1.2	1.9	0.5
2009	10-Apr		6.0	2.3	0.5 *	160	430	5.2	3.2	0.53
	23-Nov		9.0	1.1	0.12 *	240	220	1.8	0.93	
average			7.5	1.7	0.31	200	325	3.5	2.1	0.53
2010	15-Jun			0.98	0.12 *	220	430	0.12 *	0.95	
	10-Nov		16	0.78	0.12 *	170	210	0.12 *	0.98	0.12
average			16.0	0.9	0.12	195	320	0.12	1.0	0.12
2011	02-May		6.2	1.6	0.12 *	22	300 E	4.7	12	0.39
	22-Nov		2.6	5.9	0.12 *	94 E	180 E	0.12 *	0.87	0.12 *
average			4.4	3.8	0.12	58	240	2.41	6.4	0.26
2012	01-May		3.5	4.3	0.12 *	110 E	250 E	4.7	3.5	0.12 *
	25-Oct		8.3	5.2	0.12 *	61	280 E	0.12 *	1.6	0.12 *
average			5.9	4.8	0.12 *	86	265	2.41	2.6	0.12 *
2013	03-May		3.1	6.1	0.12 *	26	220 E	2.5	3.4	0.12 *
	24-Oct		5.5	0.46	0.12 *	150 E	520 E	0.12 *	0.72	0.12 *
average			4.3	3.3	0.12 *	88	370	1.31	2.1	0.12 *
2014	07-May		1.2	0.2	0.12 *	38	320 E	2.9	4.80	0.12 *
	28-Oct		5.1	0.26	0.12 *	160	59	0.35	0.55	0.12 *
average			3.2	0.23	0.12 *	99	190 E	1.63	2.68	0.12 *
2015	15-Apr		**5.5**	0.81	0.12 *	36	340	3.3	3.00	0.12 *
	13-Nov		8.6	1.60	0.12	26	410	0.12 *	1.2	0.12 *
average			7.1	1.2	0.1 *	31.0	375.0	1.7 *	2.1	0.12 *

TABLE 4-4

1,1,1-TCA CONCENTRATION HISTORY
Former Channel Master Site, Ellenville, NY
Chemical Effectiveness Monitoring Network

Well No. Well Screen Interval (ft bgl)		BH-1 10-20	BH-2 10-20	BH-9 10-20	BH-11A 28-38	BH-11B 10-20	BH-16 10-20	BH-17 22-32	BH-18 10-20	BH-19 41-51
2016	20-May		2.7	1.70	0.12 *	71	410	0.36	0.47	0.12 *
	04-Nov		12	0.39	0.12 *	180	450	0.12 *	0.44	0.29
average			7.4	1.05	0.12 *	126	430	0.24	0.46	0.21 *
2017	07-May		5.2	15.00	0.12 *	75	330	0.12 *	1.00	0.12 *
	22-Nov		7.14	0.12 *	0.12 *	120	990	0.12 *	0.56 J	0.12 *
average			6.2	7.56	0.12 *	98	660	0.12	0.78	0.12 *
2018	19-May		2.9	0.80 J	0.12 *	80	130	0.12 *	0.68 J	0.12 *
	20-Nov		3.4	9.60	0.12 *	18	640	0.12 *	0.72 J	0.12 *
average			3.2	5.20	0.12 *	49	385	0.12	0.70	0.12 *
2019	17-May		2.7	7.20	0.12 *	20	180	0.12 *	0.54 J	0.12 *
	25-Nov		3.6	6.20	0.61 J	36	580	0.12 *	0.64 J	0.28 J
average			3.2	6.70	0.37 *	28	380	0.12 *	0.59	0.20 *
2020	05-May		1.2	5.10	0.48 J	30	370	0.12 *	0.41 J	0.25 J
2020	24-Nov		4.8	0.56 J	0.92 J	34	340	0.32 *	0.64 J	0.28 J
average			3.0	2.83	0.70 J	32	355	0.22 *	0.53	0.27 *
(Feb 1987- December 2020)		24	29	11	2	8,652	28,942	40	269	38

NOTES:

Blank spaces indicate well was not sampled

J - estimated value; detected below quantitation limit

* - indicates a value of one-half the detection limit for samples in which TCA was not detected

E- Result exceeded calibration range, secondary dilution required

ft bgl = feet below grade level

All concentrations presented in units of ug/l.

TABLE 4-5

LINEAR REGRESSION ANALYSES:
1,1,1-TCA CONCENTRATIONS VS. TIME
USING HISTORIC GROUNDWATER DATA (1987 TO PRESENT)
Former Channel Master Site
Ellenville, NY

WELL	NUMBER OF SAMPLES	LINEAR REGRESSION EQUATION [1]	CORRELATION COEFFICIENT (R)	SIGNIFICANT AT 5% LEVEL?	CALCULATED Y-INTERCEPT [2] (ug/l)	CALCULATED X-INTERCEPT [3]	RATE OF CHANGE (ug/l/year)
BH-1[4]	11	Y = (4.38E-3) X + 17.3	0.052	NO	17.3	-	1.60
BH-2	85	Y = (-6.51E-3) X + 60.0	0.431	YES	60.0	April 2013	-2.38
BH-9	85	Y = (-2.461E-3) X + 24.6	0.238	YES	24.6	April 2014	-0.90
BH-11A	87	Y = (-2.796E-4) X + 3.65	0.362	YES	3.65	October 2022	-0.1021
BH-11B	89	Y = (-2.532X + 22248	0.611	YES	22248	January 2011	-925
BH-16	90	Y = (-1.085E+1) X + 88480	0.457	YES	88480	May 2009	-3962
BH-17	71	Y = (-7.942E-3) X + 89.6	0.387	YES	89.6	November 2017	-2.901
BH-18	86	Y = (-1.368-1) X + 1143	0.308	YES	1143	November 2009	-50
BH-19	88	Y = (-7.8631E-3) X + 77.4	0.500	YES	77.4	December 2013	-2.87
BH-20[5]	62	Y = (-2.097E-1) X + 1757	0.654	YES	1757	June 2013	-77
Recovery	112	Y = (-7.786E-2) X + 759	0.468	YES	759	September 2013	-28.4

Notes:

1. Y= Concentration of TCA, in ug/l
   X= Time since start of pumping, in days
   Slope= Rate of change in ug/l/day
2. Initial concentrations calculated by linear regression at the start of pumping the recovery well, January 1987 (except for BH-20, first sampled in July 1990)
3. Where the concentration of 1,1,1-TCA equals zero
4. Not sampled since October 1991
5. Pumped intermittently July 1990 - April 2001 and October 2002 - present

TABLE 4-6

LINEAR REGRESSION ANALYSES:
1,1,1-TCA CONCENTRATIONS VS. TIME
USING GROUNDWATER DATA FROM MOST RECENT 10 YEARS
(2011 to 2020)
Former Channel Master Site
Ellenville, NY

WELL	NUMBER OF SAMPLES	LINEAR REGRESSION EQUATION [1]	CORRELATION COEFFICIENT (R)	SIGNIFICANT AT 5% LEVEL?	CALCULATED Y-INTERCEPT [2] (ug/l)	CALCULATED X-INTERCEPT [3]	RATE OF CHANGE (ug/l/year)
BH-1	-	-	-	-	-	-	-
BH-2	20	Y = (-3.594E-4) X + 5.4	0.145	NO	5.4	May 2052	-0.13
BH-9	20	Y = (5.550E-4) X + 2.69	0.153	NO	2.69	August 2090	0.20
BH-11A	20	Y = (1.175E-4) X + 0.00	0.596	NO	0.00	November 2205	0.19
BH-11B	20	Y = (-1.015E-02) X +87	0.219	YES	87	December 2034	-4
BH-16	20	Y = (60217E-2) X + 257	0.326	NO	257	January 2000	23
BH-17	20	Y = (-8.519E-4) X + 3	0.579	YES	3	May 2019	-0.3
BH-18	20	Y = (-1.384E-3) X + 4.3	0.568	YES	4.3	November 2019	-0.51
BH-19	20	Y = (1.123E-5) X + 0.1	0.157	NO	0.1	March 1977	0.00
BH-20	20	Y = (-2.845E-3) X + 59	0.075	NO	59	February 2068	-1.0
Recovery	20	Y = (-2.337E-3) X + 23	0.208	NO	23	January 2167	-0.9

Notes:

1. Y= Concentration of TCA, in ug/l
   X= Time since start of pumping, in days
   Slope= Rate of change in ug/l/day
2. Initial concentrations calculated by linear regression at the start of pumping the recovery well, January 1987 (except for BH-20, first sampled in July 1990)
3. Where the concentration of 1,1,1-TCA equals zero

TABLE 4-7

DISSOLVED ARSENIC CONCENTRATIONS IN LAGOON WELLS
Former Channel Master Site
Ellenville, NY

SAMPLE DATE	MW-3	MW-8D
Jan-87	NA	NA
Apr-87	NA	NA
Jul-87	68	48
Oct-87	85	43
Jan-88	NA	NA
Apr-88	33	93
Jul-88	81	228
Oct-88	84	60
Jan-89	46	226
May-89	25.2	25
Jul-89	25.9	84.3
Oct-89	58.4	54
Jan-90	38.7	126
May-90	42.2	56.3
Jul-90	43	71
Oct-90	26	52
Jan-91	14.9	24.7
Apr-91	15	26.5
Jul-91	46.7	105
Oct-91	51.8	150
Jan-92	33.4	14.1
Apr-92	30	28.5
Jul-92	71.8	47.4
Oct-92	61.3	183
Apr-93	34.4	67.2
Nov-93	46	45
Apr-94	46	52
Oct-94	60	89
Apr-95	49	41
Oct-95	74	55
Apr-96	43	35
Oct-96	63	70
May-97	67	79
Oct-97	67	26
Apr-98	45	51
Oct-98	64	36
Apr-99	48	61
Oct-99	70	29
Apr-00	71	67
Oct-00	68	71
May-01	17	25
Oct-01	22	114
Apr-02	11	1.7 *
Oct-02	7.1	38
May-03	8.3	11
Oct-03	87	97
Apr-04	51	110
Oct-04	80	85
Apr-05	68	55
Oct-05	62	31
Apr-06	56	65

TABLE 4-7

DISSOLVED ARSENIC CONCENTRATIONS IN LAGOON WELLS
Former Channel Master Site
Ellenville, NY

SAMPLE DATE	MW-3	MW-8D
Oct-06	67	350 **
Apr-07	34	75
Nov-07	69	88
Apr-08	62	76
Oct-08	72	81
Apr-09	58	61
Nov-09	70	77
Jun-10	43	53
Nov-10	76	110
Apr-11	64	67
Nov-11	69	31
May-12	59	69
Nov-12	84	80
May-13	51	63
Oct-13	81	79
May-14	51	60
Oct-14	71	84
Apr-15	39	50
Nov-15	37	10
May-16	20	47
Nov-16	15	14
May-17	18	10
Nov-17	94	85
May-18	18	17
Nov-18	10	10
May-19	40	34
Nov-19	240	10
May-20	21	10
Nov-20	10	10

Concentrations in ug/l
NA - Sample was not analyzed for arsenic.
* Arsenic not detected - value shown is one-half the detection limit
** Anomalous result attributed to sampling or laboratory error; result is nearly identical to unfiltered total arsenic concentration in MW-8D. Not used in linear regression analysis.

TABLE 4-8

LINEAR REGRESSION ANALYSES:
DISSOLVED ARSENIC CONCENTRATIONS VS. TIME
USING HISTORIC GROUNDWATER DATA (1987 TO PRESENT)
Former Channel Master Site
Ellenville, NY

WELL	NUMBER OF SAMPLES	LINEAR REGRESSION EQUATION [1]	CORRELATION COEFFICIENT (R)	SIGNIFICANT AT 5% LEVEL?	CALCULATED Y-INTERCEPT [2] (ug/l)	RATE OF CHANGE (ug/l/year)
MW-3	77	Y = (-4.66E-04) X + 51.9	0.077	NO	51.9	-0.17
MW-8D	76	Y = (-2.461E-3) X + 78.1	0.194	NO	78.1	-0.90

Notes:

1. Y= Concentration of TCA, in ug/l
   X= Time since start of monitoring, in days
   Slope= Rate of change in ug/l/day
2. Initial concentrations calculated by linear regression at the start of monitoring 1987
3. Where the concentration of dissolved arsenic equals zero

TABLE 4-9

LINEAR REGRESSION ANALYSES:
DISSOLVED ARSENIC CONCENTRATIONS VS. TIME
USING GROUNDWATER DATA FROM MOST RECENT 10 YEARS (2011 to 2020)
Former Channel Master Site
Ellenville, NY

WELL	NUMBER OF SAMPLES	LINEAR REGRESSION EQUATION [1]	CORRELATION COEFFICIENT (R)	SIGNIFICANT AT 5% LEVEL?	CALCULATED Y-INTERCEPT [2] (ug/l)	RATE OF CHANGE (ug/l/year)
MW-3	20	Y = (-1.5763E-2) X + 71.9	0.647	YES	71.87	-5.76
MW-8D	20	Y = (-6.822E-3) X + 64.2	0.140	NO	64.22	-2.49

Notes:
1. Y= Concentration of TCA, in ug/l
   X= Time since start of monitoring, in days
   Slope= Rate of change in ug/l/day
2. Initial concentrations calculated by linear regression at the start of monitoring 1987
3 Where the concentration of dissolved arsenic equals zero

FIGURES

LEGEND:

- FORMER BUILDING PAD
- FORMER LAGOON AREA
- BORE HOLE
- MONITORING WELL
- PIEZOMETER
- RECOVERY WELL

NOTES:

1. SITE AERIAL PHOTOGRAPH ADOPTED FROM GOOGLE EARTH PRO WITH AN IMAGERY DATE OF 04/16/2016.
2. LOCATIONS OF BORE HOLES, PIEZOMETERS, AND RECOVERY WELL PROVIDED BY BORBAS SURVEYING & MAPPING, LLC. SURVEY DATE OF NOVEMBER 22, 2016.
3. THE LOCATIONS OF THE FORMER LAGOON AND ASSOCIATED MONITORING WELLS ARE TAKEN FROM DRAWING PROVIDED BY ROY H. PAULI, LAND SURVEYORS, P.C., TITLED "WELL LOCATIONS AT FORMER CHANNELMASTER CORPORATION SITE". LOCATIONS ARE APPROXIMATE.
4. FORMER BUILDING PAD DIGITIZED FROM AERIAL IMAGE AND INFORMATION FROM DRAWING "WELL LOCATIONS AT FORMER CHANNELMASTER CORPORATION SITE" (SEE NOTE 3).

0 100' 200'

APPROXIMATE SCALE IN FEET

FORMER CHANNELMASTER CORPORATION SITE
VILLAGE OF ELLENVILLE, TOWN OF WAWARSING
ULSTER COUNTY, NEW YORK

SITE PLAN AND MONITORING WELLS

ARCADIS Design & Consultancy for natural and built assets

FIGURE

1

CITY:SYRACUSE-NY DIV/GROUP:ENV DB:A.SANCHEZ LD:ALS PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\SYRACUSE-ACT\00395052\0000\00108\30905052B01.dwg LAYOUT: 1 SAVED: 9/20/2017 5:20 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 9/21/2017 1:32 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----

Path: G:\Model\ChannelMaster_0395052\Channel_Master_lagoon_area_v2.mxd

Legend

◎ Lagoon Area Monitoring Well

N

MW10D
MW10S
MW4
MW7
MW11D
MW11S
MW18
MW6
MW2D
MW2S
MW3
MW8D
MW8S
MW13D
MW13S

0 25 50 100

Feet

ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE, NEW YORK
MONITORING WELL LOCATIONS - LAGOON AREA

0395-052-108
FIGURE 2-1

Legend

Former Lagoon Area Water Table Contours (5/5/2020)

N

MW10S (295.32)

MW4 (294.31)

MW7 (294.08)

MW11S (293.49)

MW6 (294.18)

295

294

293

292

291

290

289

288

285

286

287

MW2S (290.99)

MW8S (289.29)

MW3 (288.6)

MW18 (284.03)

MW13S (288.12)

0 25 50 100 Feet

Elevations: feet MSL.

Document Path: G:\Project\0395052 Channel Master AVNET\GIS\ChannelMaster-Lagoon-A.mxd

ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE, NEW YORK
WATER TABLE ELEVATION CONTOUR MAP
FORMER LAGOON AREA WELLS -MAY 5, 2020

0395-052-108

FIGURE 2-1A

Legend

Former Lagoon Area Water Table Contours (11/23/2020)

N

MW10S (292.89)

MW4 (292.24)

MW7 (291.25)

MW11S (292.42)

MW6 (293.72)

292

291

290

289

288

287

286

285

284

MW2S (290.47)

MW8S (288.60)

MW3 (287.99)

MW18 (282.84)

MW13S (287.80)

0 25 50 100 Feet

Elevations: feet MSL.

Document Path: \\arcadis-us.com\officedata\Fairlawn-NJ\Project\0395052 Channel Master AVNET\GIS\ChannelMaster-Lagoon-A.mxd

ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE, NEW YORK
WATER TABLE ELEVATION CONTOUR MAP
FORMER LAGOON AREA WELLS - NOVEMBER 23, 2020

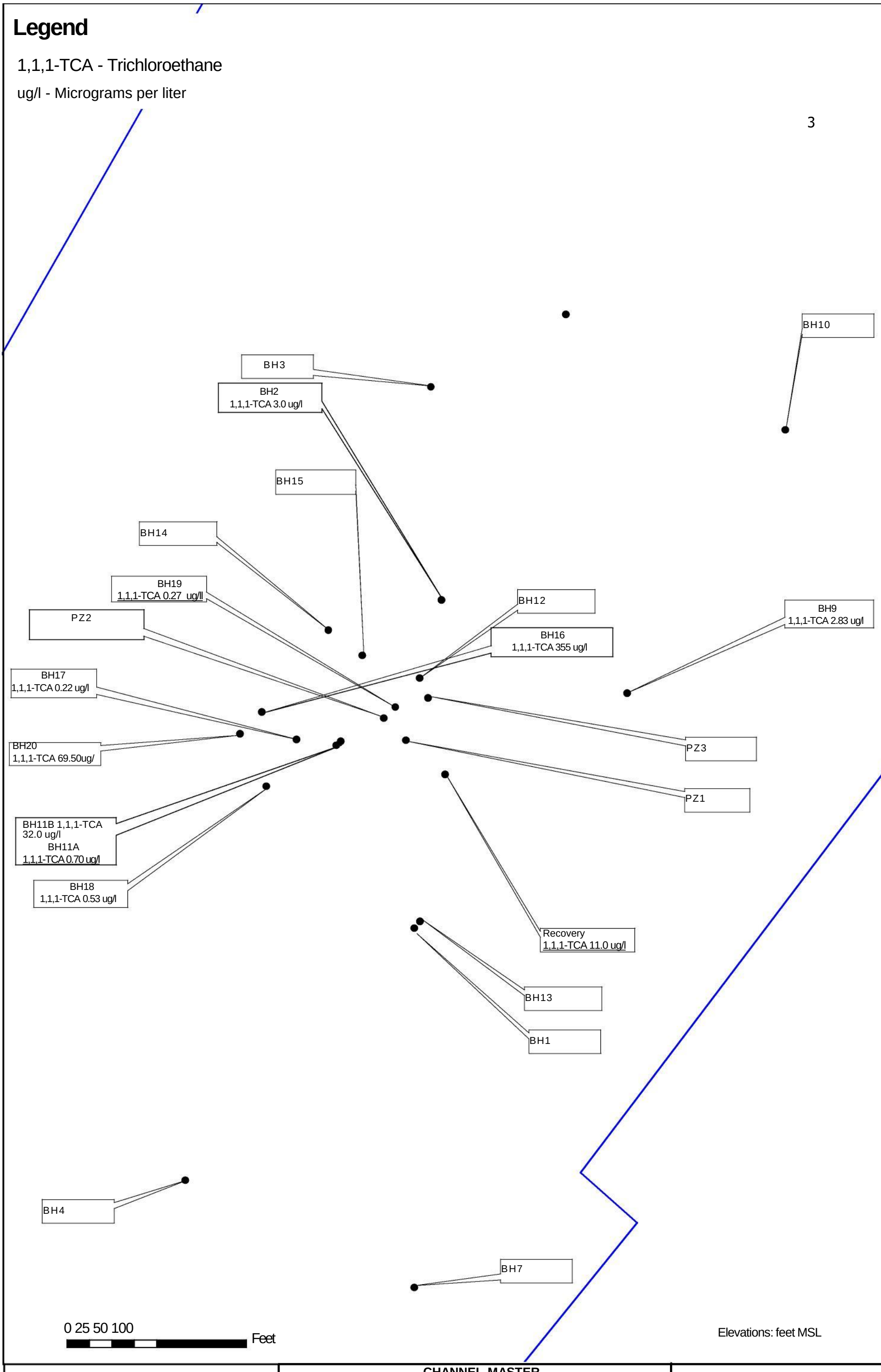
0395-052-108
FIGURE 2-1B

Legend

1,1,1-TCA - Trichloroethane

ug/l - Micrograms per liter

3



Document Path: G :\Project\0395052 Channel Master AVNET\G IS\ChannelMaster.mxd

ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE, NEW YORK
FORMER PLANT WELLS AND 2020 MEAN GROUNDWATER TCA ANALYTICAL RESULTS

0395-052-10 8

FIGURE 3.1

Legend

Former Plant Area Water Table Contours (5/4/2020)

N

BH10 (298.59)

BH3 (299.56)

299

BH15 (298.93)

BH2 (298.84)

BH14 (300.20)

BH12 (298.72)

BH19 (302.04)

BH9 (298.73)

PZ2 (298.69)

BH16 (300.59)

BH17 (302.02)

301

PZ3 (298.62)

BH20 (298.88)

PZ1 (298.83)

BH11B (298.87)
BH11A (302.07)

300

Recovery (293.26)

296

BH18 (299.62)

297

299

298

300

BH13 (298.60)

BH1 (298.95)

BH4 (301.17)

301

BH7 (299.88)

0 25 50 100 Feet

Elevations: feet MSL.

Document Path: G:\Project\0395052 Channel Master AVNET\GIS\ChannelMaster.mxd

ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE, NEW YORK
WATER TABLE ELEVATION CONTOUR MAP
FORMER PLANT AREA WELLS - MAY 4, 2020

0395-052-108

FIGURE 3-1 A

Legend

Former Plant Area Water Table Contours (11/24/2020)

N

BH10 (297.28)

BH3 (298.06)

297.5

BH15 (297.40)

BH2 (297.31)

BH14 (298.81)

BH12 (297.18)

BH19 (300.99)

BH9 (297.30)

PZ2 (297.16)

BH16 (299.10)

BH17 (301.00)

299.5

BH20 (295.50)

PZ3 (297.10)

PZ1 (297.30)

BH11B (297.33)
BH11A (301.05)

298.5

Recovery (293.45)

295.5

BH18 (298.18)

296.5

297.5

BH13 (296.86)

BH1 (297.42)

298.5

299.5

BH4 (300.03)

BH7 (298.51)

0 25 50 100
Feet

Elevations: feet MSL.

Document Path: G:\Project\0395052 Channel Master AVNET\GIS\ChannelMaster-Nov2020.mxd

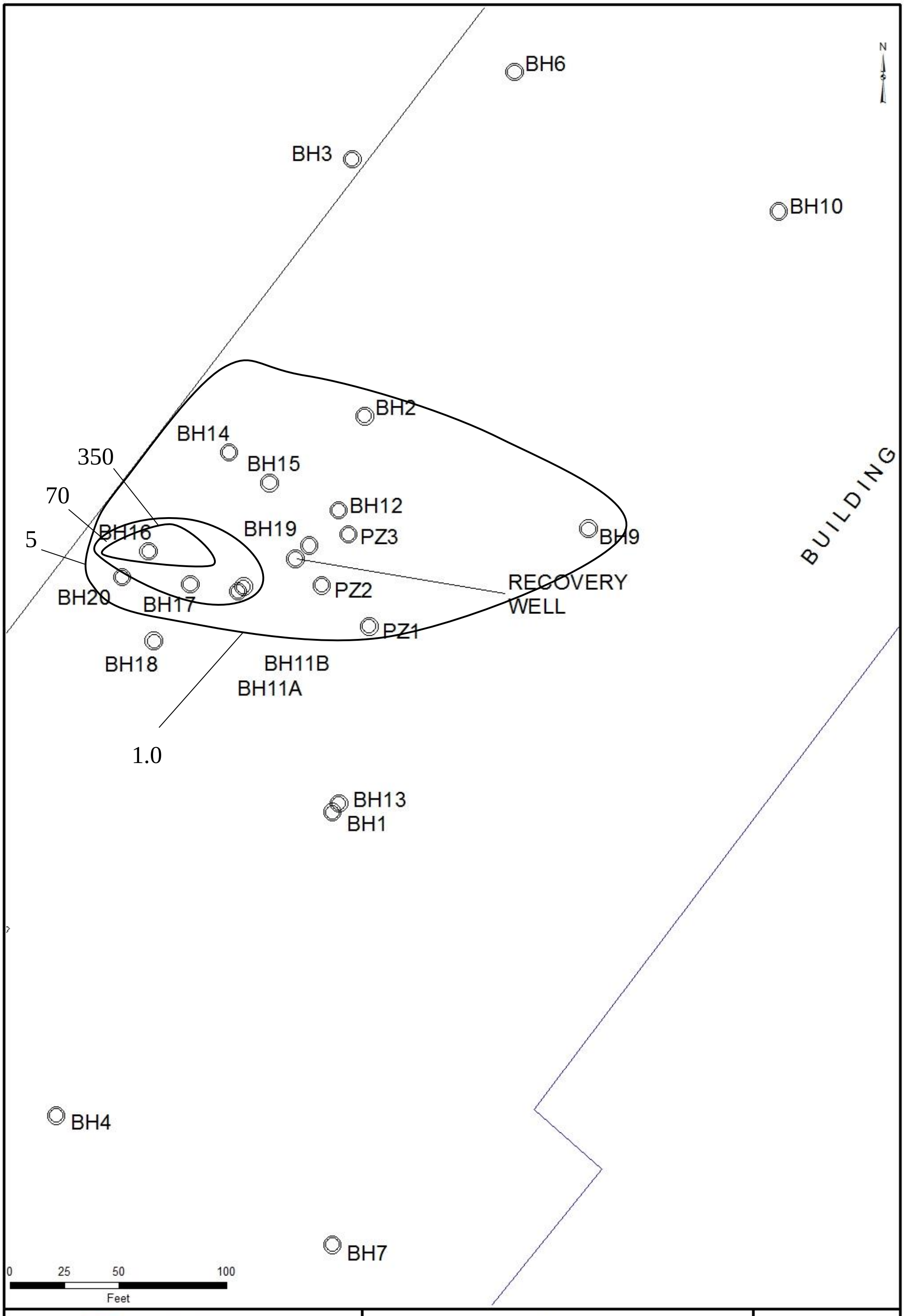
ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE, NEW YORK
WATER TABLE ELEVATION CONTOUR MAP
FORMER PLANT AREA WELLS - NOVEMBER 24, 2020

0395-052-108

FIGURE 3-1B

Path: G:\Model\ChannelMaster_0395052\Channel_Master.mxd

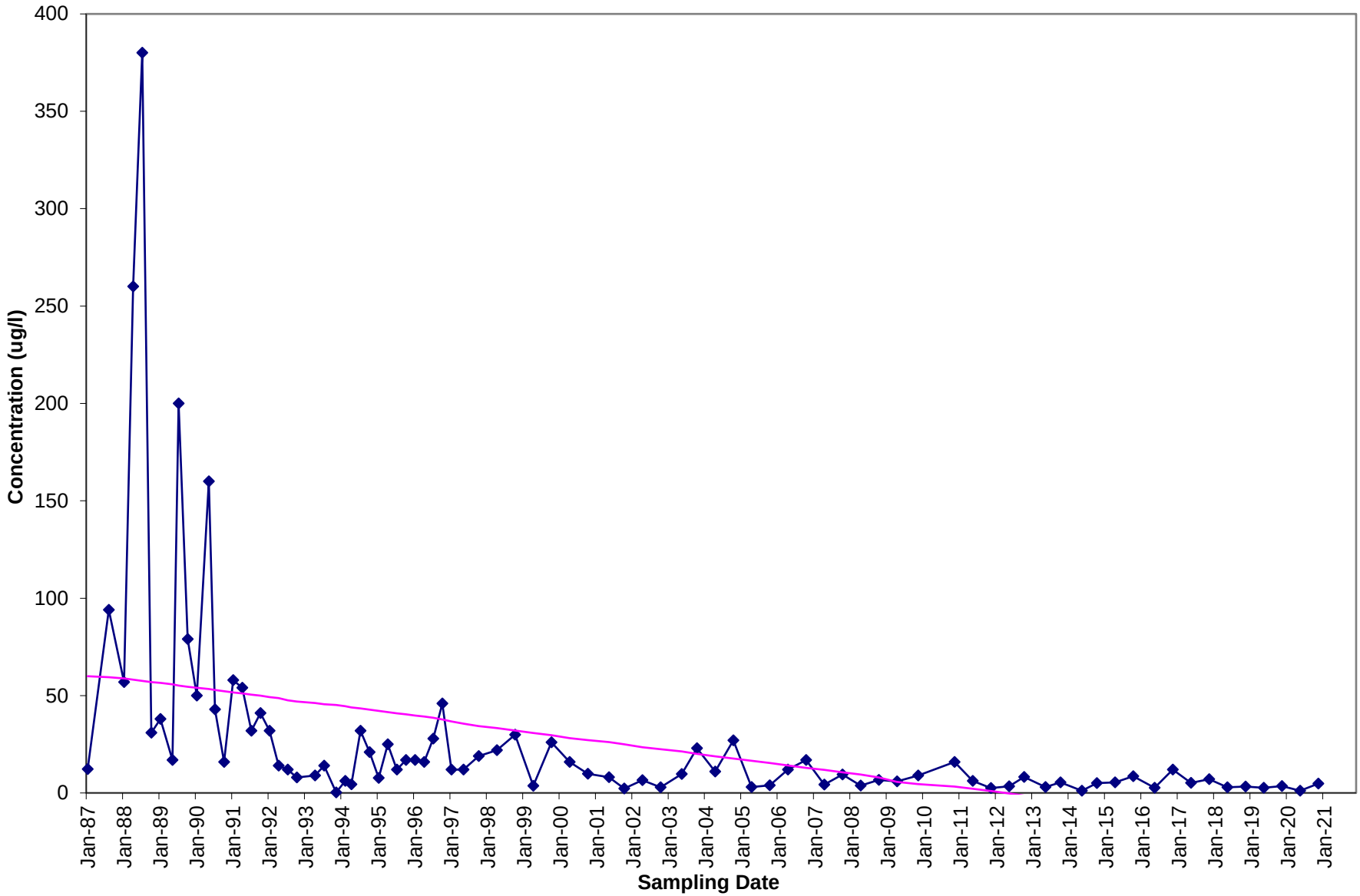


ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE NEW YORK
ISOCONCENTRATION MAP - 1,1,1-TRICHLOROETHANE (µg/l)
SHALLOW PLANT AREA WELLS – 2020 ANNUAL MEAN CONCENTRATIONS

0395-052-108

FIGURE 3-2



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC

FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

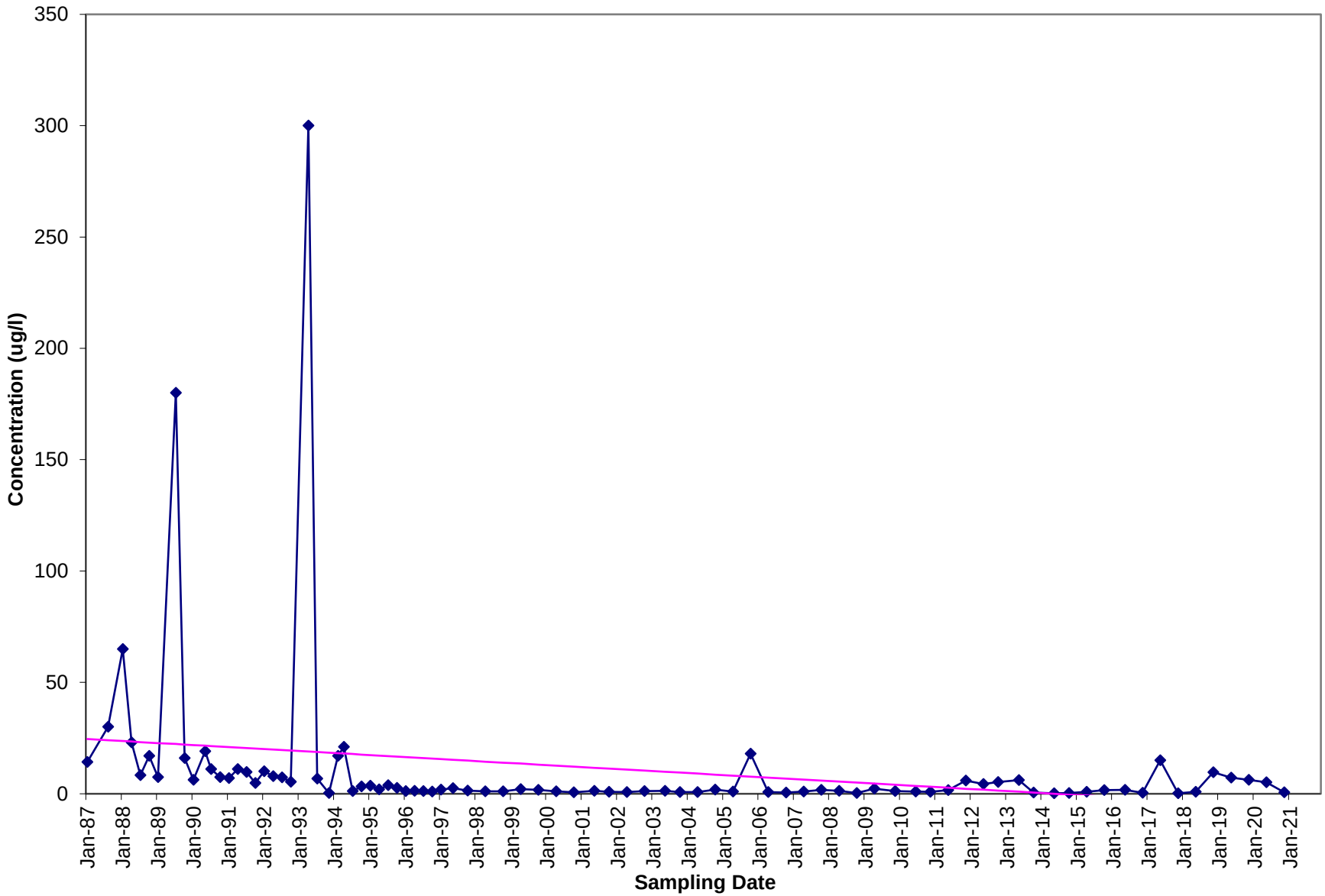
TCA CONCENTRATION VS. TIME IN BH-2

HISTORIC LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-1



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC

FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

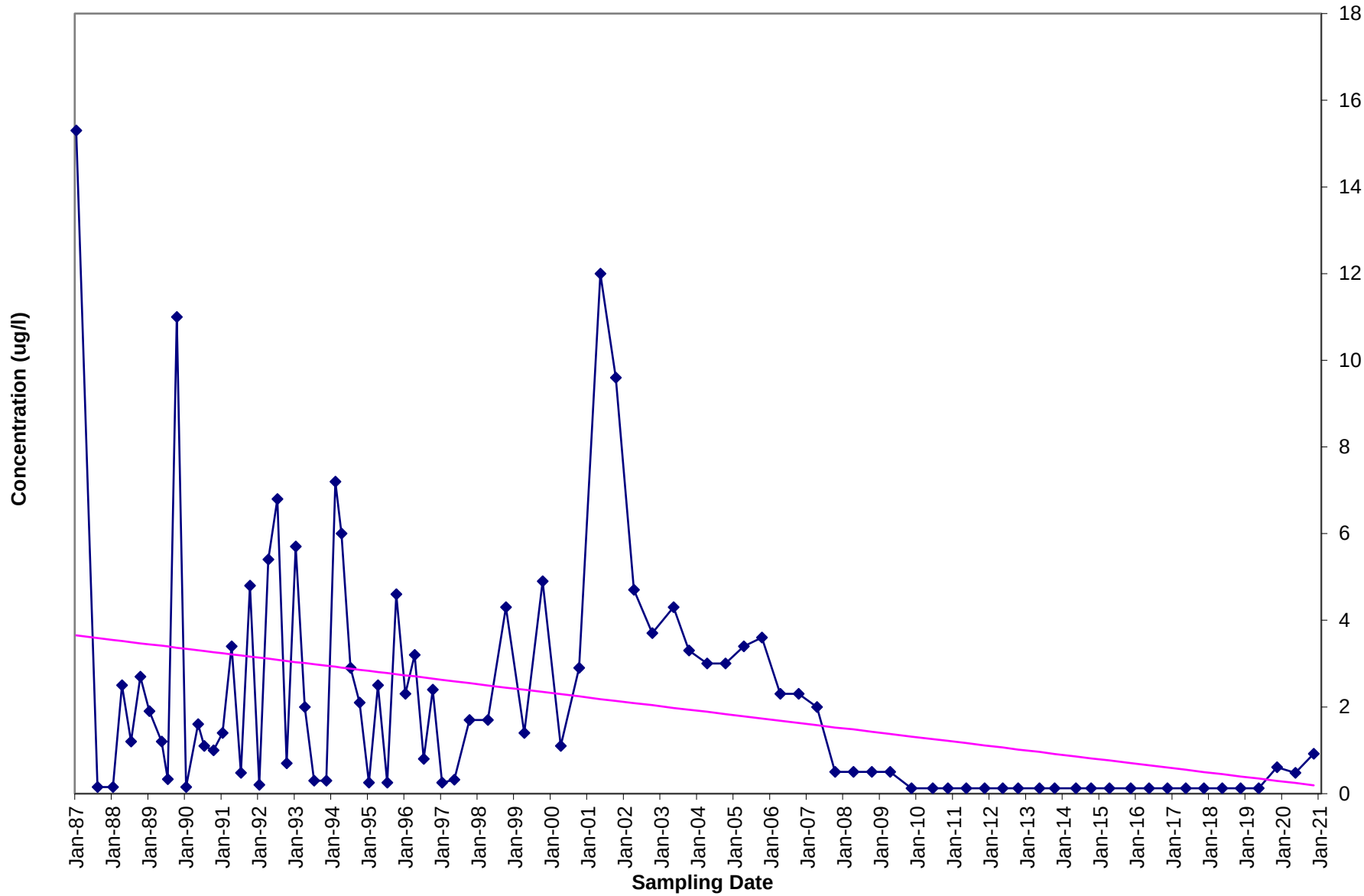
TCA CONCENTRATION VS. TIME IN BH-9

HISTORIC LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-2



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC

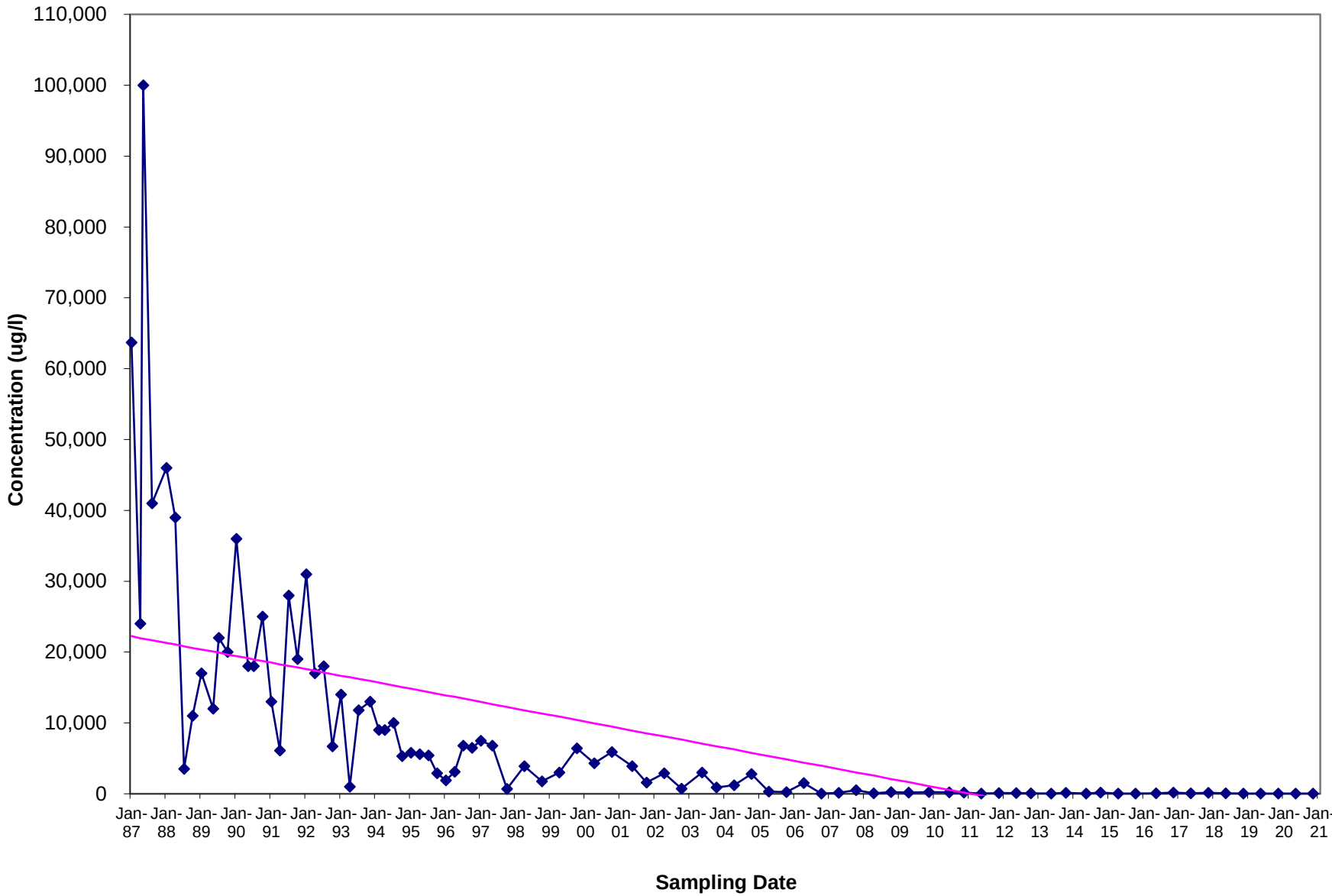
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

TCA CONCENTRATION VS. TIME IN BH-11A
HISTORIC LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-3



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC

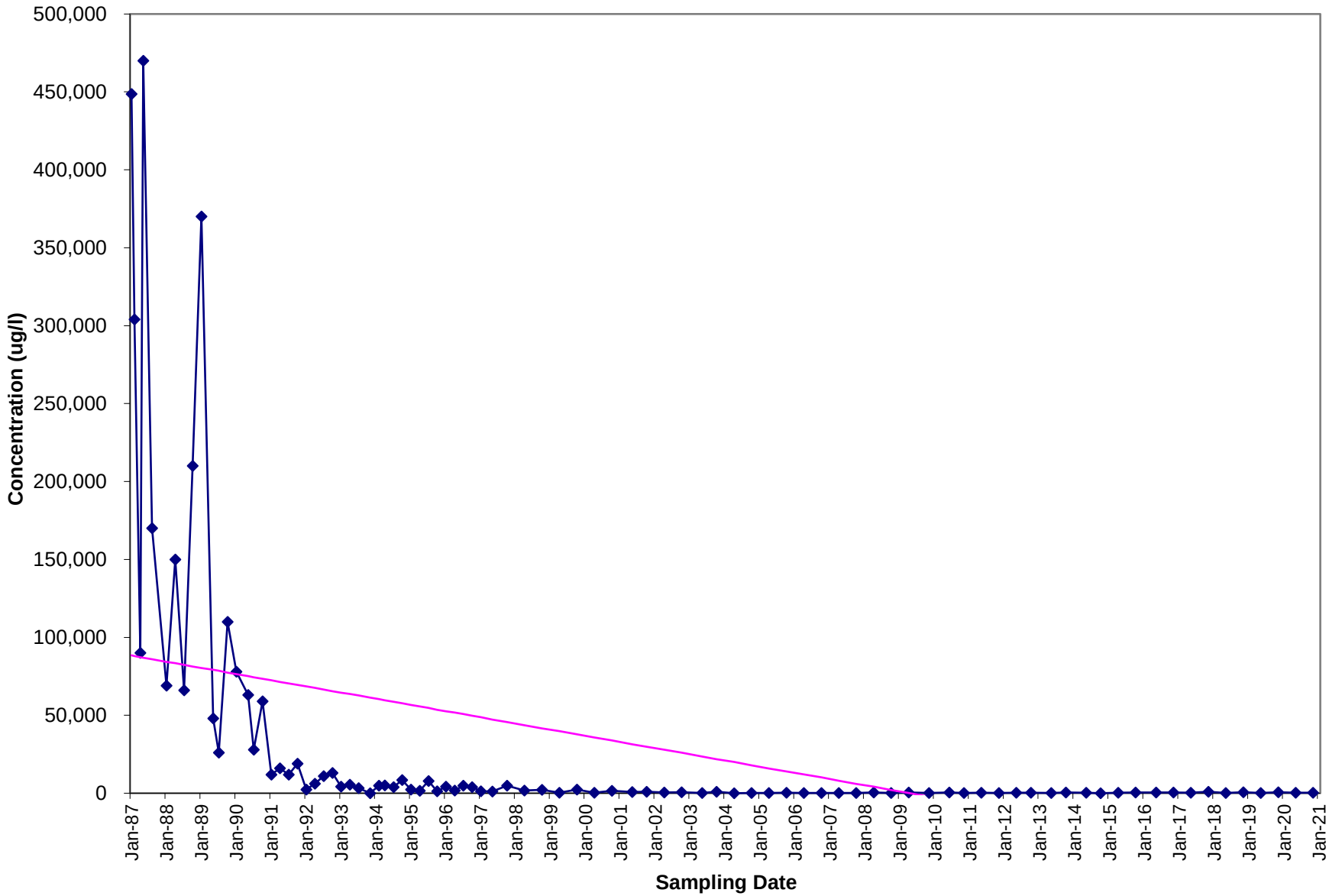
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

TCA CONCENTRATION VS. TIME IN BH-11B
HISTORIC LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-4



ARCADIS Design & Consultancy for natural and built assets

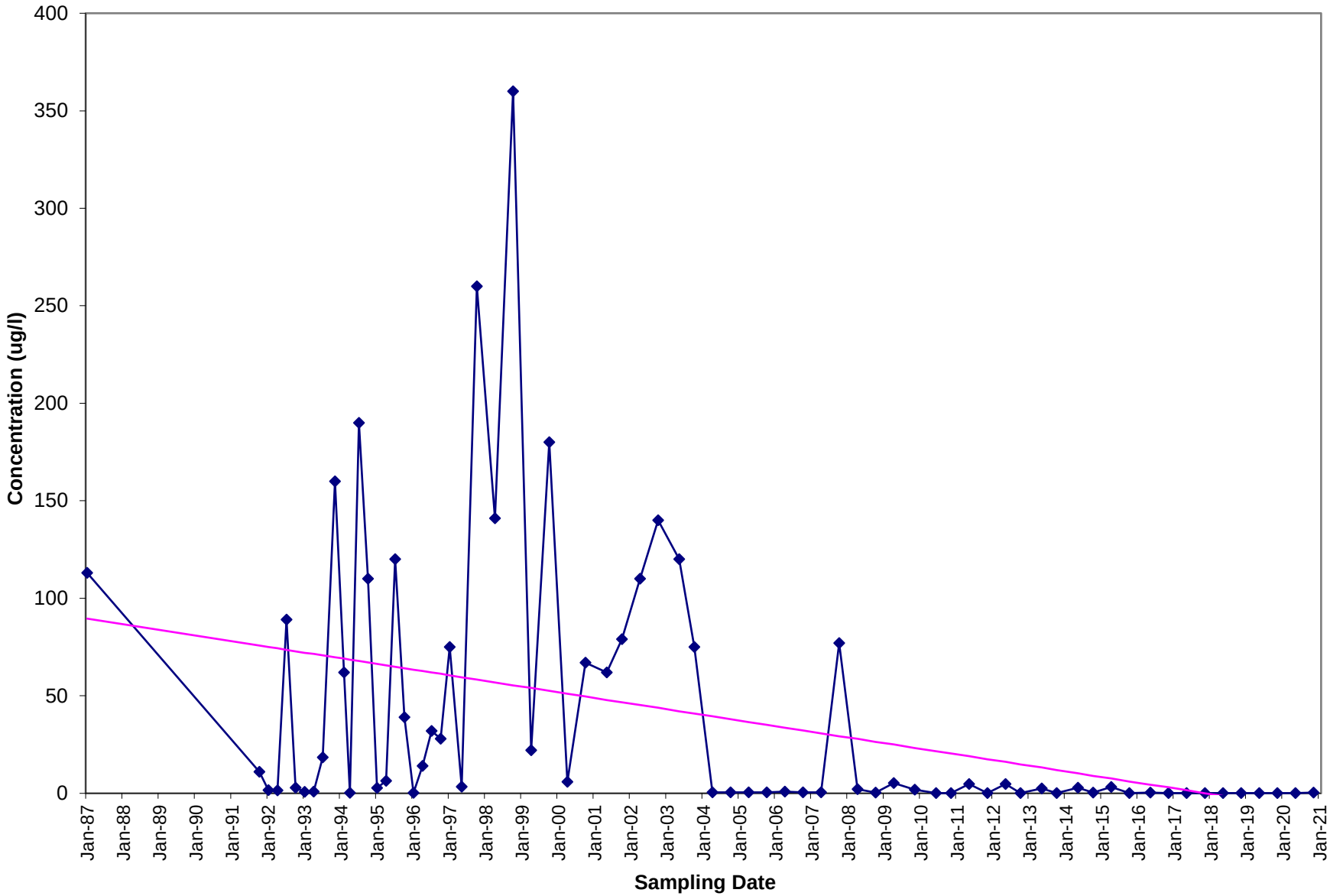
AVNET, INC.
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

TCA CONCENTRATION VS. TIME IN BH-16
HISTORIC LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-5



ARCADIS Design & Consultancy for natural and built assets

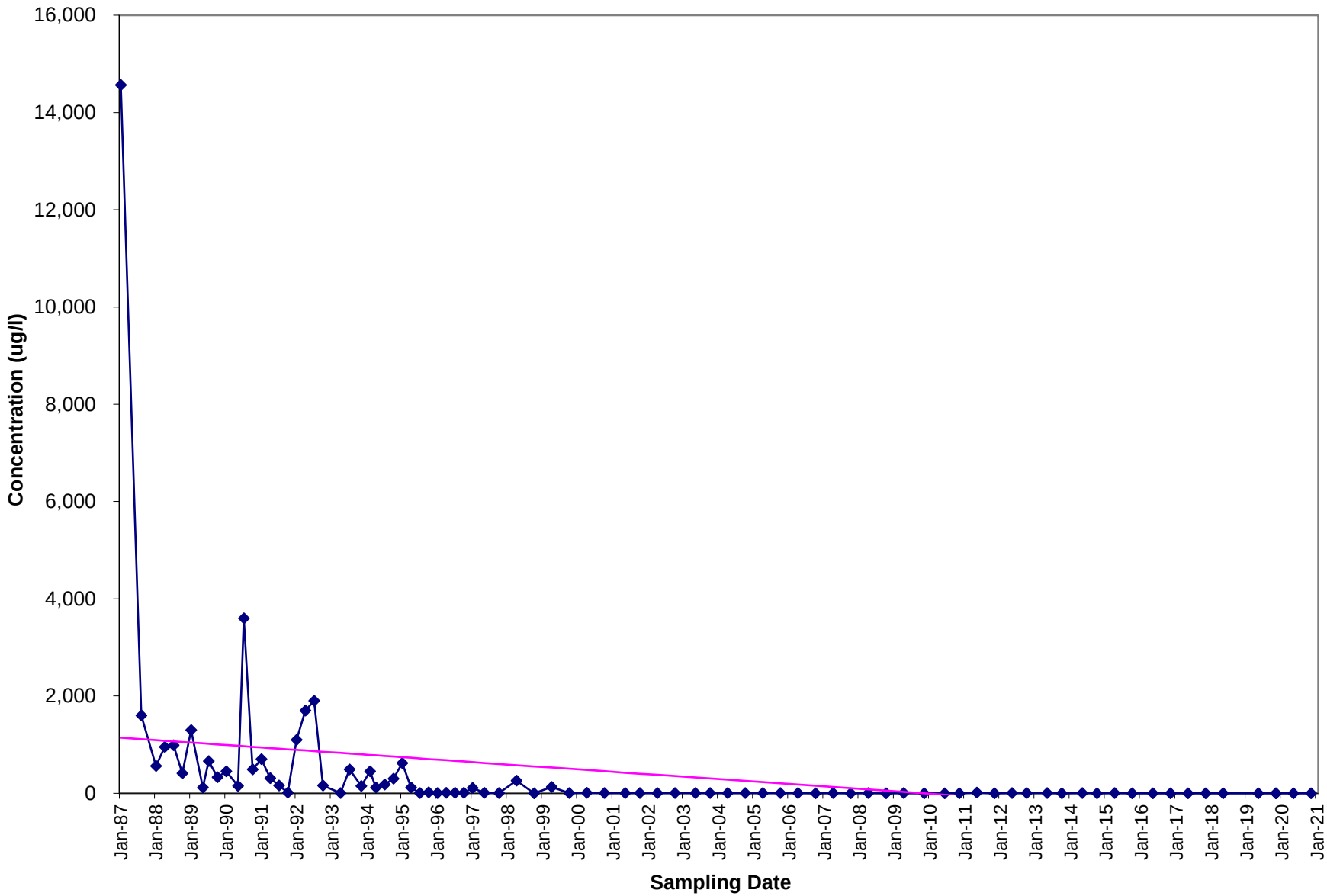
AVNET, INC.
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

TCA CONCENTRATION VS. TIME IN BH-17
HISTORIC LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-6



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC.

FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

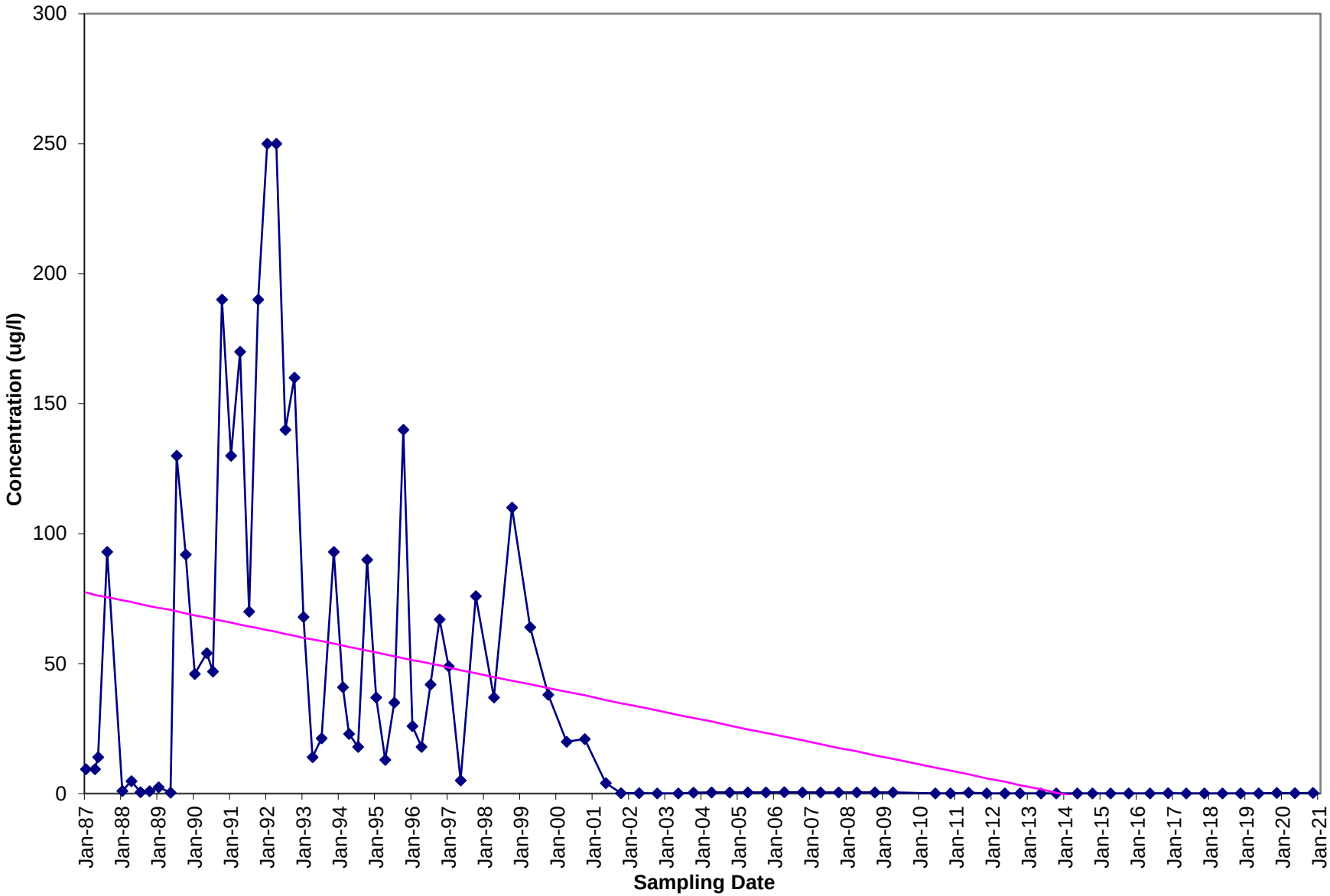
TCA CONCENTRATION VS. TIME IN BH-18

HISTORIC LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-7



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC.

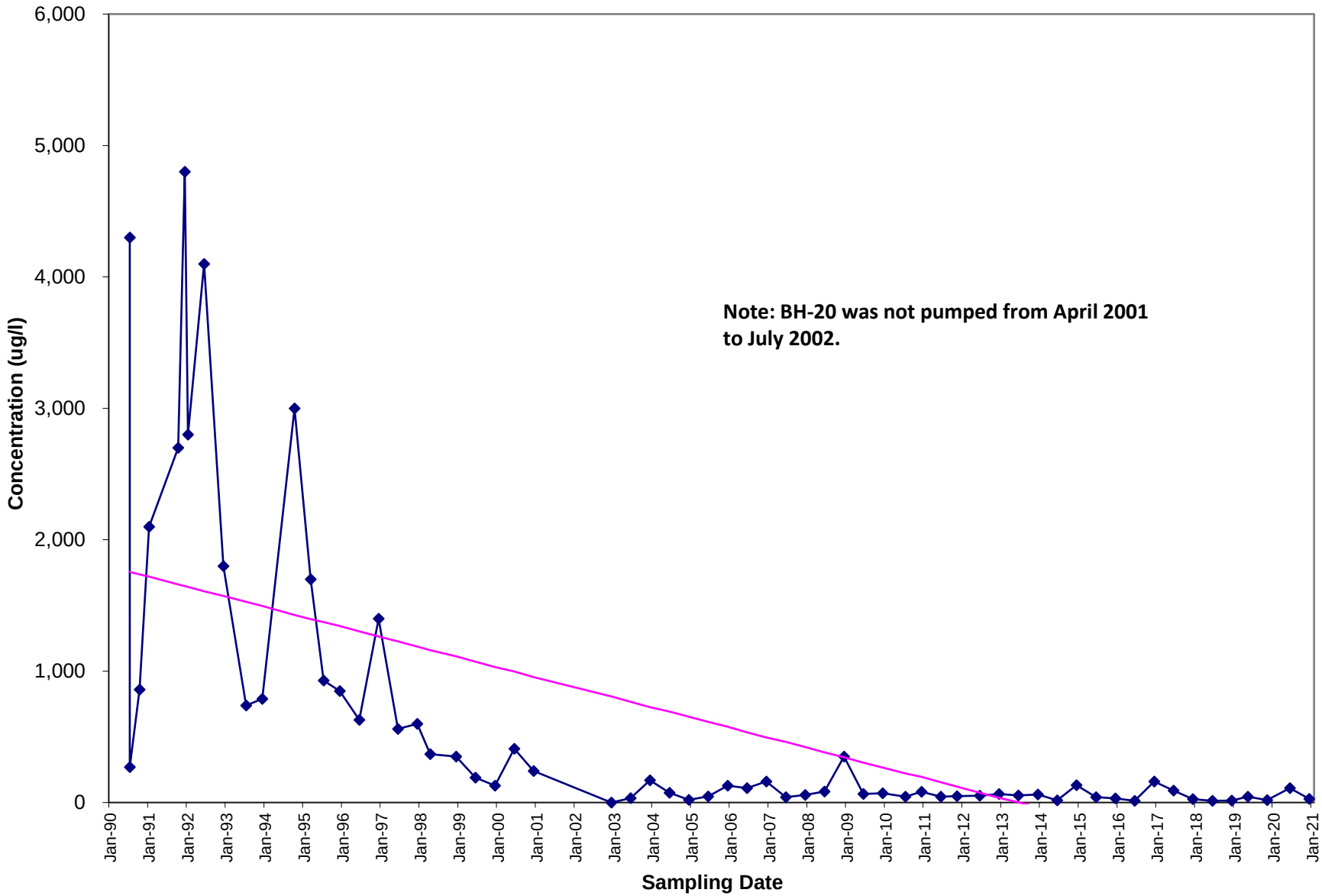
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

TCA CONCENTRATION VS. TIME IN BH-19
HISTORIC LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-8



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC.

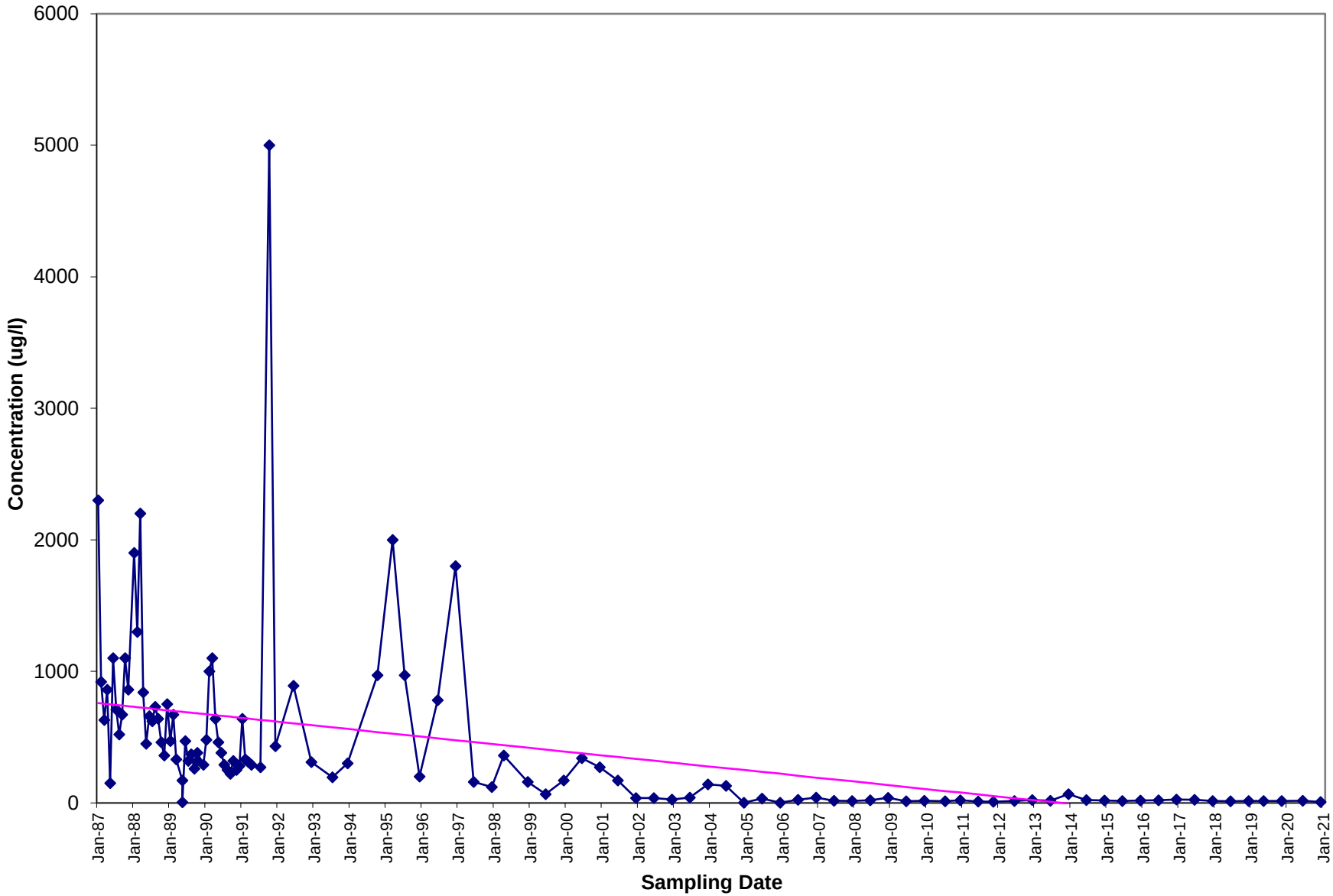
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

TCA CONCENTRATION VS. TIME IN BH-20
HISTORIC LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-9



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC.

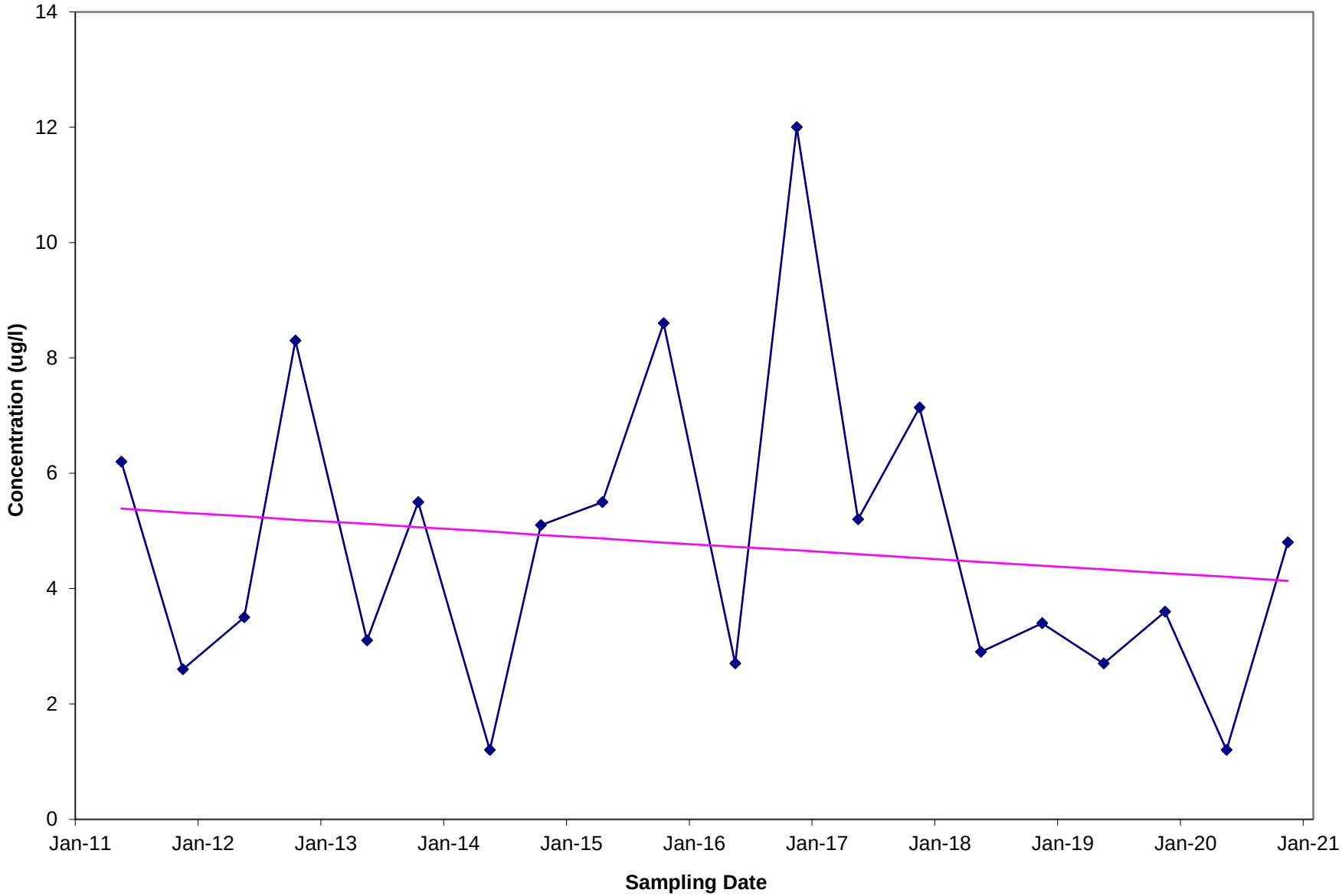
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

TCA CONCENTRATION VS. TIME IN RECOVERY WELL
HISTORIC LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-10



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC

FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

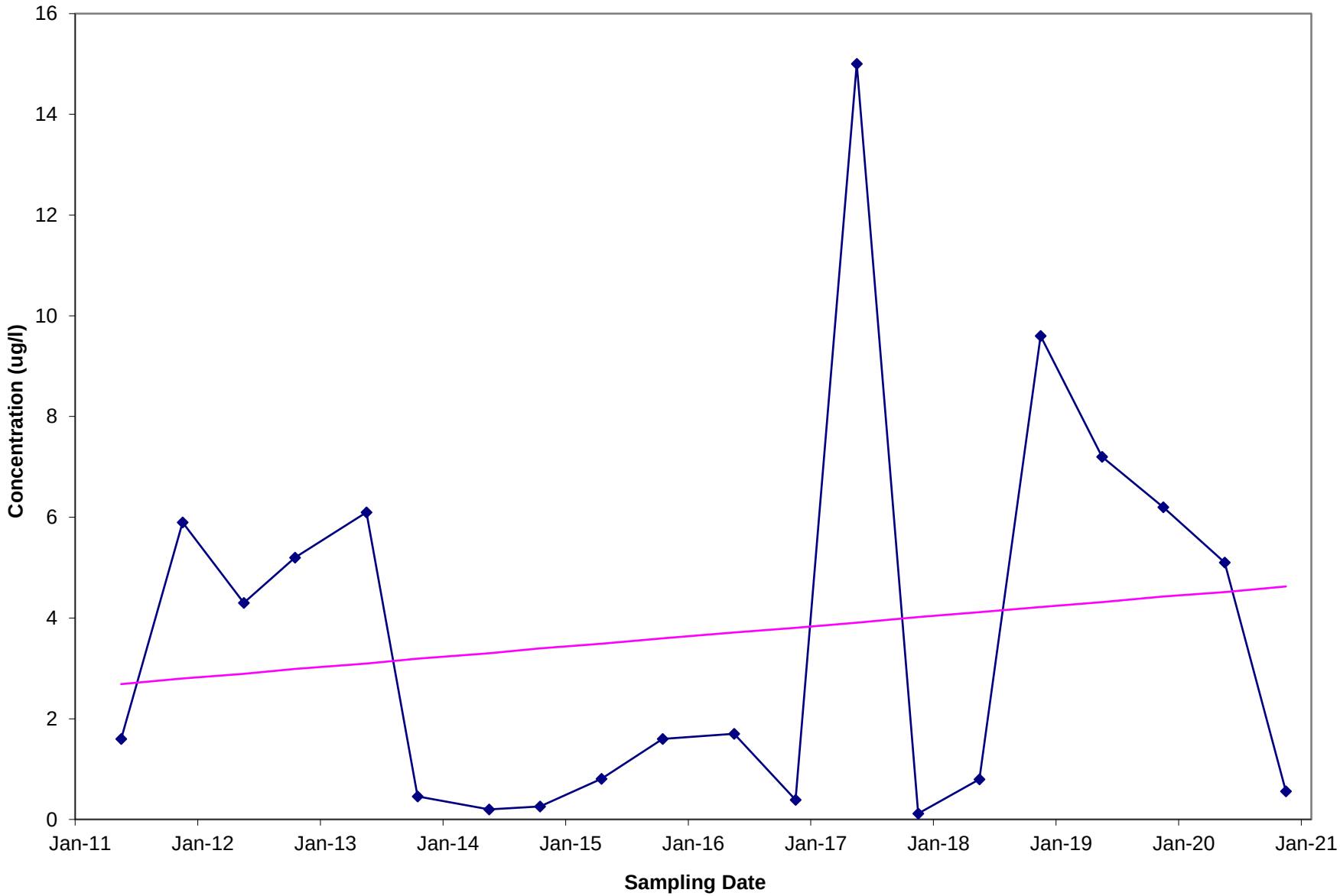
TCA CONCENTRATION VS. TIME IN BH-2

10-YEAR LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-11



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC

FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

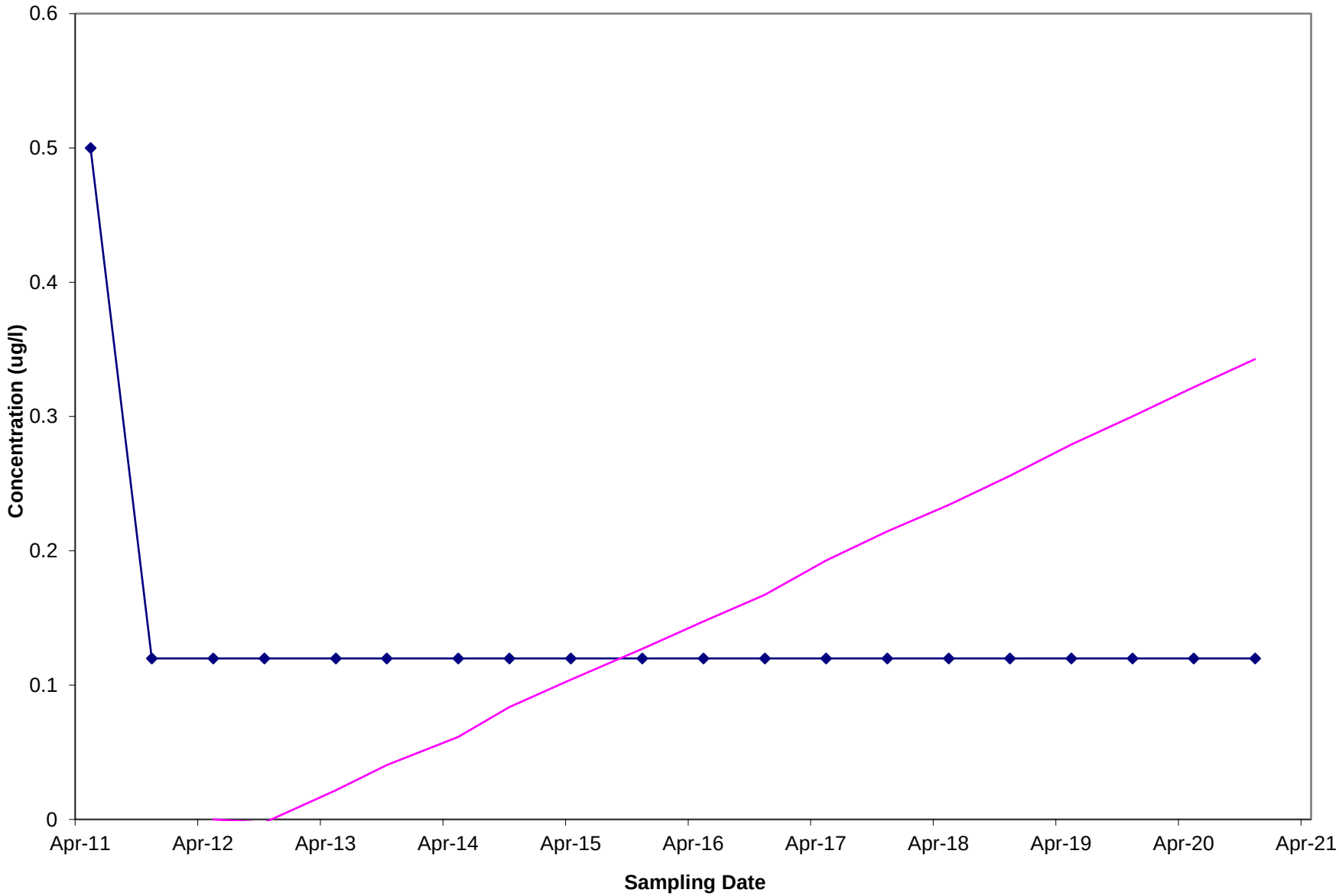
TCA CONCENTRATION VS. TIME IN BH-9

10-YEAR LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-12



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC

FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

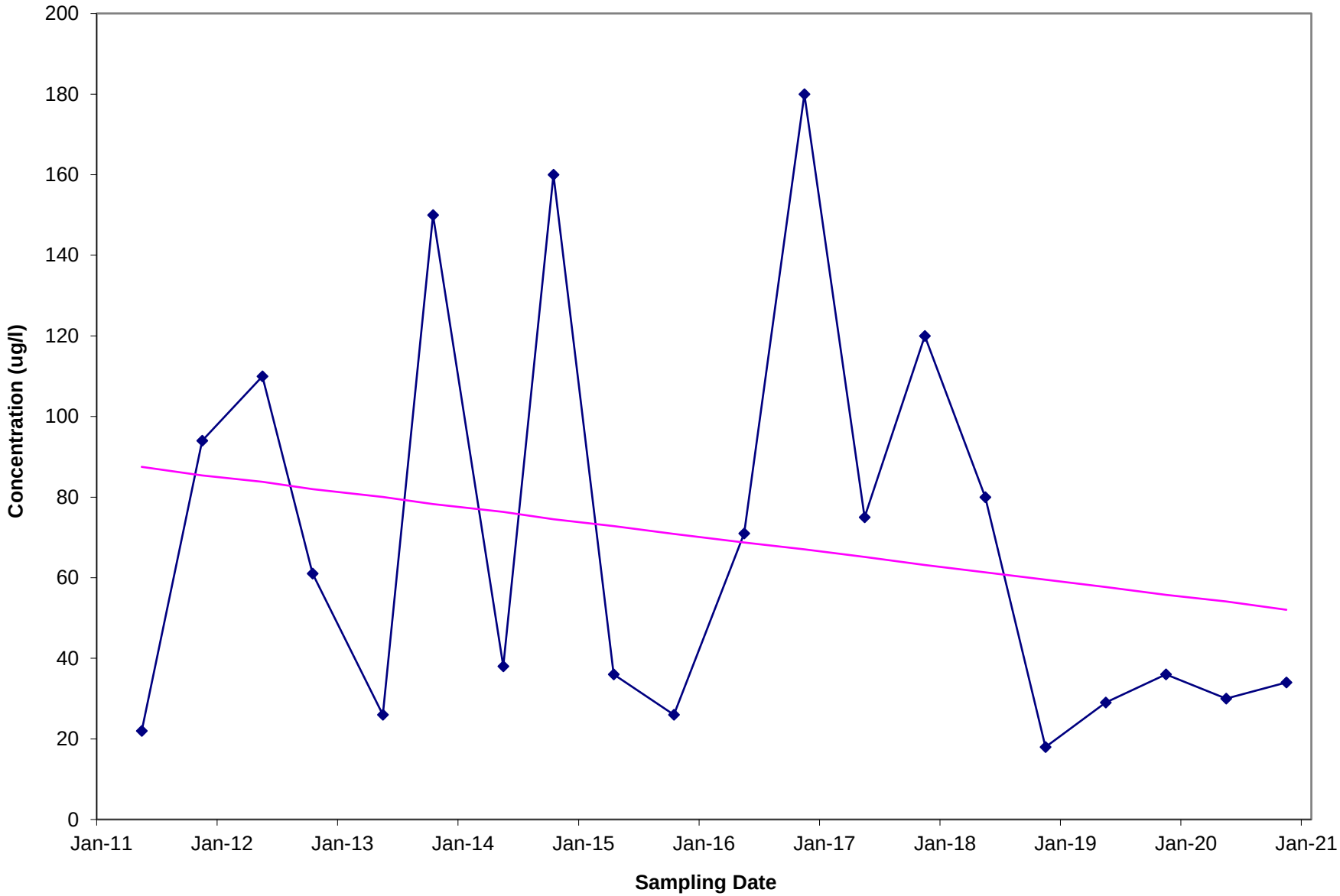
TCA CONCENTRATION VS. TIME IN BH-11A

10-YEAR LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-13



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC

FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

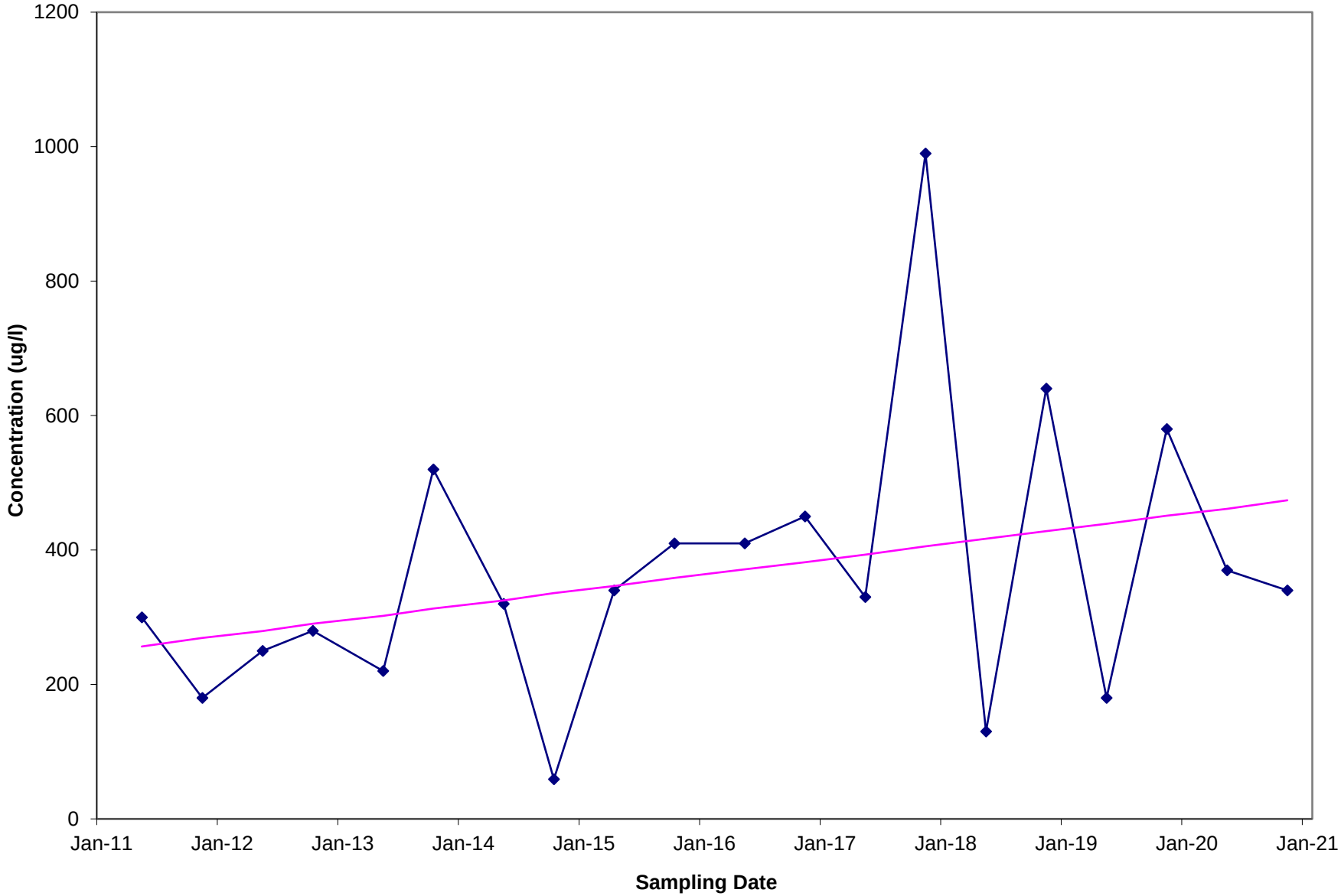
TCA CONCENTRATION VS. TIME IN BH-11B

10-YEAR LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-14



ARCADIS Design & Consultancy for natural and built assets

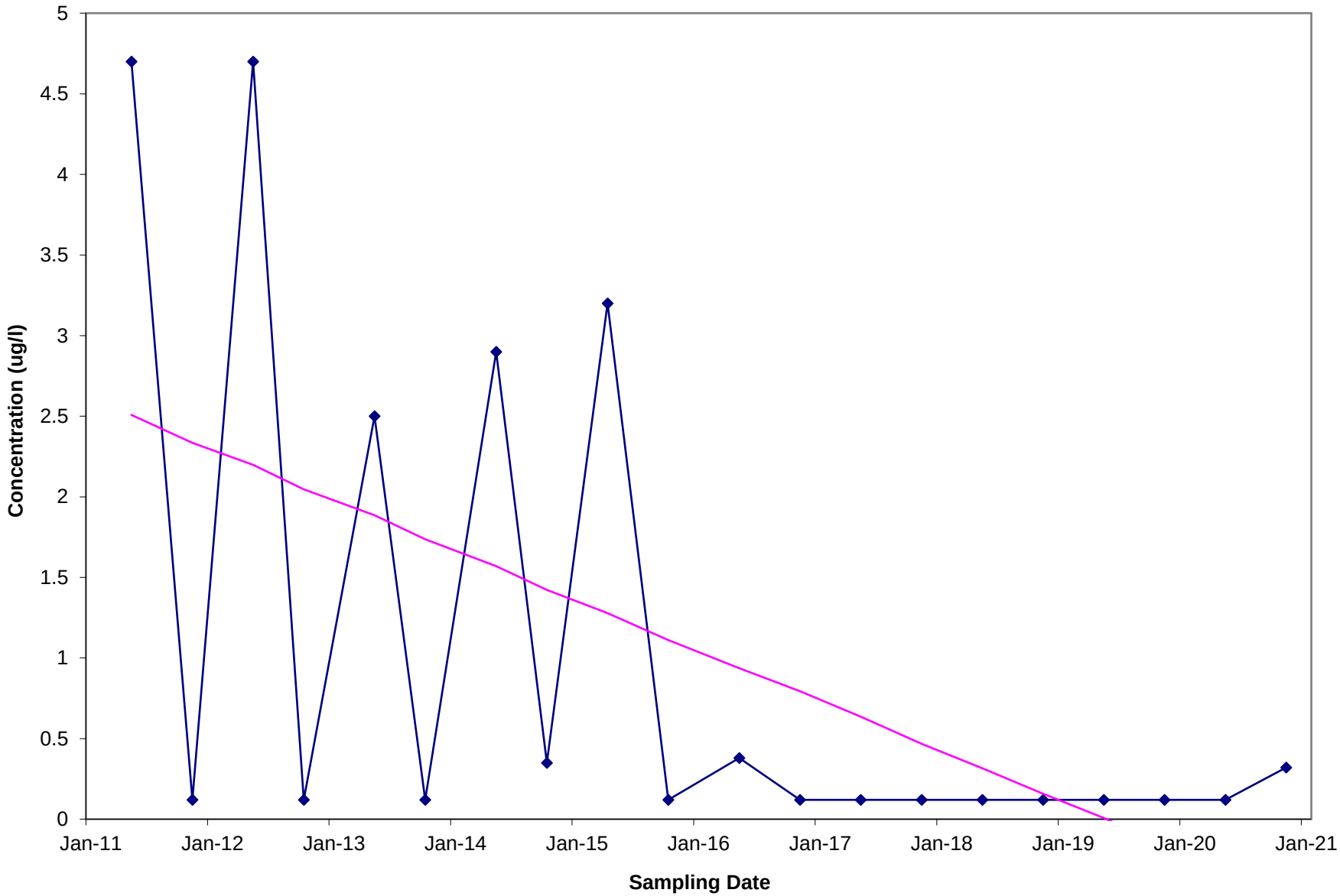
AVNET, INC.
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

TCA CONCENTRATION VS. TIME IN BH-16
10-YEAR LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-15



ARCADIS Design & Consultancy for natural and built assets

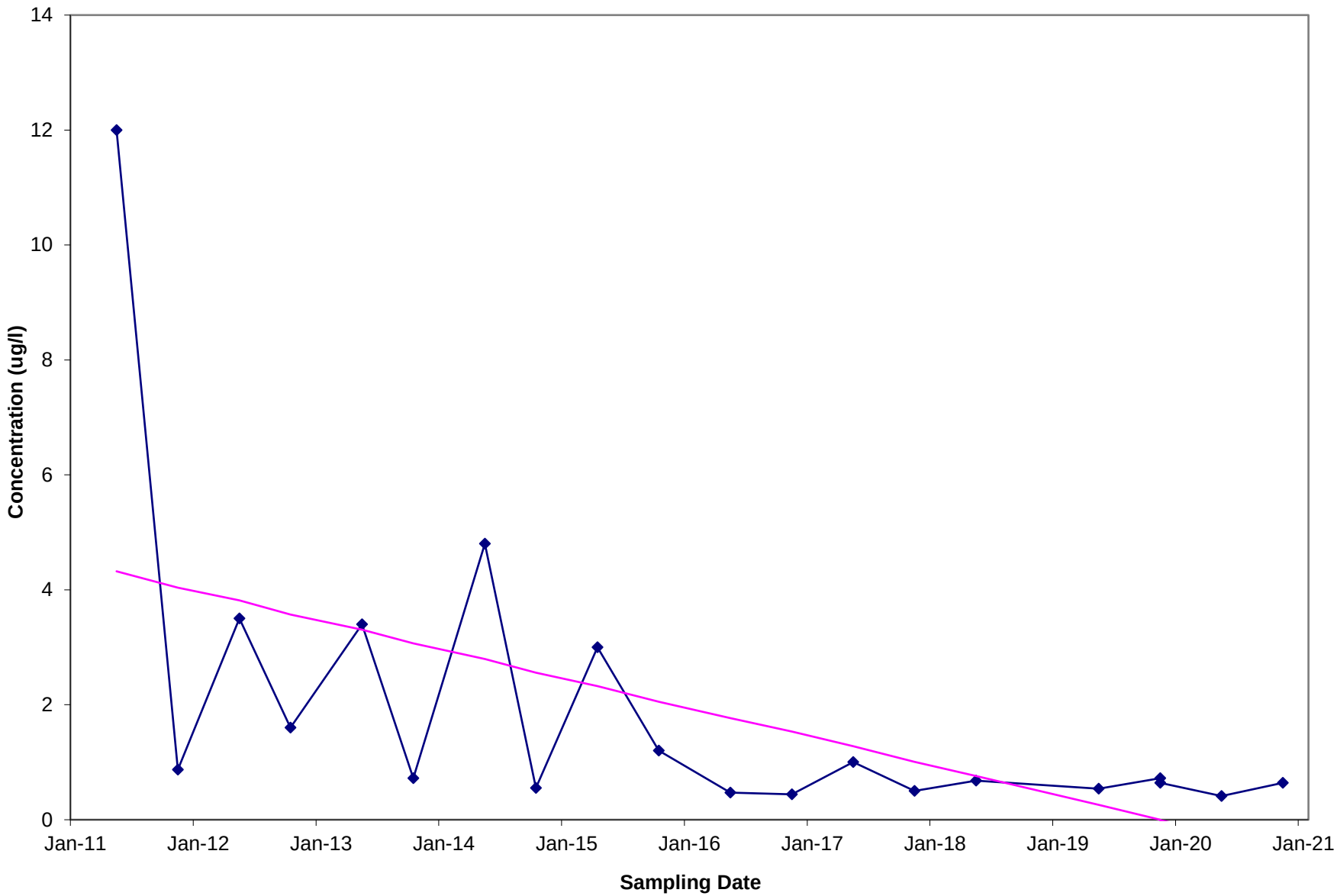
AVNET, INC.
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

TCA CONCENTRATION VS. TIME IN BH-17
10-YEAR LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-16



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC.

FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

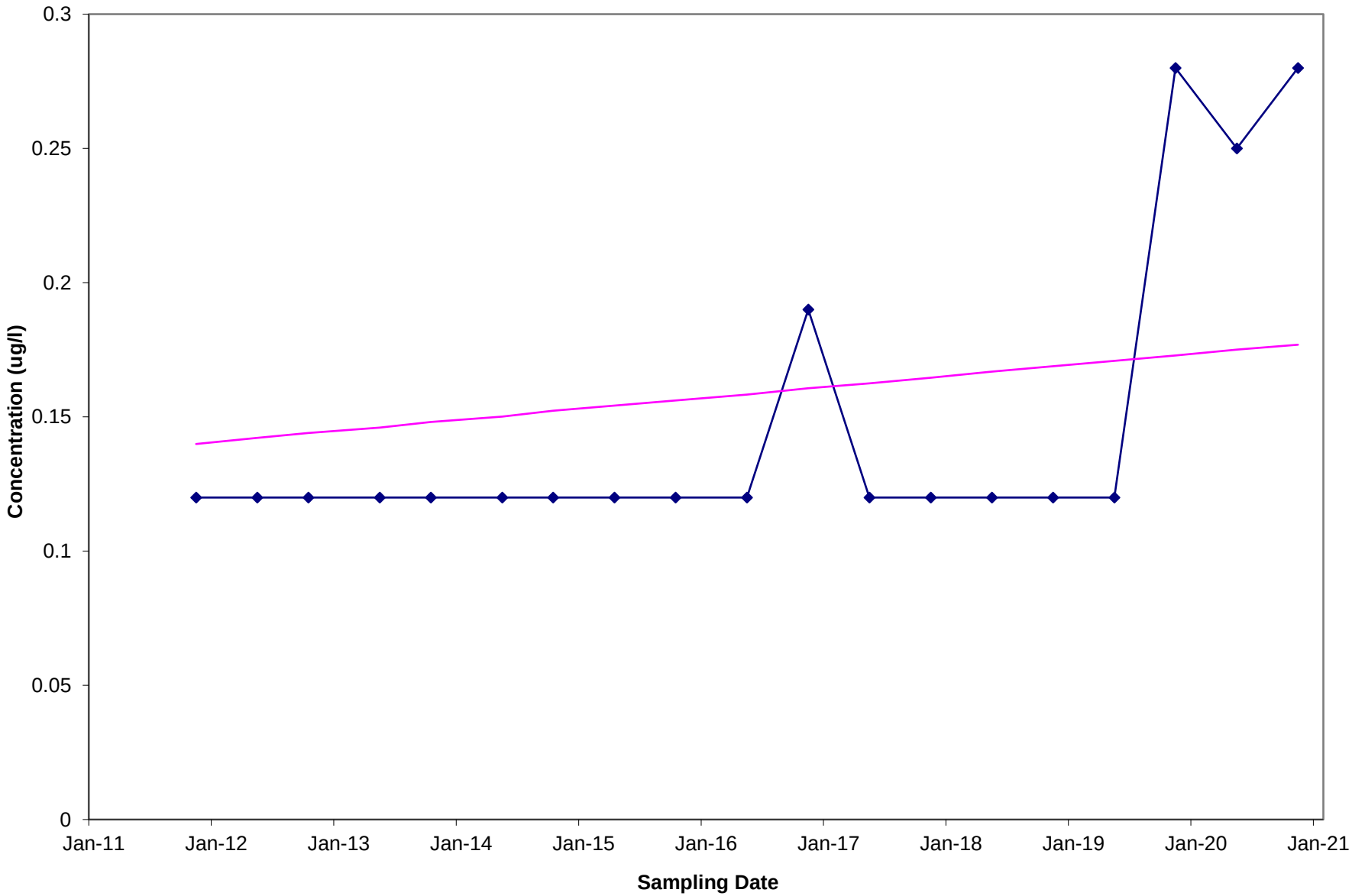
TCA CONCENTRATION VS. TIME IN BH-18

10-YEAR LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-17



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC.

FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

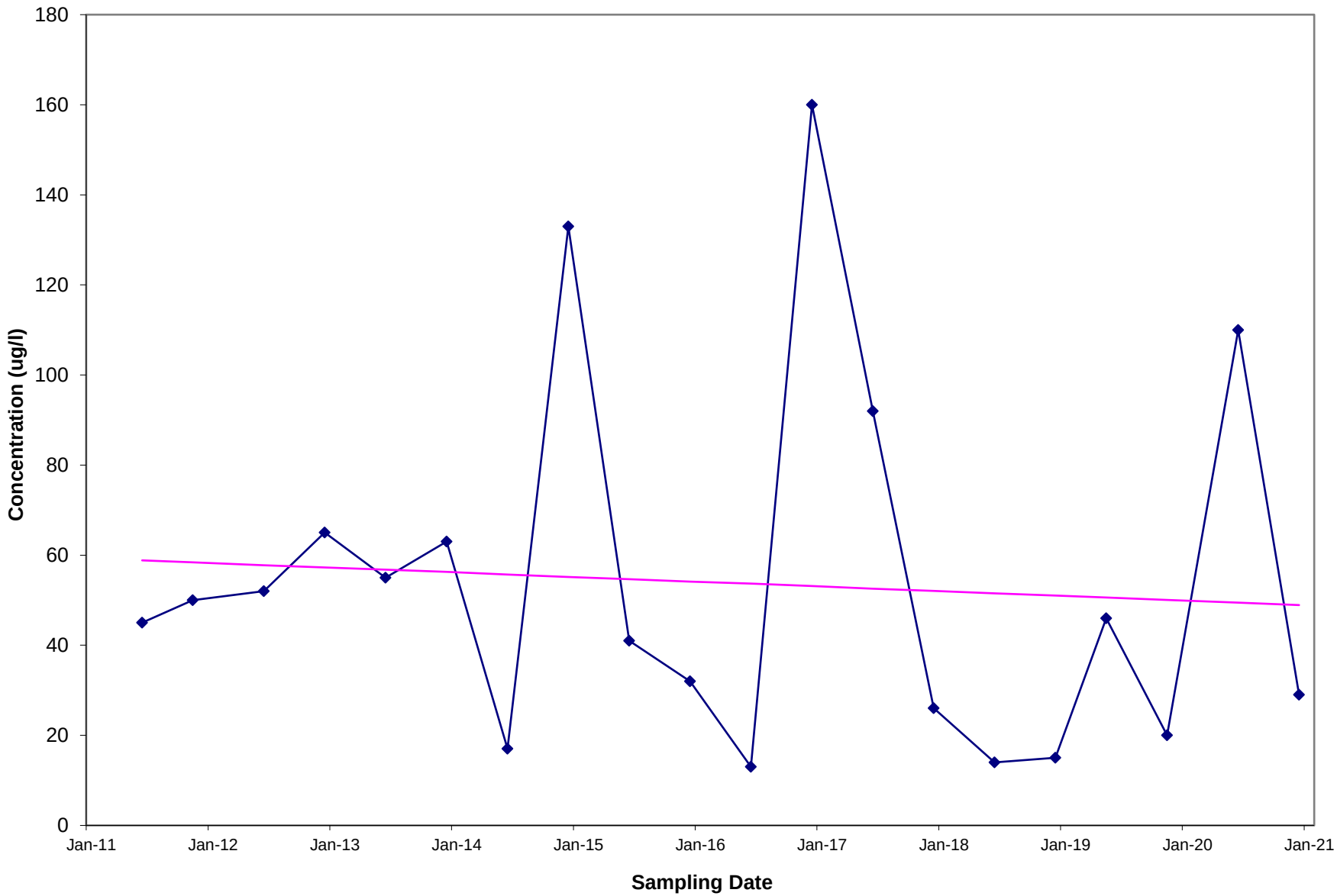
TCA CONCENTRATION VS. TIME IN BH-19

10-YEAR LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-18



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC.

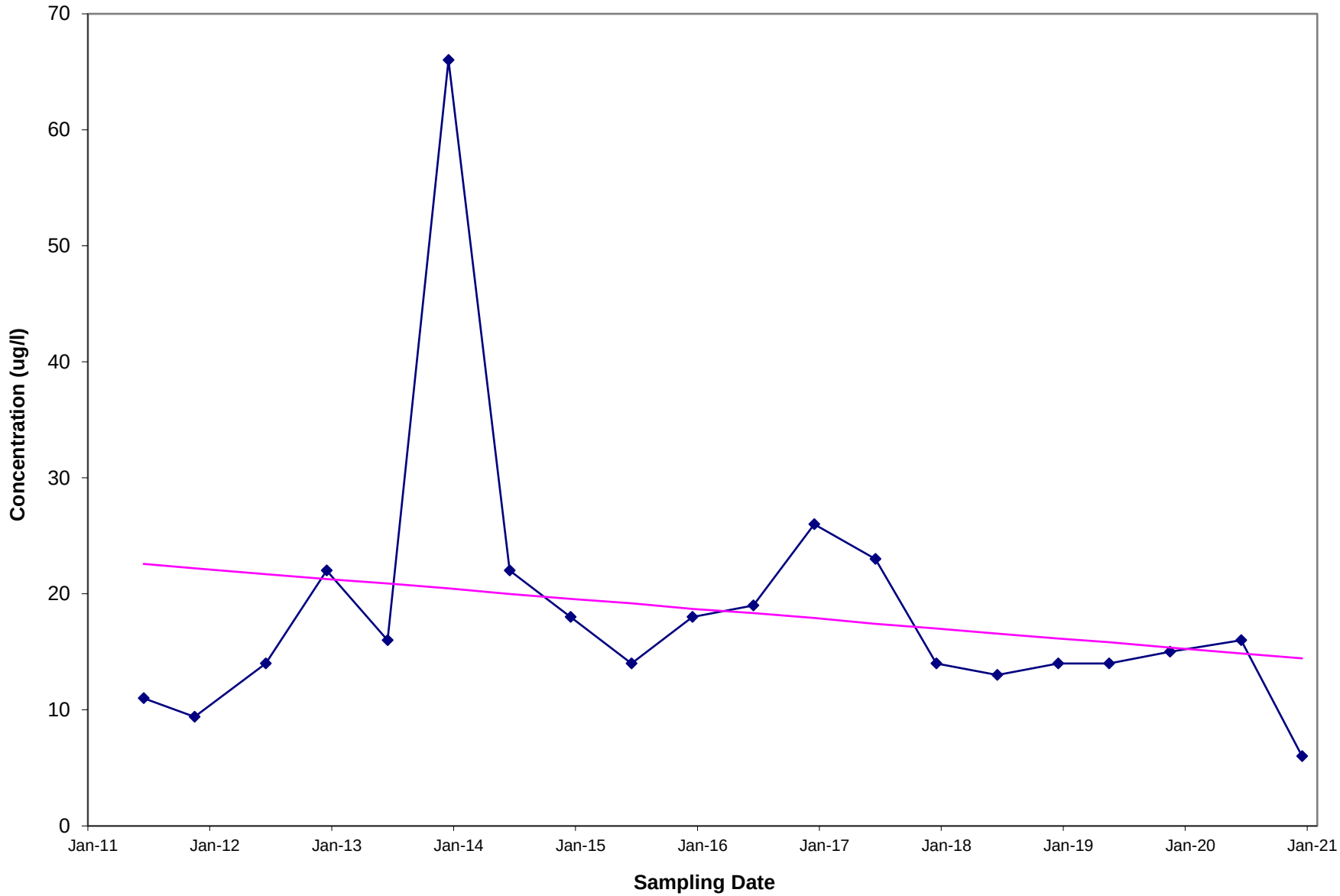
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

TCA CONCENTRATION VS. TIME IN BH-20
10-YEAR LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-19



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC.

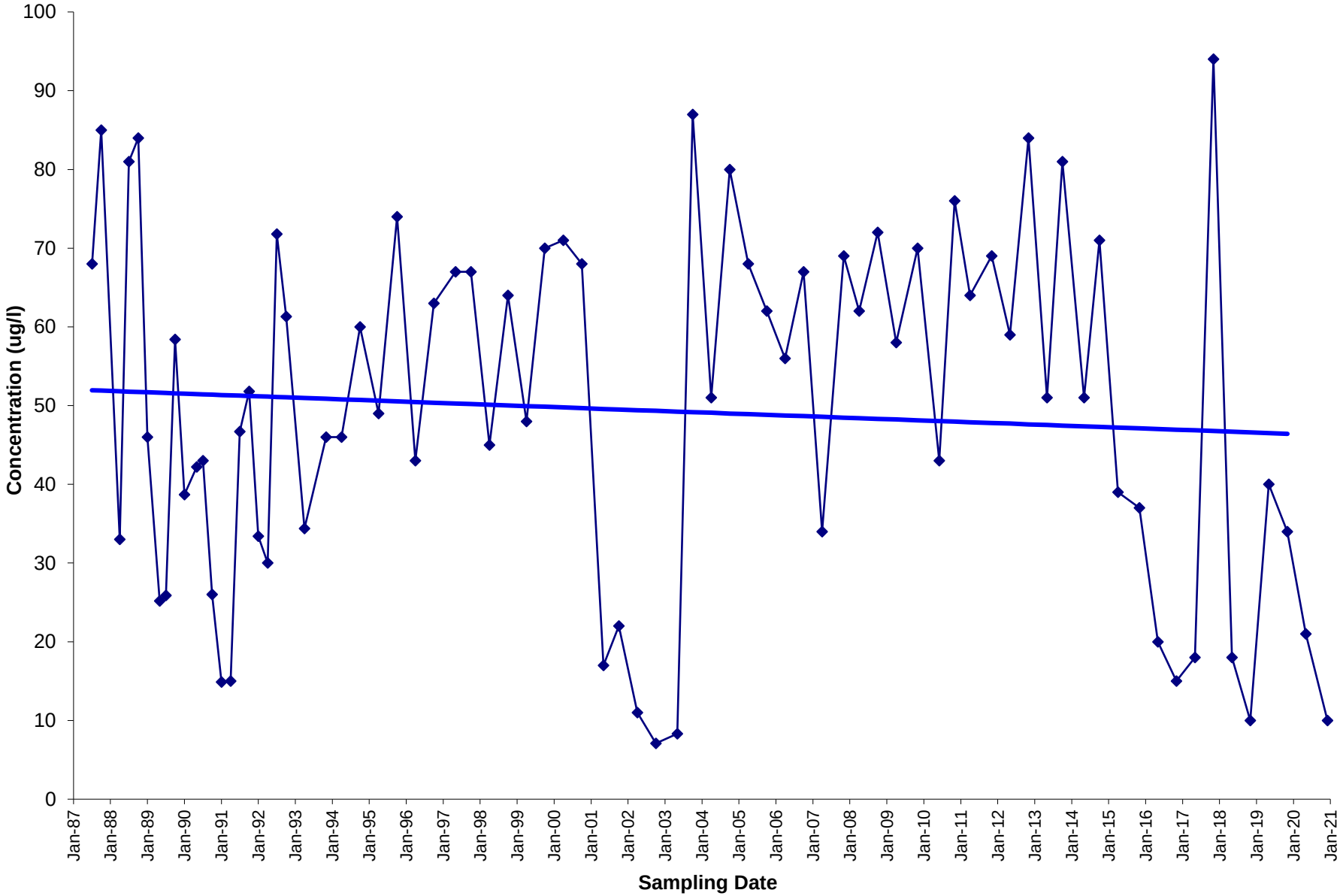
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

TCA CONCENTRATION VS. TIME IN RECOVERY WELL
10-YEAR LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-20



ARCADIS Design & Consultancy for natural and built assets

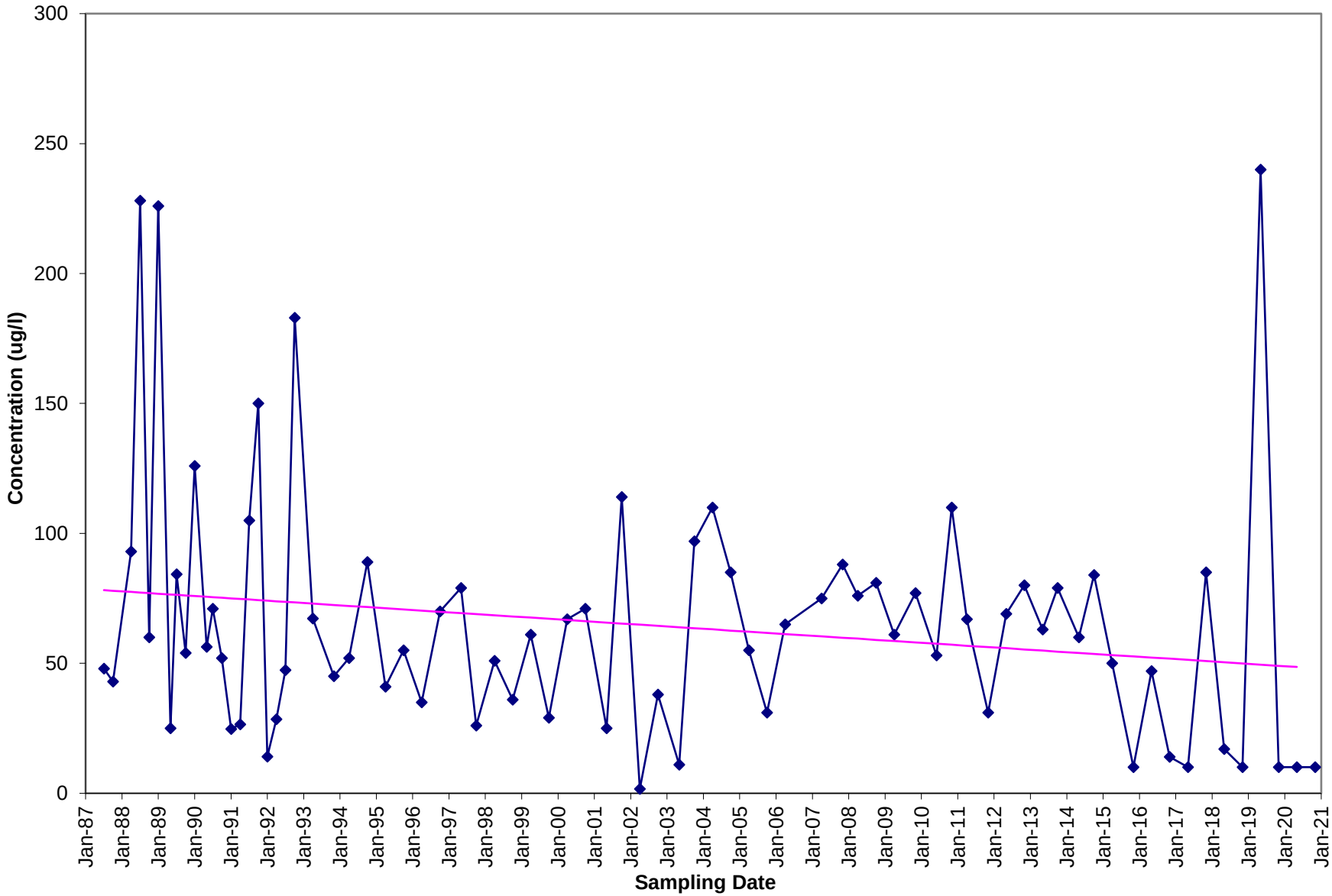
AVNET, INC.
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

DISSOLVED ARSENIC CONCENTRATION VS. TIME IN MW-3
HISTORIC LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-21



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC.

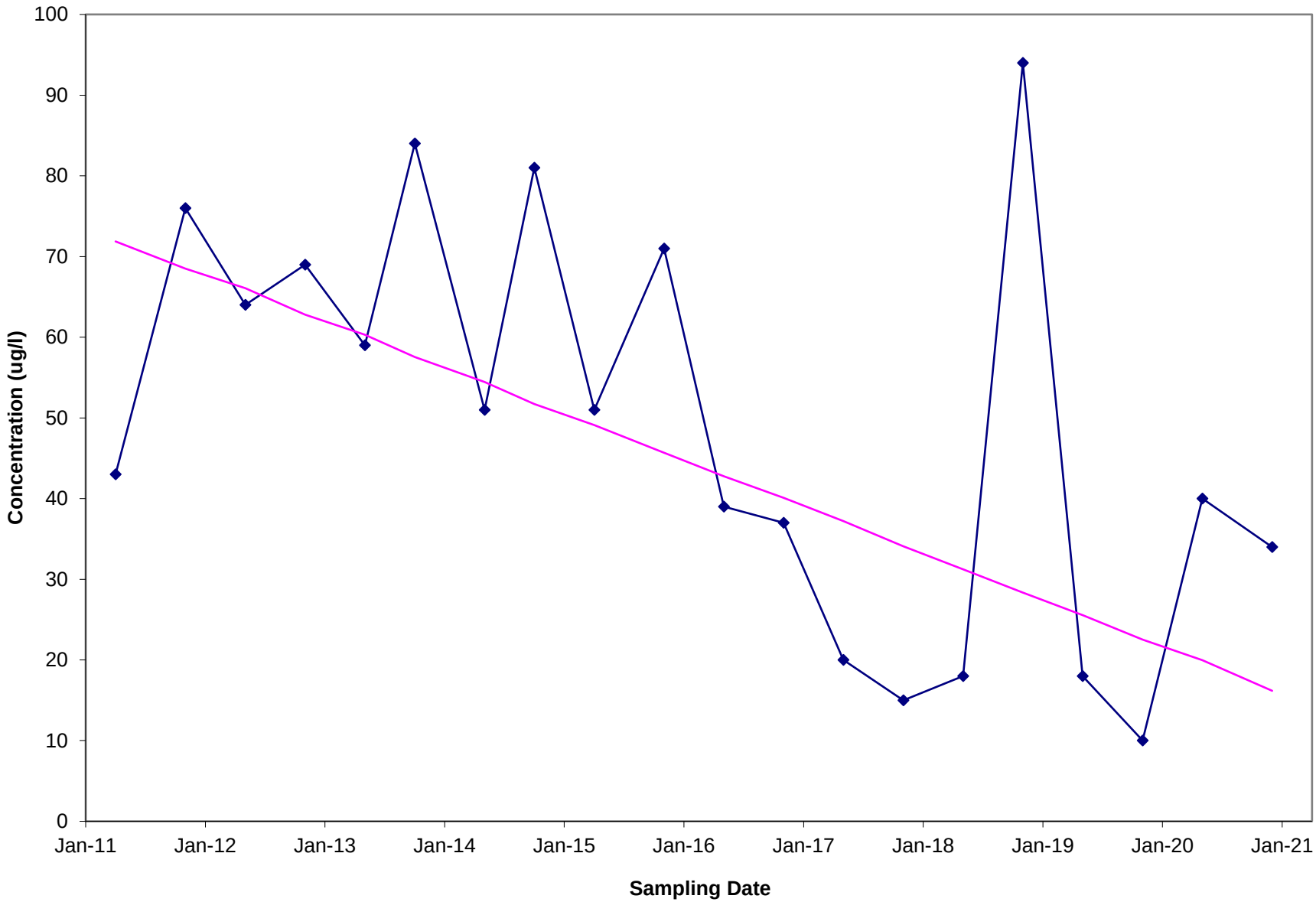
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

DISSOLVED ARSENIC CONCENTRATION VS. TIME IN MW-8D
HISTORIC LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-22



ARCADIS Design & Consultancy for natural and built assets

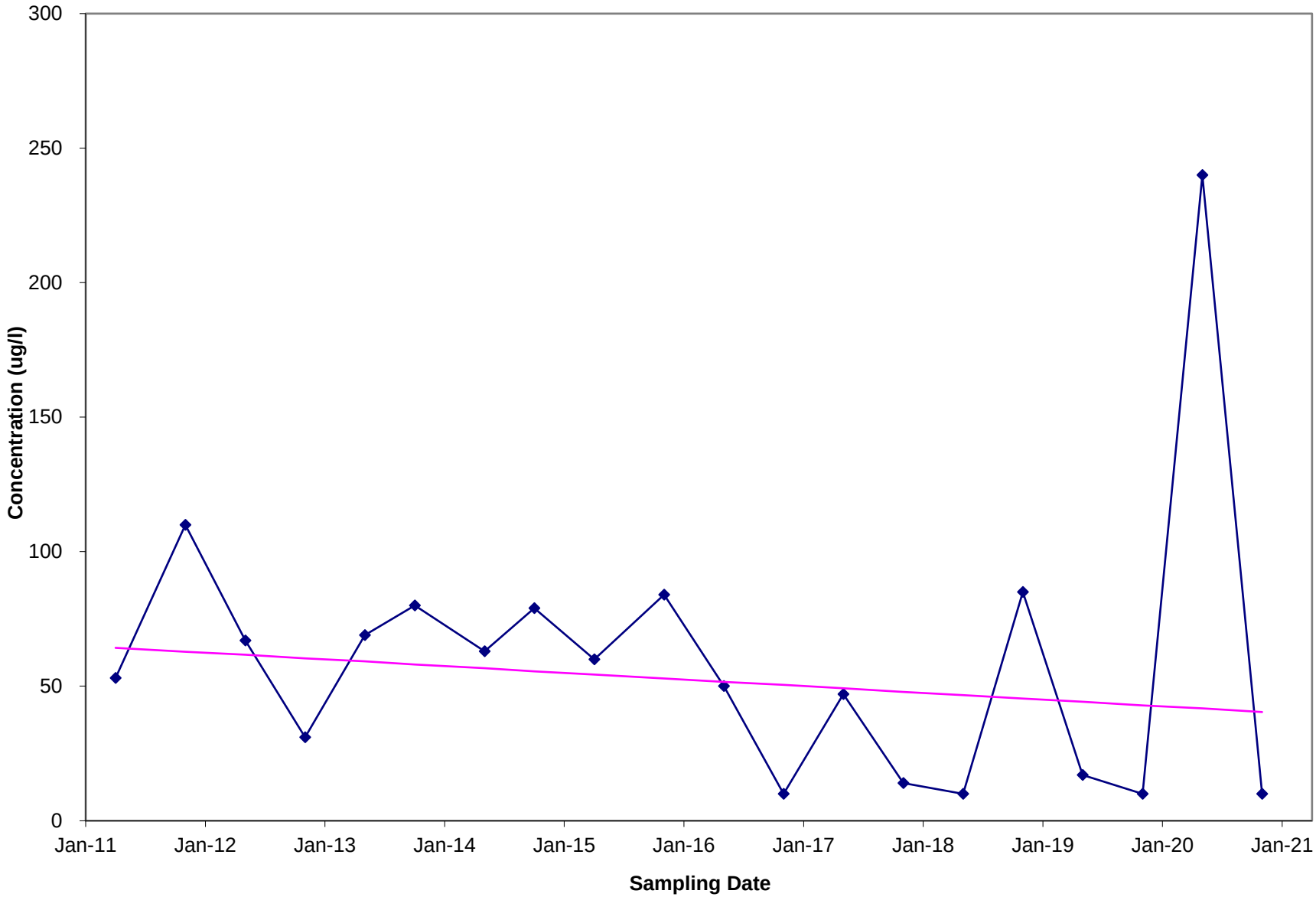
AVNET, INC.
FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

DISSOLVED ARSENIC CONCENTRATION VS. TIME IN MW-3
10-YEAR LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-23



ARCADIS Design & Consultancy for natural and built assets

AVNET, INC.

FORMER CHANNEL MASTER SITE, ELLENVILLE, NEW YORK

DISSOLVED ARSENIC CONCENTRATION VS. TIME IN MW-8D
10-YEAR LINEAR REGRESSION ANALYSIS THROUGH 2020

ARCADIS US, INC.

0395-052-109

FIGURE 4-24

Semi Annual CEMR Report - FIRST HALF 2020

Mr. John Spellman, P.E.
Division of Environmental Remediation
New York State Dept. of Environmental Conservation
625 Broadway
Albany, NY 12233-7014

Arcadis U.S., Inc.
17-17 Route 208 North
Fair Lawn
New Jersey 07410
Tel 201 797 7400
Fax 201 797 4399
www.arcadis.com

Environment

Subject:
Avnet Inc. / Former Channel Master Site, Ellenville, NY
RCRA Corrective Action & Post Closure Consent Order
Index Number: CO 3-20170802-152
Site Number: 356025

Chemical Effectiveness Monitoring Report
Semi-Annual Report for Period January 1, 2020 to June 30, 2020

Date:
August 26, 2020

Contact:
Wyn V. Davies, CIH

Phone:
610.360.4895

Email:
wyn.davies@arcadis.com

Our ref:
00395052.0000

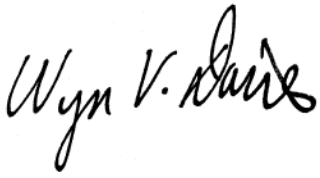
Dear Mr. Spellman:

Enclosed is the semi-annual Chemical Effectiveness Monitoring Report (CEMR) for the former Channel Master site located in Ellenville, NY submitted on behalf of Avnet, Inc. This report covers the January 1, 2020 to June 30, 2020 reporting period and presents a summary of the ongoing 2020 corrective action activity results at the facility through the first half of 2020. The overall summary of the activities for 2020, as well as a statistical evaluation, of all wells will be performed and this annual report will be issued to the NYSDEC late in 2Q2021.

If you have any comments or questions regarding the report, please call me at 610.360.4895.

Sincerely,

Arcadis of NY, Inc.



Wyn V. Davies, CIH
Associate Vice President

Copies:
Darrel Jackson, Avnet Inc., (w/encl.)
Karen Davis, Fox Rothschild LLP

ARCADIS Design & Consultancy for natural and built assets

AVNET Inc. – Former Channel Master Facility

CHEMICAL EFFECTIVENESS MONITORING REPORT

First Half 2020

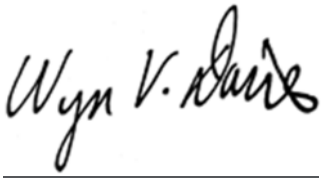
Report Period – January 1 to June 30, 2020

August 2020

CHEMICAL EFFECTIVENESS MONITORING REPORT AVNET/FORMER CHANNEL MASTER SITE, ELLENVILLE NY

First Half 2020

(January 01 to June 30, 2020)



Wyn V. Davies, CIH
Associate Vice President

Prepared for:

AVNET Inc.

Prepared by:

Arcadis of NY, Inc.
17-17 Route 208 North
Fair Lawn
New Jersey 07410
Tel 201 797 7400
Fax 201 797 4399

Our Ref.:

00395052.0000

Date:

August 26, 2020

CONTENTS

TABLES

FIGURES

1 SITE BACKGROUND

Channel Master owned and operated a manufacturing facility in Ellenville, New York until the facility was sold to Imperial Schrade in 1984. Channel Master, which was owned by Avnet Inc. at that time, relocated its operations out of state and agreed to retain responsibility for identified environmental conditions associated with its Channel Master Division at the Ellenville, NY site. In October 1997, Avnet sold its Channel Master Division and again retained its responsibilities associated with its former operations at the Ellenville site, including assuming the role of responsible party in the RCRA Corrective Action & Post Closure Consent Order executed on February 6, 2018.

During its period of operation, Channel Master treated its wastewater in a chemical treatment system within the plant building and in an outdoor surface impoundment (Lagoon) on Channel Master's property. The plant and the surface impoundment were decommissioned under the Resource Conservation and Recovery Act (RCRA) in accordance with Channel Master's approved Closure Plan. Groundwater beneath the building was found to be contaminated with several volatile organic compounds (VOCs), the primary of which was 1,1,1-trichloroethane (TCA), a solvent used in degreasing. A groundwater recovery and treatment system was installed and has been operating since January 1987 to remedy the groundwater contamination beneath the building pad.

In March 1991, the New York State Department of Environmental Conservation (NYSDEC) issued a 6NYCRR Part 373 Post-Closure Permit for the facility (NYSDEC # 3-5156-91/4-0) which was replaced by a RCRA Corrective Action & Post Closure Consent Order executed on February 6, 2018. The post-closure monitoring requirements for the former surface impoundment (lagoon area) and the monitoring and evaluation requirements for the groundwater treatment and recovery system (plant area) are addressed in the Consent Order. The corrective action was also covered by a HSWA permit (#NYDO42457788, issued by the United States Environmental Protection Agency [USEPA] in May 1991 which has been managed by NYSDEC and continues to be covered by the RCRA Corrective Action & Post Closure Consent Order executed on February 6, 2018.

2 CHEMICAL EFFECTIVENESS MONITORING PLAN - PROGRESS SUMMARY

Channel Master developed a Chemical Effectiveness Monitoring Plan (CEMR) to assess the effectiveness of the corrective action program and has been incorporated into the RCRA Corrective Action & Post Closure Consent Order executed on February 6, 2018. The purpose of the plan, as described in the permit, is to determine the rate of groundwater cleanup and verify that groundwater elevation gradients are being maintained toward the recovery well. To satisfy these objectives, the plan proposed use of water quality and water level data collected from the

recovery well and eight monitoring wells (BH-1, BH-2, BH-9, BH-11A, BH-11B, BH-16, BH-18, and BH-19) located formerly inside[1] the plant building (see Figure 3-1A).

Earlier evaluations of the effectiveness of the corrective action concluded that pumping the recovery well is effectively removing contaminants from the groundwater. However, during the period of time from 1989 to early 1992, monitoring well BH-19 had shown an increase in the concentration of TCA, which is used as the indicator parameter in this assessment. From 1993 to 1999, TCA concentrations in BH-19 generally followed a cyclical pattern before beginning a steady decrease in 1999. This monitoring well is located approximately ten feet from the recovery well and is screened deeper (41 to 51 feet below grade) than the others in the network, including the recovery well. To investigate the possibility of induced downward migration of contaminants, Channel Master proposed collecting analytical data from well BH-17 for at least one year. BH-17 is screened deeper than most wells at the site (from 22 to 32 feet below grade) and is located in the area of greatest groundwater contamination. As proposed in the evaluation report, groundwater from BH-17 is being analyzed instead of BH-1 (which was originally part of the monitoring network) for comparison to groundwater data obtained from the other deep wells and to determine the significance of the earlier increase detected at BH-19. Although deep well BH-13 was also sampled during both semiannual sampling rounds in 2000 and 2001 to provide additional data on the deeper groundwater under the plant (as requested by the NYSDEC in its letter to Avnet dated January 18, 2000), the NYSDEC discontinued the requirement to sample BH-13 in 2002, since no significant concentrations of TCA were detected there in the four sampling rounds.

In September 1991, Channel Master began pumping an additional recovery well (BH-20) inside the plant building. Screened to a depth of 24.5 feet, BH-20 was installed in July 1990 approximately 70 feet west (upgradient) of the existing recovery well. At the time, this was near the area of greatest groundwater contamination. Pumping of BH-20 ceased in April 2001 because of mechanical difficulties with the well screen and pump. Because of the historically low recovery obtained at this well (less than 5 pounds of TCA had been removed from BH-20 since December 1996) and the fact that the area of greatest contamination is now much closer to the main recovery well, this did not have a significantly adverse impact on the effectiveness of the groundwater treatment system. Nonetheless, BH-20 was rehabilitated during the annual maintenance of the recovery well and associated piping in July 2002, at which time the pumping of BH-20 recommenced. BH-20 was not included in the Chemical Effectiveness Monitoring Plan because it was not being operated at the time the plan was developed; however, the results of pumping this well are evaluated in this report.

In a letter dated January 18, 2000, Gary Casper of the NYSDEC directed Avnet to sample deep well BH-13 in April and October 2000 to further evaluate the conditions in the deep groundwater in the plant area. Neither sample contained contaminants exceeding NYSDEC groundwater quality standards. At the request of the NYSDEC, Avnet sampled BH-13 again in May and October 2001. As indicated in the semiannual groundwater monitoring report for the May 2001

[1] In April 2016, the former manufacturing building demolition was completed while maintaining the integrity of the building slab (the well structures are no longer “inside” the building). No substantial changes to the corrective action area or groundwater flow is anticipated.

sampling round, the groundwater elevation measured at BH-13 was more than 5 feet lower than the elevations measured at deep wells BH-11A, BH-17, and BH-19, indicating that BH-13 is to some degree hydraulically downgradient of the other deep wells. Therefore, because the groundwater sample from deep well BH-13 contained only 0.39 micrograms per liter (µg/l) of TCA (significantly less than the concentrations found in the other deep wells), it appears that TCA is not migrating laterally to a significant degree in the deep groundwater. Because TCA was not detected above its groundwater quality standard (GWQS) in BH-13 during any of the four sampling events in 2000 and 2001, the NYSDEC agreed to discontinue sampling BH-13 starting in 2002.

In the third and fourth quarters of 2015 and first quarter of 2016, the current site owner (AmTrust Realty) performed a demolition of the former Channel Master manufacturing buildings. The demolition activities removed all above ground structures and maintained the integrity of the building floor/pad to avoid potential issues of disrupting the groundwater flow patterns as well as the effectiveness of the groundwater recovery and treatment system. Arcadis monitored the progress of the demolition work to assure no disturbance of the well structures or the creation of infiltration pathways within the building pad occurred during the performance of the work. The relocation of the groundwater treatment system and the establishment of a new operational center on the building pad between the recovery well and BH-20 were performed in a manner that averted operational shutdowns beyond Post Closure requirements for the former Channel Master Site.

3 EVALUATION

3.1 Influence of Pumping on Groundwater Flow

Groundwater elevations were measured in the monitoring wells associated with the former plant building on May 4, 2020. These measurements were used to generate a groundwater contour map (see Figure 3-1) and to evaluate the current efficacy of the hydraulic control. Before pumping of the recovery well began in 1986, groundwater contours indicated flow generally toward the east. These contours were relatively parallel and straight. The current significant bending of the contour lines around the Recovery Well indicates that groundwater beneath the former plant building concrete slab is drawn toward the pumping well. The groundwater contours also support the impact of BH-20 on the groundwater flow to this intermittent groundwater recovery operation. Groundwater from the area surrounding the most highly contaminated groundwater shallow monitoring wells BH-11B and BH-16 also indicate flows toward the recovery well and BH-20 respectively. Therefore, the results of the current semi-annual groundwater elevation event support the goals of the CEMR in maintaining the efficacy of hydraulic control with the recovery wells. Additionally, there continues to be no groundwater flow disturbances/impacts related to the demolition of the building structure for the well structures installed beneath the former building floor slab through this semi-annual monitoring period.

3.2 Quantities of TCA Recovered and Associated Removal Rates

As discussed in the Chemical Effectiveness Monitoring Plan, 1,1,1-trichloroethane (TCA) has been detected in the monitored wells during every sampling event and consistently occurs at higher concentrations than other parameters. Therefore, TCA has been used in the semi-annual assessments (and found historically acceptable to the NYSDEC) as the indicator of contamination beneath the former plant building and the site. TCA concentrations in the recovery well have been monitored since 1986, prior to implementation of the corrective action program. TCA concentrations in BH 20 have been monitored since installation of that well in July 1990.

TCA concentration data on the recovery well are presented in Table 2-1, and the TCA concentration data for recovery well BH 20 are presented in Table 2-2.

To estimate the mass of TCA recovered from the recovery well and from BH 20, the concentration of TCA in the groundwater was multiplied by the volume of water pumped during the period between that sampling date and the preceding sampling date. The volume of groundwater pumped from the wells is recorded weekly. The following equation was used:

Mass of TCA pumped (lb.) = C•V•K

Where C = Concentration of TCA, in µg/l;

V = Volume of groundwater pumped, in gallons; and

K = Conversion factor: 8.34x10 9 (liters H_2O)(lb. TCA)/(gallons H_2O)(µg TCA)

Estimates of the mass of TCA recovered from each well since the start of pumping are presented in Table 2-1 and Table 2-2. The total amount of TCA removed by the Recovery Well and BH-20 through June 30, 2020 is approximately 867.1 pounds.

The removal rates are variable because of variability in both the concentrations and pumped volumes. The estimated average TCA removal rate from pumping the recovery well during the period covering January 1 to June 30, 2020 was approximately 0.0019 pounds per day (0.40 pounds total for the First Half of year 2020). The estimated average TCA removal rate from BH 20 during the same period was approximately 0.00027 pounds per day (0.057 pounds total for the First Half of year 2020).

4 DETERMINATION OF WATER QUALITY TREND

4.1 Historical

Avnet has evaluated groundwater data from the sampled monitoring wells as part of the corrective action program to assess the impact of TCA removal on groundwater quality beneath the plant's former building slab. Although the permit originally required the sampling of eight monitoring wells (BH-1, BH-2, BH-9, BH-11A, BH-11B, BH-16, BH-18, and BH-19), concentrations of TCA have been monitored in ten wells since 1986. Of the eight wells initially required to be sampled, six wells (BH-1, BH-2, BH-9, BH-11B, BH-16 and BH-18) are approximately 20 feet deep and monitor the shallow water table, while the other two wells (BH-

11A and BH-19) monitor deeper zones of the water bearing formation and are 38 and 51 feet deep, respectively. A third deep well, BH-17, is 32 feet deep and is also used to monitor the deeper zone. Prior to October 1991, this well was only sampled twice, in September 1985 and August 1986. The well is now being sampled instead of BH-1 to investigate the possibility of downward migration of contaminants as discussed in the previous section. In addition, the NYSDEC directed Avnet to sample deep well BH-13 in April and October 2000 and in May and October 2001 to provide additional information on the deeper groundwater under the site. The sampling of BH-13 was discontinued in 2002, as agreed to by the NYSDEC. The locations of these wells are shown on Figure 3-1A.

Water quality data collected before the start of the corrective action program were used to determine the average background concentration of TCA in the monitoring wells. Generally, two or three values are available from each well, as shown on Table 2-3. The concentrations measured at each well vary considerably, sometimes by as much as two orders of magnitude. Therefore, the estimates of background concentrations have a high degree of error associated with them.

In the case of several monitoring wells, samples collected shortly after installation (1985-1986, before the pumping and treating system began operating) contained the highest TCA concentrations recorded in those wells. This is particularly evident in the samples collected from BH 11A, BH-11B, BH-16, BH-18, and BH-17 (although one sample from BH-17 collected in 1998 contained the highest TCA concentration ever recorded for that well). The contaminants may have mobilized from the unsaturated soil during well installation; therefore, the concentrations detected may not represent what was present in the groundwater, and the calculated background concentrations may be overestimated.

Trends in water quality can be determined from historic data collected since the start of the corrective action program as presented in Table 2-4. Table 2-4 reveals a significant groundwater quality reduction trend of TCA in shallow wells decreasing in three orders of magnitude since pumping began [Especially evident in wells BH11B and BH-16].

Annual average TCA concentrations in deep well BH-19 have been generally decreasing since 1992, with the annual averages for the years 2002-2018 being the lowest ever. No sample from BH-19 has exceeded the NYSDEC GWQS for TCA (5.0 µg/l) since October 2000, and TCA has been detected in BH-19 above its laboratory reporting limit (generally 1.0 µg/l) only three times since April 2003. The annual average TCA concentration in deep well BH-17 peaked in 1998, and although the TCA concentration has tended to fluctuate somewhat since sampling of BH-17 began in 1991, TCA has been detected in BH-17 above its GWQS on only two occasions since October 2003. TCA concentrations in the other wells have been generally decreasing since 1987 as shown in Table 2-4.

The addition of one data point to the existing set of data is generally not sufficient to create a significant change in the linear regression analyses. Accordingly, the NYSDEC agreed that these analyses may now be performed on an annual basis and submitted with the Annual Report.

4.2 Current Monitoring Data Results

The results of the TCA monitoring for the First Half of 2020 are presented in Table 2-4.

An iso-concentration map was constructed using the TCA concentrations in the five shallow groundwater samples collected in May 2020, as shown on Figure 3-2. Although the isopleths themselves should not be considered exact, the patterns on this map indicate that the area of highest contamination is near BH-11B (30 µg/l) and BH-16 (370 µg/l).

These results confirm that the recovery well is positioned near the area of greatest groundwater contamination and requires no modification to the goals of the Chemical Effectiveness Monitoring Plan.

5 CONCLUSIONS AND RECOMMENDATIONS

Water quality and water level data collected from the shallow wells located beneath the pad of the former plant building indicate that pumping the recovery well continues to remove contaminants from the groundwater. Groundwater quality in monitoring wells BH-11B, BH-16, and BH-18, historically three of the most contaminated shallow wells, has improved significantly as a result of the pumping. The concentration of 1,1,1-trichloroethane (TCA) in all three wells has decreased by several orders of magnitude since pumping began, although it appears that the reduction of the TCA concentration in groundwater has slowed in recent years. All samples collected from BH-11B and BH-16 (the two most contaminated wells) from October 2006 through June 2020 contained TCA at concentrations less than one part per million (ppm or mg/l), and in 25 of the 30 sampling rounds since April 2002, samples from these two wells have both contained TCA below one ppm. The TCA concentration in BH-18 has only slightly exceeded GWQS on two occasions since April 1999 – most recently in 2011.

A qualitative review of the most recent shallow groundwater contour map (Figure 3-1) and iso-concentration map (Figure 3-2) indicate that the contaminant plume appears to be effectively contained by the recovery well and BH-20 capture zones. This is supported by the fact that TCA has not been detected above its NYSDEC GWQS of 5.0 µg/l in the downgradient shallow well BH-9 since 1994, except for six samples, one in October 2005, one in November 2011, one in May 2013, one in November 2018, one in May 2019, and one in this round May 2020 was slightly above at 5.1 µg/l.

Avnet will continue to sample BH-17 (in lieu of shallow well BH-1) as well as BH-11A and BH-19 to monitor concentrations of volatile organic compounds (VOCs) in the deep groundwater, thereby addressing the concern with downward and/or deep lateral migration.

Therefore, the historical weight of evidence of facts continues to support the conclusion that the current corrective action program is effectively controlling the contaminant plume in the shallow groundwater and therefore should continue.

TABLES

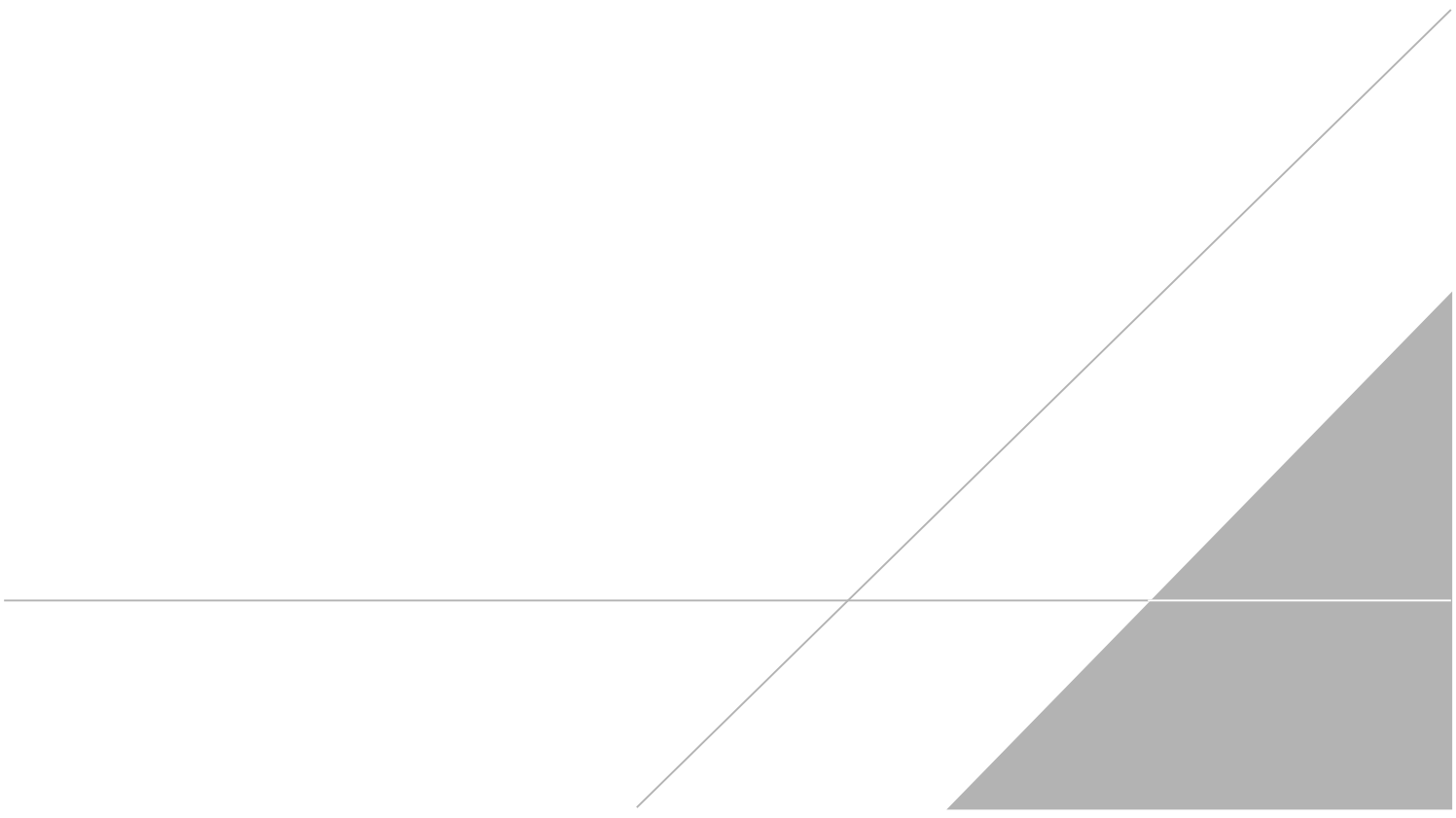


TABLE 2-1

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN RECOVERY WELL
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
3/18/1986	19	0		
12/3/1986	7500	0		
12/8/1986	3100	81000	2.1	
1/14/1987	2300	180910	3.5	
2/20/1987	920	941560	7.2	
3/20/1987	630	873500	4.6	
4/29/1987	860	1120240	8.0	
5/27/1987	150	608350	0.76	
6/11/1987	1100	295070	2.7	
7/28/1987	710	966190	5.7	
8/18/1987	520	569900	2.5	
9/15/1987	670	732400	4.1	
10/12/1987	1100	751920	6.9	
11/19/1987	860	944670	6.8	
1/20/1988	1900	1611970	26	
2/17/1988	1300	227410	2.5	
3/18/1988	2200	620380	11	
4/7/1988	840	556180	3.9	
5/18/1988	450	571190	2.1	
6/7/1988	660	0	0.0	
7/12/1988	620	0	0.0	
8/30/1988	730	569960	3.5	
9/30/1988	640	164950	0.88	
10/27/1988	460	439310	1.7	
11/30/1988	360	1225510	3.7	
12/22/1988	750	462160	2.9	
1/17/1989	470	446290	1.7	
2/8/1989	670	475070	2.7	
3/29/1989	330	1199950	3.3	
5/2/1989	170	319080	0.45	
5/22/1989	5.1	262740	0.011	
6/30/1989	470	464420	1.8	
7/6/1989	320	0	0.0	
8/2/1989	370	363790	1.1	
9/12/1989	260	1680180	3.6	
10/4/1989	320	985570	2.6	
10/25/1989	380	975570	3.1	
12/13/1989	290	1739400	4.2	
1/9/1990	480	431730	1.7	
2/6/1990	1000	528180	4.4	
3/3/1990	1100	426570	3.9	
4/2/1990	640	923500	4.9	
5/10/1990	460	1152430	4.4	
6/4/1990	380	1419860	4.5	
7/1/1990	290	0	0.0	
8/7/1990	250	3049880	6.4	

TABLE 2-1

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN RECOVERY WELL
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
9/4/1990	220	1703420	3.1	0.112
10/8/1990	320	2054910	5.5	0.161
11/6/1990	250	1261917	2.6	0.091
12/10/1990	280	1791263	4.2	0.123
1/9/1991	640	503440	2.7	0.090
2/9/1991	330	1093430	3.0	0.097
3/6/1991	310	862420	2.2	0.089
4/20/1991	290	2432100	5.9	0.131
7/24/1991	270	2639010	5.9	0.063
10/15/1991	5000	3464990	144	1.741
12/21/1991	430	3211800	12	0.172
6/19/1992	890	7858630	58	0.322
12/7/1992	310	5733730	15	0.087
7/9/1993	195	4164728	6.8	0.032
12/6/1993	300	3789014	9.5	0.063
10/25/1994	970	8423700	68	0.211
3/28/1995	2000	4139800	69	0.448
7/12/1995	970	3354600	27	0.256
12/5/1995	200	4766100	7.9	0.054
6/11/1996	780	4398500	29	0.151
12/17/1996	1800	4297700	65	0.341
6/10/1997	160	3151400	4.2	0.024
12/16/1997	120	4643400	4.6	0.025
4/28/1998	360	4258800	13	0.096
12/10/1998	160	5930800	7.9	0.035
6/24/1999	66	3907100	2.2	0.011
12/28/1999	170	5397900	7.7	0.041
6/13/2000	340	4098800	11.6	0.069
12/29/2000	270	5491500	12.4	0.062
6/12/2001	170	5710200	8.1	0.049
12/26/2001	36	6573900	2.0	0.010
6/25/2002	36	4680800	1.4	0.0078
12/31/2002	26	5184000	1.1	0.0059
6/24/2003	40	5627400	1.9	0.011
12/30/2003	140	5525800	6.5	0.034
6/29/2004	130	6198100	6.7	0.037
12/28/2004	0	5540600	0.0	0.000
6/28/2005	32	5317700	1.4	0.0078
12/27/2005	0	4438700	0.0	0.000
6/28/2006	23	4667300	0.90	0.0049
12/27/2006	41	5061500	1.7	0.010
6/26/2007	16	5288400	0.71	0.0039
12/24/2007	15	5007800	0.63	0.0035
6/24/2008	19	4378500	0.69	0.0038
12/30/2008	39	3677500	1.20	0.0063
6/30/2009	13	3752500	0.41	0.0022

TABLE 2-1

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN RECOVERY WELL
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
12/30/2009	16	4403800	0.59	0.0032
6/29/2010	12	3898500	0.39	0.0022
12/28/2010	19	4132300	0.65	0.0036
6/15/2011	11	4750000	0.44	0.0026
12/28/2011	9.4	4941900	0.39	0.0020
6/30/2012	14	4951000	0.58	0.0031
12/26/2012	22	5283500	0.97	0.0054
6/28/2013	16	5503000	0.73	0.0040
12/31/2013	66	5214300	2.87	0.0154
6/25/2014	22	4860400	0.89	0.0051
12/30/2014	18	4812400	0.72	0.0038
6/5/2015	14	4427300	0.52	0.0033
12/29/2015	18	5227600	0.78	0.0038
6/30/2016	19	3794107	0.60	0.0033
12/30/2016	26	4926193	1.07	0.0058
6/30/2017	23	4090300	0.78	0.0043
12/27/2017	14	3594000	0.42	0.0023
6/30/2018	13	4158500	0.45	0.0024
12/31/2018	14	5078800	0.59	0.0032
6/3/2019	14	4241800	0.50	0.0032
12/1/2019	15	2691900	0.34	0.0019
6/30/2020	16	3011700	0.40	0.0019
TOTALS		324,807,842	828.17	

Notes:
* Gallons pumped is measured from previous sampling date.
Updated 8/2020

TABLE 2-2

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN BH-20
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
7/13/1990	4300	12,487	0.45	0.090
7/25/1990	270	0	0.00	0.000
10/17/1990	860	0	0.00	0.000
1/9/1991	2100	0	0.00	0.000
10/15/1991	2700	16,410	0.37	0.018
12/21/1991	4800	88,290	3.5	0.053
1/15/1992	2800	32,880	0.77	0.031
6/19/1992	4100	201,990	6.9	0.044
12/7/1992	1800	182,170	2.7	0.016
7/7/1993	740	330,450	2.0	0.010
12/6/1993	790	118,620	0.78	0.0051
10/25/1994	3000	324,410	8.1	0.025
3/28/1995	1700	124,490	1.8	0.011
7/12/1995	930	85,160	0.66	0.0062
12/5/1995	850	124,840	0.88	0.0061
6/11/1996	630	217,360	1.1	0.0060
12/17/1996	1400	192,540	2.2	0.012
6/10/1997	560	190,070	0.89	0.0051
12/16/1997	600	153,750	0.77	0.0041
4/28/1998	370	156,550	0.48	0.0036
12/10/1998	350	226,630	0.66	0.0029
6/24/1999	190	194,730	0.31	0.0016
12/28/1999	130	146,970	0.16	0.0009
6/13/2000	410	250,780	0.86	0.0051
12/29/2000	240	266,290	0.53	0.0027
12/31/2002	0	209,410	0.00	0.0000
6/24/2003	34	226,960	0.064	0.00037
12/30/2003	170	296,080	0.42	0.0022
6/29/2004	75	239,060	0.15	0.00082
12/28/2004	21	108,140	0.019	0.00010
6/28/2005	48	254,480	0.10	0.00056
12/27/2005	130	189,520	0.21	0.00113
6/28/2006	110	192,330	0.18	0.00096
12/27/2006	160	200,010	0.27	0.00147
6/26/2007	41	234,690	0.080	0.00044
12/24/2007	59	104,060	0.051	0.00028
6/24/2008	84	196,380	0.14	0.00075
12/30/2008	350	68,170	0.20	0.00105
6/30/2009	65	84,360	0.05	0.00025
12/30/2009	71	84,380	0.05	0.00027
6/29/2010	45	137,270	0.05	0.00028
12/28/2010	83	70,630	-1.80	-0.00991
6/15/2011	45	138,690	1.06	0.00626
12/28/2011	50	206,800	0.08	0.00043
6/30/2012	52	66,660	0.03	0.00015
12/26/2012	65	61,170	0.03	0.00019
6/28/2013	55	89,650	0.04	0.00022
12/31/2013	63	96,070	0.05	0.00027
6/25/2014	17	88,060	0.01	0.00007
12/30/2014	133	63,340	0.07	0.00037
6/5/2015	41	67,840	0.02	0.00013
12/29/2015	32	19,020	0.005	0.00003
6/30/2016	13	31,590	0.003	0.00002
12/30/2016	160	19,400	0.026	0.00014
6/30/2017	92	54,880	0.042	0.00023
12/27/2017	26	47,610	0.010	0.00006
6/30/2018	14	71,340	0.008	0.00005
12/31/2018	15	61,310	0.008	0.00004
6/3/2019	46	62,980	0.024	0.00016
12/1/2019	20	28,440	0.005	0.00003
6/30/2020	110	62,620	0.057	0.00027
TOTALS		7,871,267	38.86	

Notes:
* Gallons pumped is measured from previous sampling date.
Pumping of BH-20 ceased in April 2001 and was continued in July 2002.

Updated 8/2020

TABLE 2-3
INITIAL 1,1,1-TCA CONCENTRATIONS
Former Channel Master Site
Chemical Effectiveness Monitoring

Well No.	BH-1	BH-2	BH-9	BH-11A	BH-11B	BH-16	BH-17	BH-18	BH-19
Well Screen Interval (ft bgl)	10-20	10-20	10-20	28-38	10-20	10-20	22-32	10-20	41-51
1985									
13-Jun	0.5 *	19.5	17.0						
17-Jul	2.0	17.0	4.0						
17-Sep				0.5 *	37,800	276,000	226	19,930	
17-Dec					13,300				
1986									
18-Mar				30.0					18.0
20-Jun		0.5 *	0.5 *						
16-Sep	9.3		38.0		140,000	900,000	0.8 *	9,200	0.8 *
03-Dec						170,000			
Sample average (1985-86)	3.9	12.3	14.9	15.3	63,700	448,667	113	14,565	9.4

NOTES: Blank space indicates well was not sampled

* indicates a value of one-half the detection limit for samples in which TCA was not detected

ft bgl = feet below grade level

All concentrations presented in units of ug/l.

TABLE 2-4

1,1,1-TCA CONCENTRATION HISTORY
Former Channel Master Site, Ellenville, NY
Chemical Effectiveness Monitoring Network

Well No.		BH-1	BH-2	BH-9	BH-11A	BH-11B	BH-16	BH-17	BH-18	BH-19
Well Screen Interval (ft bgl)		10-20	10-20	10-20	28-38	10-20	10-20	22-32	10-20	41-51
Average Initial Concentration (data collected 1985-1986)		3.9	12.3	14.9	15.3	63,700	448,667	113	14,565	9.4
1987	20-Feb						304,000			
	29-Apr					24,000	90,000			9.4
	27-May					100,000	470,000			14.0
	18-Aug		94	30	0.15 *	41,000	170,000		1,600	93.0
average			94	30	0.15 *	55,000	258,500		1,600	39
1988	20-Jan		57	65	0.15 *	46,000	69,000		560	1.1
	07-Apr		260	23	2.5	39,000	150,000		950	4.8
	21-Jul		380	8.3	1.2	3,500	66,000		990	0.55
	27-Oct		31	17	2.7	11,000	210,000		410	0.95
average			182	28	1.6	24,875	123,750		728	1.9
1989	17-Jan		38	7.4	1.9	17,000	370,000		1,300	2.5
	01-May	1.5	17		1.2	12,000	48,000		120	0.4
	05-Jul	2.1	200	180	0.33	22,000	26,000		660	130.0
	25-Oct	8.8	79	16	11.0	20,000	110,000		330	92.0
average		4.1	84	68	3.6	17,750	138,500		603	56
1990	23-Jan	100	50	6.2	0.15 *	36,000	78,000		450	46
	10-May	100	160	19	1.6	18,000	63,000		150	54
	25-Jul	8.3	43	11	1.1	18,000	28,000		3,600	47
	17-Oct	3.2	16	7.4	1.0	25,000	59,000		490	190
average		53	67	11	0.96	24,250	57,000		1,173	84
1991	09-Jan	10	58	7.0	1.4	13,000	12,000		700	130
	24-Apr	3.2	54	11	3.4	6,100	16,000		310	170
	24-Jul	4.4	32	9.7	0.48	28,000	12,000		160	70
	15-Oct		41	4.8	4.8	19,000	19,000	11	12	190
average		5.9	46	8	2.5	16,525	14,750	11	296	140
1992	16-Jan		32	10	0.2 *	31,000	2,400	1.6	1,100	250
	07-Apr		14	7.8	5.4	17,000	6,100	1.5	1,700	250
	22-Jul		12	7.3	6.8	18,000	11,000	89	1,900	140
	20-Oct		8.0	5.3	0.7	6,700	13,000	2.8	160	160
average			17	7.6	3.3	18,175	8,125	24	1,215	200
1993	26-Jan				5.7	14,000	4,200	0.75	2,300	68
	07-Apr		9.0	300.0	2.0	180	5,500	0.80	4.1	14
	06-Jul		14	6.8	0.25 *	11,800	3,270	18.4	13	21
	02-Nov		0.25 *	0.25 *	0.25 *	13,000	12,000	160	150	93
average			7.8	102	2.1	9,745	6,243	45	617	49
1994	01-Feb		6.3	17	7.2	9,000	4,900	62	450	41
	13-Apr		4.5	21	6.0	9,000	5,000	0.25 *	120	23
	06-Jul		32	1.2	2.9	10,000	4,000	190	180	18
	12-Oct		21	3.2	2.1	5,300	8,400	110	300	90
average			16	11	4.6	8,325	5,575	91	263	43
1995	10-Jan		7.7	3.6	0.25 *	5,800	2,300	2.7	620	37
	11-Apr		25	1.9	2.5	5,600	1,500	6.4	120	13
	12-Jul		12	3.8	0.25 *	5,400	7,900	120	3.5	35
	25-Oct		17	2.6	4.6	2,900	13,000	39	19	140
average			15	3.0	1.9	4,925	6,175	42	191	56
1996	25-Jan		17	1.2	2.3	1,900	4,300	0.25 *	4.5	26
	03-Apr		16	1.3	3.2	3,100	1,700	14	9.5	18
	10-Jul		28	1.1	0.80	6,800	4,800	32	9.0	42
	08-Oct		46	0.90	2.4	6,500	4,000	28	10	67
average			27	1.1	2.2	4,575	3,700	19	8.3	38
1997	14-Jan		12	1.8	0.25 *	7,500	1,200	75.0	110	49
	29-May		12	2.5	0.32	6,800	1,100	3.4	10	5.1
	22-Oct		19	1.4	1.7	690	4,910	260	2.9	76
average			14	1.9	0.76	4,997	2,403	113	41	43
1998	28-Apr		22	1.0	1.7	3,900	1,700	135.0	260	37
	27-Oct		30	1.0	4.3	1,800	2,200	360.0	0.24	110
average			26	1.0	3.0	2,850	1,950	248	130	74
1999	08-Apr		3.7	2.0	1.4	3,000	360	22	130	64
	20-Oct		26	1.7	4.9	6,300	2,300	180	2.5	38
average			15	1.9	3.2	4,650	1,330	101	66	51

TABLE 2-4

1,1,1-TCA CONCENTRATION HISTORY
Former Channel Master Site, Ellenville, NY
Chemical Effectiveness Monitoring Network

Well No. / Well Screen Interval (ft bgl)		BH-1 10-20	BH-2 10-20	BH-9 10-20	BH-11A 28-38	BH-11B 10-20	BH-16 10-20	BH-17 22-32	BH-18 10-20	BH-19 41-51
2000	19-Apr		16	0.99	1.1	4,300	380	5.9	6.9	20
	17-Oct		9.9	0.59	2.9	5,900	1,600	67	2.0	21
average			13	0.79	2.0	5,100	990	36	4.5	21
2001	31-May		8.1	1.3	12	4,200	840	62	1.6	4.1
	29-Oct		2.3	0.79	9.6	1,600	960	79	1.4	0.17
average			5.2	1.0	11	2,900	900	71	1.5	2.1
2002	18-Apr		6.6	0.73	4.7	2,900	420	110	1.4	0.24
	09-Oct		3.0	1.1	3.7	730	700	140	1.4	0.11 *
average			4.8	0.92	4.2	1,815	560	125	1.4	0.18
2003	29-May		9.8	1.3	4.3	3,000	210	120	1.3	0.37
	23-Oct		23	0.7	3.3	900	120	75	1.3	0.13 *
average			16	1.0	3.8	1,950	165	98	1.3	0.25
2004	07-Apr		11	0.71 J	3.0	1,200	75	0.5 *	3.1	0.5 *
	22-Oct		27	1.8	3.0	2,800	120	0.5 *	5.6	0.5 *
average			19	1.3	3.0	2,000	98	0.5	4.4	0.5
2005	29-Apr		3.1	0.94	3.4	300	170	0.5 *	2.6	0.5 *
	21-Oct		4.0	18	3.6	240	390	0.5 *	2.0	0.5 *
average			3.6	9.5	3.5	270	280	0.5	2.3	0.5
2006	20-Apr		12	0.76 J	2.3	1,500	110	0.84 J	1.3	0.55 J
	10-Oct		17	0.55	2.3	33	120	0.5 *	0.95 J	0.5 *
average			14.5	0.66	2.3	767	115	0.7	1.1	0.5
2007	21-Apr		4.4	0.94 J	2.0	140	160	0.5 *	4.2	0.5 *
	30-Oct		9.5	1.7	0.5 *	530	120	77	0.78 J	0.5 *
average			7.0	1.32	1.3	335	140	38.8	2.5	0.5
2008	03-Apr		3.9	1.3	0.5 *	77	490	2.1	3.0	0.5 *
	22-Oct		6.8	0.28 J	0.5 *	240	210	0.36 J	0.80 J	0.5 *
average			5.4	0.79	0.5	159	350	1.2	1.9	0.5
2009	10-Apr		6.0	2.3	0.5 *	160	430	5.2	3.2	0.53
	23-Nov		9.0	1.1	0.12 *	240	220	1.8	0.93	
average			7.5	1.7	0.31	200	325	3.5	2.1	0.53
2010	15-Jun			0.98	0.12 *	220	430	0.12 *	0.95	
	10-Nov		16	0.78	0.12 *	170	210	0.12 *	0.98	0.12
average			16.0	0.9	0.12	195	320	0.12	1.0	0.12
2011	02-May		6.2	1.6	0.12 *	22	300 E	4.7	12	0.39
	22-Nov		2.6	5.9	0.12 *	94 E	180 E	0.12 *	0.87	0.12 *
average			4.4	3.8	0.12	58	240	2.41	6.4	0.26
2012	01-May		3.5	4.3	0.12 *	110 E	250 E	4.7	3.5	0.12 *
	25-Oct		8.3	5.2	0.12 *	61	280 E	0.12 *	1.6	0.12 *
average			5.9	4.8	0.12 *	86	265	2.41	2.6	0.12 *
2013	03-May		3.1	6.1	0.12 *	26	220 E	2.5	3.4	0.12 *
	24-Oct		5.5	0.46	0.12 *	150 E	520 E	0.12 *	0.72	0.12 *
average			4.3	3.3	0.12 *	88	370	1.31	2.1	0.12 *
2014	07-May		1.2	0.2	0.12 *	38	320 E	2.9	4.80	0.12 *
	28-Oct		5.1	0.26	0.12 *	160	59	0.35	0.55	0.12 *
average			3.2	0.23	0.12 *	99	190 E	1.63	2.68	0.12 *
2015	15-Apr		**5.5**	0.81	0.12 *	36	340	3.3	3.00	0.12 *
	13-Nov		8.6	1.60	0.12	26	410	0.12 *	1.2	0.12 *
average			7.1	1.2	0.1 *	31.0	375.0	1.7 *	2.1	0.12 *

TABLE 2-4

1,1,1-TCA CONCENTRATION HISTORY
Former Channel Master Site, Ellenville, NY
Chemical Effectiveness Monitoring Network

Well No. Well Screen Interval (ft bgl)		BH-1 10-20	BH-2 10-20	BH-9 10-20	BH-11A 28-38	BH-11B 10-20	BH-16 10-20	BH-17 22-32	BH-18 10-20	BH-19 41-51
2016	20-May		2.7	1.70	0.12 *	71	410	0.36	0.47	0.12 *
	04-Nov		12	0.39	0.12 *	180	450	0.12 *	0.44	0.29
average			7.4	1.05	0.12 *	126	430	0.24	0.46	0.21 *
2017	07-May		5.2	15.00	0.12 *	75	330	0.12 *	1.00	0.12 *
	22-Nov		7.14	0.12 *	0.12 *	120	990	0.12 *	0.56 J	0.12 *
average			6.2	7.56	0.12 *	98	660	0.12	0.78	0.12 *
2018	19-May		2.9	0.80 J	0.12 *	80	130	0.12 *	0.68 J	0.12 *
	20-Nov		3.4	9.60	0.12 *	18	640	0.12 *	0.72 J	0.12 *
average			3.2	5.20	0.12 *	49	385	0.12	0.70	0.12 *
2019	17-May		2.7	7.20	0.12 *	20	180	0.12 *	0.54 J	0.12 *
	25-Nov		3.6	6.20	0.61 J	36	580	0.12 *	0.64 J	0.28 J
average			3.2	6.70	0.37 *	28	380	0.12 *	0.59	0.20 *
2020	05-May		1.2	5.10	0.48 J	30	370	0.12 *	0.41 J	0.25 J
average			1.2	5.10	0.48 J	30	370	0.12 *	0.41	0.25 *
(Feb 1987- May 2020)		24	29	12	2	8,754	29,275	40	272	39

NOTES:

Blank spaces indicate well was not sampled

J - estimated value; detected below quantitation limit

* - indicates a value of one-half the detection limit for samples in which TCA was not detected

E- Result exceeded calibration range, secondary dilution required

ft bgl = feet below grade level

All concentrations presented in units of ug/l.

FIGURES

Legend

1,1,1-TCA - Trichloroethane

ug/l - Micrograms per liter

N

BH3

BH2
1,1,1-TCA 1.2 ug/

BH10

BH15

BH14

BH19
1,1,1-TCA 0.25 ug/l

BH12

BH9
1,1,1-TCA 5.10 ug/l

PZ2

BH16
1,1,1-TCA 370.0 ug/l

BH17
1,1,1-TCA 0.24 ug/l

BH20
1,1,1-TCA 110 ug/l

PZ3

PZ1

BH11B
1,1,1-TCA 30.00 ug
/l BH11A
1,1,1-TCA 0.48 ug/l

BH18
1,1,1-TCA 0.41 ug/l

Recovery Well
1,1,1-TCA 16.0 ug/l

BH13

BH1

BH4

BH7

0 25 50 100
Feet

Elevations: feet MSL

Document Path: G:\Project\0395052 Channel Master AVNET\GIS\ChannelMaster.mxd

may 4, 2020

ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE, NEW YORK
SEMI-ANNUAL GROUNDWATER ANALYTICAL RESULTS
MAY 4, 2020

0395-052-108
FIGURE 3-1

Legend

Former Plant Area Water Table Contours (5/4/2020)

N

BH10 (298.59)

BH3 (299.56)

299

BH15 (298.93)

BH2 (298.84)

BH14 (300.20)

BH12 (298.72)

BH19 (302.04)

BH9 (298.73)

PZ2 (298.69)

BH16 (300.59)

BH17 (302.02)

301

PZ3 (298.62)

BH20 (298.88)

PZ1 (298.83)

BH11B (298.87)
BH11A (302.07)

300

Recovery (293.26)

296

BH18 (299.62)

297

299

298

300

BH13 (298.60)

BH1 (298.95)

BH4 (301.17)

301

BH7 (299.88)

0 25 50 100 Feet

Elevations: feet MSL.

Document Path: G:\Project\0395052 Channel Master AVNET\GIS\ChannelMaster.mxd

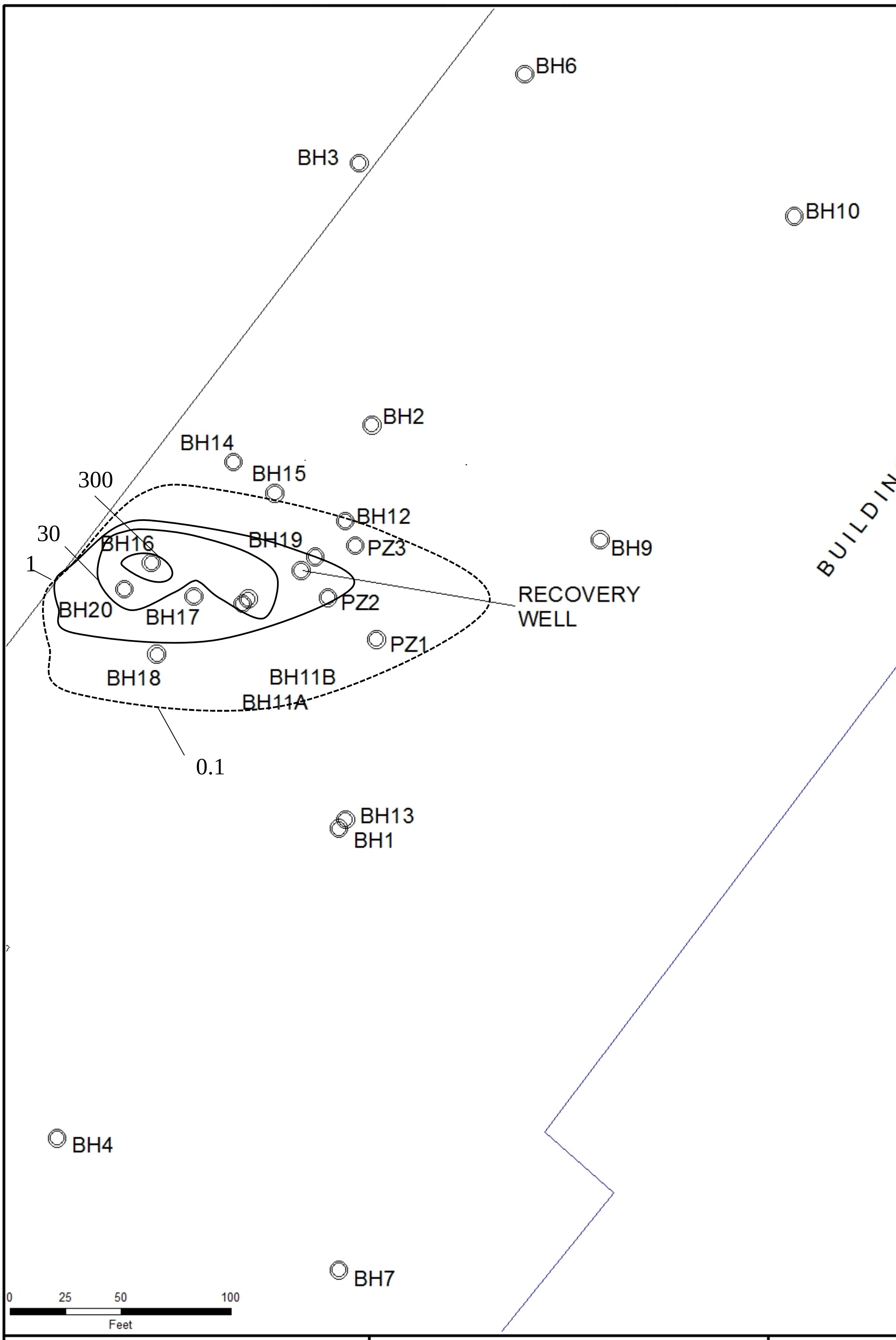
ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE, NEW YORK
WATER TABLE ELEVATION CONTOUR MAP
FORMER PLANT AREA WELLS - MAY 4, 2020

0395-052-108

FIGURE 3-1

Path: G:\Model\ChannelMaster_0395052\Channel_Master.mxd



ARCADIS Design & Consultancy for natural and built assets	CHANNEL MASTER ELLENVILLE NEW YORK ISOCONCENTRATION MAP - 1,1,1-TRICHLOROETHANE (µg/l) SHALLOW PLANT AREA WELLS – May 4, 2020	0395-052-108 **FIGURE 3-2**

Arcadis U.S., Inc.

17-17 Route 208 North

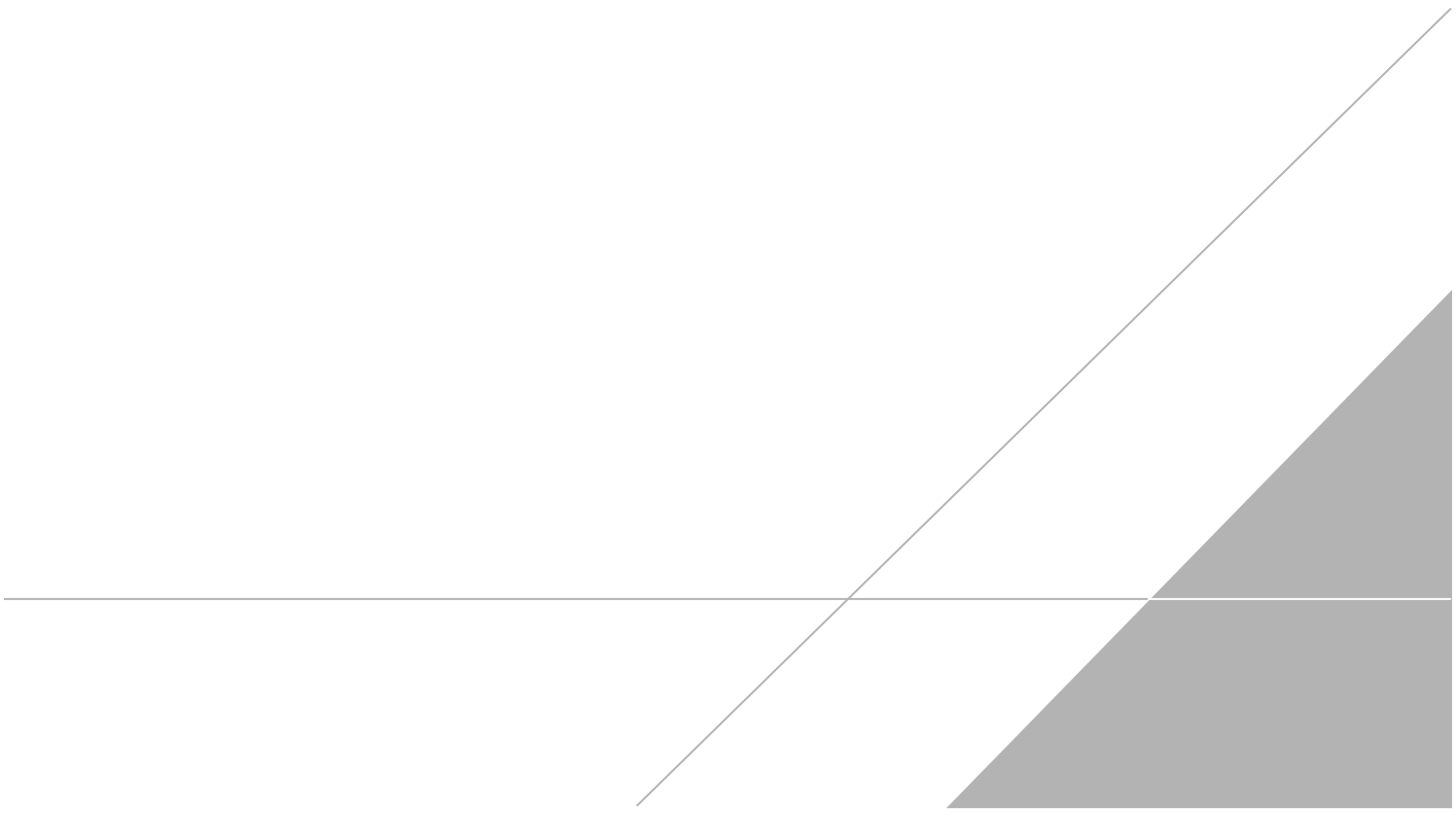
Fair Lawn, New Jersey 07410

Tel 201 797 7400

Fax 201 797 4399

www.arcadis.com

Semi Annual CEMR Report - SECOND HALF 2020



Mr. John Spellman, P.E.
Division of Environmental Remediation
New York State Dept. of Environmental Conservation
625 Broadway
Albany, NY 12233-7014

Arcadis U.S., Inc.
17-17 Route 208 North
Fair Lawn
New Jersey 07410
Tel 201 797 7400
Fax 201 797 4399
www.arcadis.com

Environment

Subject:
Avnet Inc. / Former Channel Master Site, Ellenville, NY
RCRA Corrective Action & Post Closure Consent Order
Index Number: CO 3-20170802-152
Site Number: 356025

Chemical Effectiveness Monitoring Report
Semi-Annual Report for Period July 1, 2020 to December 31, 2020

Date:
February 5, 2021

Contact:
Wyn V. Davies, CIH

Phone:
610.360.4895

Email:
wyn.davies@arcadis.com

Our ref:
00395052.0000

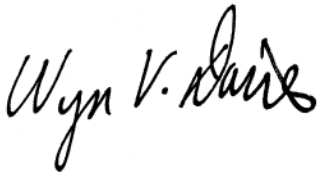
Dear Mr. Spellman:

Enclosed is the semi-annual Chemical Effectiveness Monitoring Report (CEMR) for the former Channel Master site located in Ellenville, NY submitted on behalf of Avnet, Inc. This report covers the July 1, 2020 to December 31, 2020 reporting period and presents a summary of the ongoing 2020 corrective action activity results at the facility through the second half of 2020. The overall summary of the activities for 2019, as well as a statistical evaluation, of all wells will be performed and this annual report will be issued to the NYSDEC late in 2Q2021.

If you have any comments or questions regarding the report, please call me at 610.360.4895.

Sincerely,

Arcadis of NY, Inc.



Wyn V. Davies, CIH
Associate Vice President

Copies:
Darrel Jackson, Avnet Inc., (w/encl.)
Karen Davis, Fox Rothschild LLP

ARCADIS Design & Consultancy for natural and built assets

AVNET Inc. – Former Channel Master Facility

CHEMICAL EFFECTIVENESS MONITORING REPORT

Second Half 2020

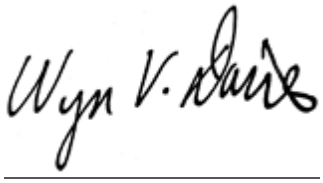
Report Period – July 1 to December 31, 2020

February 2021

CHEMICAL EFFECTIVENESS MONITORING REPORT AVNET/FORMER CHANNEL MASTER SITE, ELLENVILLE NY

Second Half 2020

(July 01 to December 31, 2020)



Wyn V. Davies, CIH
Associate Vice President

Prepared for:

AVNET Inc.

Prepared by:

Arcadis of NY, Inc.
17-17 Route 208 North
Fair Lawn
New Jersey 07410
Tel 201 797 7400
Fax 201 797 4399

Our Ref.:

00395052.0000

Date:

February 05, 2021

CONTENTS

TABLES

FIGURES

1 SITE BACKGROUND

Channel Master owned and operated a manufacturing facility in Ellenville, New York until the facility was sold to Imperial Schrade in 1984. Channel Master, which was owned by Avnet Inc. at that time, relocated its operations out of state and agreed to retain responsibility for identified environmental conditions associated with its Channel Master Division at the Ellenville, NY site. In October 1997, Avnet sold its Channel Master Division and again retained its responsibilities associated with its former operations at the Ellenville site, including assuming the role of responsible party in the RCRA Corrective Action & Post Closure Consent Order executed on February 6, 2018. A draft Site Management Plan has been reviewed/commented on November 09, 2020 by the NYSDEC.

During its period of operation, Channel Master treated its wastewater in a chemical treatment system within the plant building and in an outdoor surface impoundment (Lagoon) on Channel Master's property. The plant and the surface impoundment were decommissioned under the Resource Conservation and Recovery Act (RCRA) in accordance with Channel Master's approved Closure Plan. Groundwater beneath the building was found to be contaminated with several volatile organic compounds (VOCs), the primary of which was 1,1,1-trichloroethane (TCA), a solvent used in degreasing. A groundwater recovery and treatment system was installed and has been operating since January 1987 to remedy the groundwater contamination beneath the building pad.

In March 1991, the New York State Department of Environmental Conservation (NYSDEC) issued a 6NYCRR Part 373 Post-Closure Permit for the facility (NYSDEC # 3-5156-91/4-0) which was replaced by a RCRA Corrective Action & Post Closure Consent Order executed on February 6, 2018. The post-closure monitoring requirements for the former surface impoundment (lagoon area) and the monitoring and evaluation requirements for the groundwater treatment and recovery system (plant area) are addressed in the Consent Order. The corrective action was also covered by a HSWA permit (#NYDO42457788, issued by the United States Environmental Protection Agency [USEPA] in May 1991 which has been managed by NYSDEC and continues to be covered by the RCRA Corrective Action & Post Closure Consent Order executed on February 6, 2018.

2 CHEMICAL EFFECTIVENESS MONITORING PLAN - PROGRESS SUMMARY

Channel Master developed a Chemical Effectiveness Monitoring Plan (CEMR) to assess the effectiveness of the corrective action program and has been incorporated into the RCRA Corrective Action & Post Closure Consent Order executed on February 6, 2018. The purpose of the plan, as described in the permit, is to determine the rate of groundwater cleanup and verify that groundwater elevation gradients are being maintained toward the recovery well. To satisfy these objectives, the plan proposed use of water quality and water level data collected from the

recovery well and eight monitoring wells (BH-1, BH-2, BH-9, BH-11A, BH-11B, BH-16, BH-18, and BH-19) located formerly inside[1] the plant building (see Figure 3-1A).

Earlier evaluations of the effectiveness of the corrective action concluded that pumping the recovery well is effectively removing contaminants from the groundwater. However, during the period of time from 1989 to early 1992, monitoring well BH-19 had shown an increase in the concentration of TCA, which is used as the indicator parameter in this assessment. From 1993 to 1999, TCA concentrations in BH-19 generally followed a cyclical pattern before beginning a steady decrease in 1999. This monitoring well is located approximately ten feet from the recovery well and is screened deeper (41 to 51 feet below grade) than the others in the network, including the recovery well. To investigate the possibility of induced downward migration of contaminants, Channel Master proposed collecting analytical data from well BH-17 for at least one year. BH-17 is screened deeper than most wells at the site (from 22 to 32 feet below grade) and is located in the area of greatest groundwater contamination. As proposed in the evaluation report, groundwater from BH-17 is being analyzed instead of BH-1 (which was originally part of the monitoring network) for comparison to groundwater data obtained from the other deep wells and to determine the significance of the earlier increase detected at BH-19. Although deep well BH-13 was also sampled during both semiannual sampling rounds in 2000 and 2001 to provide additional data on the deeper groundwater under the plant (as requested by the NYSDEC in its letter to Avnet dated January 18, 2000), the NYSDEC discontinued the requirement to sample BH-13 in 2002, since no significant concentrations of TCA were detected there in the four sampling rounds.

In September 1991, Channel Master began pumping an additional recovery well (BH-20) inside the plant building. Screened to a depth of 24.5 feet, BH-20 was installed in July 1990 approximately 70 feet west (upgradient) of the existing recovery well. At the time, this was near the area of greatest groundwater contamination. Pumping of BH-20 ceased in April 2001 because of mechanical difficulties with the well screen and pump. Because of the historically low recovery obtained at this well (less than 5 pounds of TCA had been removed from BH-20 since December 1996) and the fact that the area of greatest contamination is now much closer to the main recovery well, this did not have a significantly adverse impact on the effectiveness of the groundwater treatment system. Nonetheless, BH-20 was rehabilitated during the annual maintenance of the recovery well and associated piping in July 2002, at which time the pumping of BH-20 recommenced. BH-20 was not included in the Chemical Effectiveness Monitoring Plan because it was not being operated at the time the plan was developed; however, the results of pumping this well are evaluated in this report.

In a letter dated January 18, 2000, Gary Casper of the NYSDEC directed Avnet to sample deep well BH-13 in April and October 2000 to further evaluate the conditions in the deep groundwater in the plant area. Neither sample contained contaminants exceeding NYSDEC groundwater quality standards. At the request of the NYSDEC, Avnet sampled BH-13 again in May and October 2001. As indicated in the semiannual groundwater monitoring report for the May 2001

[1] In April 2016, the former manufacturing building demolition was completed while maintaining the integrity of the building slab (the well structures are no longer “inside” the building). No substantial changes to the corrective action area or groundwater flow is anticipated.

sampling round, the groundwater elevation measured at BH-13 was more than 5 feet lower than the elevations measured at deep wells BH-11A, BH-17, and BH-19, indicating that BH-13 is to some degree hydraulically downgradient of the other deep wells. Therefore, because the groundwater sample from deep well BH-13 contained only 0.39 micrograms per liter (µg/l) of TCA (significantly less than the concentrations found in the other deep wells), it appears that TCA is not migrating laterally to a significant degree in the deep groundwater. Because TCA was not detected above its groundwater quality standard (GWQS) in BH-13 during any of the four sampling events in 2000 and 2001, the NYSDEC agreed to discontinue sampling BH-13 starting in 2002.

In the third and fourth quarters of 2015 and first quarter of 2016, the current site owner (AmTrust Realty) performed a demolition of the former Channel Master manufacturing buildings. The demolition activities removed all above ground structures and maintained the integrity of the building floor/pad to avoid potential issues of disrupting the groundwater flow patterns as well as the effectiveness of the groundwater recovery and treatment system. Arcadis monitored the progress of the demolition work to assure no disturbance of the well structures or the creation of infiltration pathways within the building pad occurred during the performance of the work. The relocation of the groundwater treatment system and the establishment of a new operational center on the building pad between the recovery well and BH-20 were performed in a manner that averted operational shutdowns beyond Post Closure requirements for the former Channel Master Site.

3 EVALUATION

3.1 Influence of Pumping on Groundwater Flow

Groundwater elevations were measured in the monitoring wells associated with the former plant building on November 24, 2020. These measurements were used to generate a groundwater contour map (see Figure 3-1) and to evaluate the current efficacy of the hydraulic control. Before pumping of the recovery well began in 1986, groundwater contours indicated flow generally toward the east. These contours were relatively parallel and straight. The current significant bending of the contour lines around the Recovery Well indicates that groundwater beneath the former plant building concrete slab is drawn toward the pumping well. The groundwater contours also support the impact of BH-20 on the groundwater flow to this intermittent groundwater recovery operation. Groundwater from the area surrounding the most highly contaminated groundwater shallow monitoring wells BH-11B and BH-16 also indicate flows toward the recovery well and BH-20 respectively. Therefore, the results of the current semi-annual groundwater elevation event support the goals of the CEMR in maintaining the efficacy of hydraulic control with the recovery wells. Additionally, there continues to be no groundwater flow disturbances/impacts related to the demolition of the building structure for the well structures installed beneath the former building floor slab through this semi-annual monitoring period.

3.2 Quantities of TCA Recovered and Associated Removal Rates

As discussed in the Chemical Effectiveness Monitoring Plan, 1,1,1-trichloroethane (TCA) has been detected in the monitored wells during every sampling event and consistently occurs at higher concentrations than other parameters. Therefore, TCA has been used in the semi-annual assessments (and found historically acceptable to the NYSDEC) as the indicator of contamination beneath the former plant building and the site. TCA concentrations in the recovery well have been monitored since 1986, prior to implementation of the corrective action program. TCA concentrations in BH 20 have been monitored since installation of that well in July 1990.

TCA concentration data on the recovery well are presented in Table 2-1, and the TCA concentration data for recovery well BH 20 are presented in Table 2-2.

To estimate the mass of TCA recovered from the recovery well and from BH 20, the concentration of TCA in the groundwater was multiplied by the volume of water pumped during the period between that sampling date and the preceding sampling date. The volume of groundwater pumped from the wells is recorded weekly. The following equation was used:

Mass of TCA pumped (lb.) = C•V•K

Where C = Concentration of TCA, in µg/l;

V = Volume of groundwater pumped, in gallons; and

K = Conversion factor: 8.34x10 9 (liters H_2O)(lb. TCA)/(gallons H_2O)(µg TCA)

Estimates of the mass of TCA recovered from each well since the start of pumping are presented in Table 2-1 and Table 2-2. The total amount of TCA removed by the Recovery Well and BH-20 through December 31, 2020 is approximately 867.3 pounds.

The removal rates are variable because of variability in both the concentrations and pumped volumes. The estimated average TCA removal rate from pumping the recovery well during the period covering July 1 to December 31, 2020 was approximately 0.0012 pounds per day (0.23 pounds total for the Second Half of year 2020). The estimated average TCA removal rate from BH 20 during the same period was approximately 0.00005 pounds per day (0.01 pounds total for the Second Half of year 2020).

4 DETERMINATION OF WATER QUALITY TREND

4.1 Historical

Avnet has evaluated groundwater data from the sampled monitoring wells as part of the corrective action program to assess the impact of TCA removal on groundwater quality beneath the plant's former building slab. Although the permit originally required the sampling of eight monitoring wells (BH-1, BH-2, BH-9, BH-11A, BH-11B, BH-16, BH-18, and BH-19), concentrations of TCA have been monitored in ten wells since 1986. Of the eight wells initially required to be sampled, six wells (BH-1, BH-2, BH-9, BH-11B, BH-16 and BH-18) are approximately 20 feet deep and monitor the shallow water table, while the other two wells (BH-

11A and BH-19) monitor deeper zones of the water bearing formation and are 38 and 51 feet deep, respectively. A third deep well, BH-17, is 32 feet deep and is also used to monitor the deeper zone. Prior to October 1991, this well was only sampled twice, in September 1985 and August 1986. The well is now being sampled instead of BH-1 to investigate the possibility of downward migration of contaminants as discussed in the previous section. In addition, the NYSDEC directed Avnet to sample deep well BH-13 in April and October 2000 and in May and October 2001 to provide additional information on the deeper groundwater under the site. The sampling of BH-13 was discontinued in 2002, as agreed to by the NYSDEC. The locations of these wells are shown on Figure 3-1A.

Water quality data collected before the start of the corrective action program were used to determine the average background concentration of TCA in the monitoring wells. Generally, two or three values are available from each well, as shown on Table 2-3. The concentrations measured at each well vary considerably, sometimes by as much as two orders of magnitude. Therefore, the estimates of background concentrations have a high degree of error associated with them.

In the case of several monitoring wells, samples collected shortly after installation (1985-1986, before the pumping and treating system began operating) contained the highest TCA concentrations recorded in those wells. This is particularly evident in the samples collected from BH 11A, BH-11B, BH-16, BH-18, and BH-17 (although one sample from BH-17 collected in 1998 contained the highest TCA concentration ever recorded for that well). The contaminants may have mobilized from the unsaturated soil during well installation; therefore, the concentrations detected may not represent what was present in the groundwater, and the calculated background concentrations may be overestimated.

Trends in water quality can be determined from historic data collected since the start of the corrective action program as presented in Table 2-4. Table 2-4 reveals a significant groundwater quality reduction trend of TCA in shallow wells decreasing in three orders of magnitude since pumping began [Especially evident in wells BH11B and BH-16].

Annual average TCA concentrations in deep well BH-19 have been generally decreasing since 1992, with the annual averages for the years 2002-2018 being the lowest ever. No sample from BH-19 has exceeded the NYSDEC GWQS for TCA (5.0 µg/l) since October 2000, and TCA has been detected in BH-19 above its laboratory reporting limit (generally 1.0 µg/l) only three times since April 2003. The annual average TCA concentration in deep well BH-17 peaked in 1998, and although the TCA concentration has tended to fluctuate somewhat since sampling of BH-17 began in 1991, TCA has been detected in BH-17 above its GWQS on only two occasions since October 2003. TCA concentrations in the other wells have been generally decreasing since 1987 as shown in Table 2-4.

The addition of one data point to the existing set of data is generally not sufficient to create a significant change in the linear regression analyses. Accordingly, the NYSDEC agreed that these analyses may now be performed on an annual basis and submitted with the Annual Report.

4.2 Current Monitoring Data Results

The results of the TCA monitoring for the Second Half of 2020 are presented in Table 2-4.

An iso-concentration map was constructed using the TCA concentrations in the five shallow groundwater samples collected in November 2020, as shown on Figure 3-2. Although the isopleths themselves should not be considered exact, the patterns on this map indicate that the area of highest contamination is near BH-11B (30 µg/l) and BH-16 (370 µg/l).

These results confirm that the recovery well is positioned near the area of greatest groundwater contamination and requires no modification to the goals of the Chemical Effectiveness Monitoring Plan.

5 CONCLUSIONS AND RECOMMENDATIONS

Water quality and water level data collected from the shallow wells located beneath the pad of the former plant building indicate that pumping the recovery well continues to remove contaminants from the groundwater. Groundwater quality in monitoring wells BH-11B, BH-16, and BH-18, historically three of the most contaminated shallow wells, has improved significantly as a result of the pumping. The concentration of 1,1,1-trichloroethane (TCA) in all three wells has decreased by several orders of magnitude since pumping began, although it appears that the reduction of the TCA concentration in groundwater has slowed in recent years. All samples collected from BH-11B and BH-16 (the two most contaminated wells) from October 2006 through December 2020 contained TCA at concentrations less than one part per million (ppm or mg/l), and in 26 of the 31 sampling rounds since April 2002, samples from these two wells have both contained TCA below one ppm. The TCA concentration in BH-18 has only slightly exceeded GWQS on two occasions since April 1999 – most recently in 2011.

A qualitative review of the most recent shallow groundwater contour map (Figure 3-1) and iso-concentration map (Figure 3-2) indicate that the contaminant plume appears to be effectively contained by the recovery well and BH-20 capture zones. This is supported by the fact that TCA has not been detected above its NYSDEC GWQS of 5.0 µg/l in the downgradient shallow well BH-9 since 1994, except for six samples, one in October 2005, one in November 2011, one in May 2013, one in November 2018, one in May 2019, and one in this round May 2020 was slightly above at 5.1 µg/l.

Avnet will continue to sample BH-17 (in lieu of shallow well BH-1) as well as BH-11A and BH-19 to monitor concentrations of volatile organic compounds (VOCs) in the deep groundwater, thereby addressing the concern with downward and/or deep lateral migration.

Therefore, the historical weight of evidence of facts continues to support the conclusion that the current corrective action program is effectively controlling the contaminant plume in the shallow groundwater and therefore should continue.

TABLES

TABLE 2-1

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN RECOVERY WELL
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
3/18/1986	19	0		
12/3/1986	7500	0		
12/8/1986	3100	81000	2.1	0.419
1/14/1987	2300	180910	3.5	0.094
2/20/1987	920	941560	7.2	0.195
3/20/1987	630	873500	4.6	0.164
4/29/1987	860	1120240	8.0	0.201
5/27/1987	150	608350	0.76	0.027
6/11/1987	1100	295070	2.7	0.180
7/28/1987	710	966190	5.7	0.122
8/18/1987	520	569900	2.5	0.118
9/15/1987	670	732400	4.1	0.146
10/12/1987	1100	751920	6.9	0.255
11/19/1987	860	944670	6.8	0.178
1/20/1988	1900	1611970	26	0.412
2/17/1988	1300	227410	2.5	0.088
3/18/1988	2200	620380	11	0.379
4/7/1988	840	556180	3.9	0.195
5/18/1988	450	571190	2.1	0.052
6/7/1988	660	0	0.0	0.000
7/12/1988	620	0	0.0	0.000
8/30/1988	730	569960	3.5	0.071
9/30/1988	640	164950	0.88	0.028
10/27/1988	460	439310	1.7	0.062
11/30/1988	360	1225510	3.7	0.108
12/22/1988	750	462160	2.9	0.131
1/17/1989	470	446290	1.7	0.067
2/8/1989	670	475070	2.7	0.121
3/29/1989	330	1199950	3.3	0.067
5/2/1989	170	319080	0.45	0.013
5/22/1989	5.1	262740	0.011	0.001
6/30/1989	470	464420	1.8	0.047
7/6/1989	320	0	0.0	0.000
8/2/1989	370	363790	1.1	0.042
9/12/1989	260	1680180	3.6	0.089
10/4/1989	320	985570	2.6	0.120
10/25/1989	380	975570	3.1	0.147
12/13/1989	290	1739400	4.2	0.086
1/9/1990	480	431730	1.7	0.064
2/6/1990	1000	528180	4.4	0.157
3/3/1990	1100	426570	3.9	0.157
4/2/1990	640	923500	4.9	0.164
5/10/1990	460	1152430	4.4	0.116
6/4/1990	380	1419860	4.5	0.180
7/1/1990	290	0	0.0	0.000
8/7/1990	250	3049880	6.4	0.172

TABLE 2-1

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN RECOVERY WELL
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
9/4/1990	220	1703420	3.1	0.112
10/8/1990	320	2054910	5.5	0.161
11/6/1990	250	1261917	2.6	0.091
12/10/1990	280	1791263	4.2	0.123
1/9/1991	640	503440	2.7	0.090
2/9/1991	330	1093430	3.0	0.097
3/6/1991	310	862420	2.2	0.089
4/20/1991	290	2432100	5.9	0.131
7/24/1991	270	2639010	5.9	0.063
10/15/1991	5000	3464990	144	1.741
12/21/1991	430	3211800	12	0.172
6/19/1992	890	7858630	58	0.322
12/7/1992	310	5733730	15	0.087
7/9/1993	195	4164728	6.8	0.032
12/6/1993	300	3789014	9.5	0.063
10/25/1994	970	8423700	68	0.211
3/28/1995	2000	4139800	69	0.448
7/12/1995	970	3354600	27	0.256
12/5/1995	200	4766100	7.9	0.054
6/11/1996	780	4398500	29	0.151
12/17/1996	1800	4297700	65	0.341
6/10/1997	160	3151400	4.2	0.024
12/16/1997	120	4643400	4.6	0.025
4/28/1998	360	4258800	13	0.096
12/10/1998	160	5930800	7.9	0.035
6/24/1999	66	3907100	2.2	0.011
12/28/1999	170	5397900	7.7	0.041
6/13/2000	340	4098800	11.6	0.069
12/29/2000	270	5491500	12.4	0.062
6/12/2001	170	5710200	8.1	0.049
12/26/2001	36	6573900	2.0	0.010
6/25/2002	36	4680800	1.4	0.0078
12/31/2002	26	5184000	1.1	0.0059
6/24/2003	40	5627400	1.9	0.011
12/30/2003	140	5525800	6.5	0.034
6/29/2004	130	6198100	6.7	0.037
12/28/2004	0	5540600	0.0	0.000
6/28/2005	32	5317700	1.4	0.0078
12/27/2005	0	4438700	0.0	0.000
6/28/2006	23	4667300	0.90	0.0049
12/27/2006	41	5061500	1.7	0.010
6/26/2007	16	5288400	0.71	0.0039
12/24/2007	15	5007800	0.63	0.0035
6/24/2008	19	4378500	0.69	0.0038
12/30/2008	39	3677500	1.20	0.0063
6/30/2009	13	3752500	0.41	0.0022

TABLE 2-1

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN RECOVERY WELL
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
12/30/2009	16	4403800	0.59	0.0032
6/29/2010	12	3898500	0.39	0.0022
12/28/2010	19	4132300	0.65	0.0036
6/15/2011	11	4750000	0.44	0.0026
12/28/2011	9.4	4941900	0.39	0.0020
6/30/2012	14	4951000	0.58	0.0031
12/26/2012	22	5283500	0.97	0.0054
6/28/2013	16	5503000	0.73	0.0040
12/31/2013	66	5214300	2.87	0.0154
6/25/2014	22	4860400	0.89	0.0051
12/30/2014	18	4812400	0.72	0.0038
6/5/2015	14	4427300	0.52	0.0033
12/29/2015	18	5227600	0.78	0.0038
6/30/2016	19	3794107	0.60	0.0033
12/30/2016	26	4926193	1.07	0.0058
6/30/2017	23	4090300	0.78	0.0043
12/27/2017	14	3594000	0.42	0.0023
6/30/2018	13	4158500	0.45	0.0024
12/31/2018	14	5078800	0.59	0.0032
6/3/2019	14	4241800	0.50	0.0032
12/1/2019	15	2691900	0.34	0.0019
6/30/2020	16	3011700	0.40	0.0019
12/31/2020	6	4571400	0.23	0.0012
TOTALS		329,379,242	828.40	

Notes:
* Gallons pumped is measured from previous sampling date.
Updated 2/2021

TABLE 2-2

1,1,1-TCA CONCENTRATIONS AND REMOVAL IN BH-20
Former Channel Master Site
Chemical Effectiveness Monitoring

SAMPLING DATE	TCA CONCENTRATION IN WATER (ug/l)	WATER PUMPED* (gallons)	TCA REMOVED (pounds)	TCA REMOVAL RATE (lbs/day)
7/13/1990	4300	12,487	0.45	0.090
7/25/1990	270	0	0.00	0.000
10/17/1990	860	0	0.00	0.000
1/9/1991	2100	0	0.00	0.000
10/15/1991	2700	16,410	0.37	0.018
12/21/1991	4800	88,290	3.5	0.053
1/15/1992	2800	32,880	0.77	0.031
6/19/1992	4100	201,990	6.9	0.044
12/7/1992	1800	182,170	2.7	0.016
7/7/1993	740	330,450	2.0	0.010
12/6/1993	790	118,620	0.78	0.0051
10/25/1994	3000	324,410	8.1	0.025
3/28/1995	1700	124,490	1.8	0.011
7/12/1995	930	85,160	0.66	0.0062
12/5/1995	850	124,840	0.88	0.0061
6/11/1996	630	217,360	1.1	0.0060
12/17/1996	1400	192,540	2.2	0.012
6/10/1997	560	190,070	0.89	0.0051
12/16/1997	600	153,750	0.77	0.0041
4/28/1998	370	156,550	0.48	0.0036
12/10/1998	350	226,630	0.66	0.0029
6/24/1999	190	194,730	0.31	0.0016
12/28/1999	130	146,970	0.16	0.0009
6/13/2000	410	250,780	0.86	0.0051
12/29/2000	240	266,290	0.53	0.0027
12/31/2002	0	209,410	0.00	0.0000
6/24/2003	34	226,960	0.064	0.00037
12/30/2003	170	296,080	0.42	0.0022
6/29/2004	75	239,060	0.15	0.00082
12/28/2004	21	108,140	0.019	0.00010
6/28/2005	48	254,480	0.10	0.00056
12/27/2005	130	189,520	0.21	0.00113
6/28/2006	110	192,330	0.18	0.00096
12/27/2006	160	200,010	0.27	0.00147
6/26/2007	41	234,690	0.080	0.00044
12/24/2007	59	104,060	0.051	0.00028
6/24/2008	84	196,380	0.14	0.00075
12/30/2008	350	68,170	0.20	0.00105
6/30/2009	65	84,360	0.05	0.00025
12/30/2009	71	84,380	0.05	0.00027
6/29/2010	45	137,270	0.05	0.00028
12/28/2010	83	70,630	-1.80	-0.00991
6/15/2011	45	138,690	1.06	0.00626
12/28/2011	50	206,800	0.08	0.00043
6/30/2012	52	66,660	0.03	0.00015
12/26/2012	65	61,170	0.03	0.00019
6/28/2013	55	89,650	0.04	0.00022
12/31/2013	63	96,070	0.05	0.00027
6/25/2014	17	88,060	0.01	0.00007
12/30/2014	133	63,340	0.07	0.00037
6/5/2015	41	67,840	0.02	0.00013
12/29/2015	32	19,020	0.005	0.00003
6/30/2016	13	31,590	0.003	0.00002
12/30/2016	160	19,400	0.026	0.00014
6/30/2017	92	54,880	0.042	0.00023
12/27/2017	26	47,610	0.010	0.00006
6/30/2018	14	71,340	0.008	0.00005
12/31/2018	15	61,310	0.008	0.00004
6/3/2019	46	62,980	0.024	0.00016
12/1/2019	20	28,440	0.005	0.00003
6/30/2020	110	62,620	0.057	0.00027
12/31/2020	29	62,620	0.010	0.00005
TOTALS		7,933,887	38.87	

Notes:
* Gallons pumped is measured from previous sampling date.
Pumping of BH-20 ceased in April 2001 and was continued in July 2002.

Updated 2/2021

TABLE 2-3
INITIAL 1,1,1-TCA CONCENTRATIONS
Former Channel Master Site
Chemical Effectiveness Monitoring

Well No.	BH-1	BH-2	BH-9	BH-11A	BH-11B	BH-16	BH-17	BH-18	BH-19
Well Screen Interval (ft bgl)	10-20	10-20	10-20	28-38	10-20	10-20	22-32	10-20	41-51
1985									
13-Jun	0.5 *	19.5	17.0						
17-Jul	2.0	17.0	4.0						
17-Sep				0.5 *	37,800	276,000	226	19,930	
17-Dec					13,300				
1986									
18-Mar				30.0					18.0
20-Jun		0.5 *	0.5 *						
16-Sep	9.3		38.0		140,000	900,000	0.8 *	9,200	0.8 *
03-Dec						170,000			
Sample average (1985-86)	3.9	12.3	14.9	15.3	63,700	448,667	113	14,565	9.4

NOTES: Blank space indicates well was not sampled

* indicates a value of one-half the detection limit for samples in which TCA was not detected

ft bgl = feet below grade level

All concentrations presented in units of ug/l.

TABLE 2-4

1,1,1-TCA CONCENTRATION HISTORY
Former Channel Master Site, Ellenville, NY
Chemical Effectiveness Monitoring Network

Well No.		BH-1	BH-2	BH-9	BH-11A	BH-11B	BH-16	BH-17	BH-18	BH-19
Well Screen Interval (ft bgl)		10-20	10-20	10-20	28-38	10-20	10-20	22-32	10-20	41-51
Average Initial Concentration (data collected 1985-1986)		3.9	12.3	14.9	15.3	63,700	448,667	113	14,565	9.4
1987	20-Feb						304,000			
	29-Apr					24,000	90,000			9.4
	27-May					100,000	470,000			14.0
	18-Aug		94	30	0.15 *	41,000	170,000		1,600	93.0
average			94	30	0.15 *	55,000	258,500		1,600	39
1988	20-Jan		57	65	0.15 *	46,000	69,000		560	1.1
	07-Apr		260	23	2.5	39,000	150,000		950	4.8
	21-Jul		380	8.3	1.2	3,500	66,000		990	0.55
	27-Oct		31	17	2.7	11,000	210,000		410	0.95
average			182	28	1.6	24,875	123,750		728	1.9
1989	17-Jan		38	7.4	1.9	17,000	370,000		1,300	2.5
	01-May	1.5	17		1.2	12,000	48,000		120	0.4
	05-Jul	2.1	200	180	0.33	22,000	26,000		660	130.0
	25-Oct	8.8	79	16	11.0	20,000	110,000		330	92.0
average		4.1	84	68	3.6	17,750	138,500		603	56
1990	23-Jan	100	50	6.2	0.15 *	36,000	78,000		450	46
	10-May	100	160	19	1.6	18,000	63,000		150	54
	25-Jul	8.3	43	11	1.1	18,000	28,000		3,600	47
	17-Oct	3.2	16	7.4	1.0	25,000	59,000		490	190
average		53	67	11	0.96	24,250	57,000		1,173	84
1991	09-Jan	10	58	7.0	1.4	13,000	12,000		700	130
	24-Apr	3.2	54	11	3.4	6,100	16,000		310	170
	24-Jul	4.4	32	9.7	0.48	28,000	12,000		160	70
	15-Oct		41	4.8	4.8	19,000	19,000	11	12	190
average		5.9	46	8	2.5	16,525	14,750	11	296	140
1992	16-Jan		32	10	0.2 *	31,000	2,400	1.6	1,100	250
	07-Apr		14	7.8	5.4	17,000	6,100	1.5	1,700	250
	22-Jul		12	7.3	6.8	18,000	11,000	89	1,900	140
	20-Oct		8.0	5.3	0.7	6,700	13,000	2.8	160	160
average			17	7.6	3.3	18,175	8,125	24	1,215	200
1993	26-Jan				5.7	14,000	4,200	0.75	2,300	68
	07-Apr		9.0	300.0	2.0	180	5,500	0.80	4.1	14
	06-Jul		14	6.8	0.25 *	11,800	3,270	18.4	13	21
	02-Nov		0.25 *	0.25 *	0.25 *	13,000	12,000	160	150	93
average			7.8	102	2.1	9,745	6,243	45	617	49
1994	01-Feb		6.3	17	7.2	9,000	4,900	62	450	41
	13-Apr		4.5	21	6.0	9,000	5,000	0.25 *	120	23
	06-Jul		32	1.2	2.9	10,000	4,000	190	180	18
	12-Oct		21	3.2	2.1	5,300	8,400	110	300	90
average			16	11	4.6	8,325	5,575	91	263	43
1995	10-Jan		7.7	3.6	0.25 *	5,800	2,300	2.7	620	37
	11-Apr		25	1.9	2.5	5,600	1,500	6.4	120	13
	12-Jul		12	3.8	0.25 *	5,400	7,900	120	3.5	35
	25-Oct		17	2.6	4.6	2,900	13,000	39	19	140
average			15	3.0	1.9	4,925	6,175	42	191	56
1996	25-Jan		17	1.2	2.3	1,900	4,300	0.25 *	4.5	26
	03-Apr		16	1.3	3.2	3,100	1,700	14	9.5	18
	10-Jul		28	1.1	0.80	6,800	4,800	32	9.0	42
	08-Oct		46	0.90	2.4	6,500	4,000	28	10	67
average			27	1.1	2.2	4,575	3,700	19	8.3	38
1997	14-Jan		12	1.8	0.25 *	7,500	1,200	75.0	110	49
	29-May		12	2.5	0.32	6,800	1,100	3.4	10	5.1
	22-Oct		19	1.4	1.7	690	4,910	260	2.9	76
average			14	1.9	0.76	4,997	2,403	113	41	43
1998	28-Apr		22	1.0	1.7	3,900	1,700	135.0	260	37
	27-Oct		30	1.0	4.3	1,800	2,200	360.0	0.24	110
average			26	1.0	3.0	2,850	1,950	248	130	74
1999	08-Apr		3.7	2.0	1.4	3,000	360	22	130	64
	20-Oct		26	1.7	4.9	6,300	2,300	180	2.5	38
average			15	1.9	3.2	4,650	1,330	101	66	51

TABLE 2-4

1,1,1-TCA CONCENTRATION HISTORY
Former Channel Master Site, Ellenville, NY
Chemical Effectiveness Monitoring Network

Well No. / Well Screen Interval (ft bgl)		BH-1 10-20	BH-2 10-20	BH-9 10-20	BH-11A 28-38	BH-11B 10-20	BH-16 10-20	BH-17 22-32	BH-18 10-20	BH-19 41-51
2000	19-Apr		16	0.99	1.1	4,300	380	5.9	6.9	20
	17-Oct		9.9	0.59	2.9	5,900	1,600	67	2.0	21
average			13	0.79	2.0	5,100	990	36	4.5	21
2001	31-May		8.1	1.3	12	4,200	840	62	1.6	4.1
	29-Oct		2.3	0.79	9.6	1,600	960	79	1.4	0.17
average			5.2	1.0	11	2,900	900	71	1.5	2.1
2002	18-Apr		6.6	0.73	4.7	2,900	420	110	1.4	0.24
	09-Oct		3.0	1.1	3.7	730	700	140	1.4	0.11 *
average			4.8	0.92	4.2	1,815	560	125	1.4	0.18
2003	29-May		9.8	1.3	4.3	3,000	210	120	1.3	0.37
	23-Oct		23	0.7	3.3	900	120	75	1.3	0.13 *
average			16	1.0	3.8	1,950	165	98	1.3	0.25
2004	07-Apr		11	0.71 J	3.0	1,200	75	0.5 *	3.1	0.5 *
	22-Oct		27	1.8	3.0	2,800	120	0.5 *	5.6	0.5 *
average			19	1.3	3.0	2,000	98	0.5	4.4	0.5
2005	29-Apr		3.1	0.94	3.4	300	170	0.5 *	2.6	0.5 *
	21-Oct		4.0	18	3.6	240	390	0.5 *	2.0	0.5 *
average			3.6	9.5	3.5	270	280	0.5	2.3	0.5
2006	20-Apr		12	0.76 J	2.3	1,500	110	0.84 J	1.3	0.55 J
	10-Oct		17	0.55	2.3	33	120	0.5 *	0.95 J	0.5 *
average			14.5	0.66	2.3	767	115	0.7	1.1	0.5
2007	21-Apr		4.4	0.94 J	2.0	140	160	0.5 *	4.2	0.5 *
	30-Oct		9.5	1.7	0.5 *	530	120	77	0.78 J	0.5 *
average			7.0	1.32	1.3	335	140	38.8	2.5	0.5
2008	03-Apr		3.9	1.3	0.5 *	77	490	2.1	3.0	0.5 *
	22-Oct		6.8	0.28 J	0.5 *	240	210	0.36 J	0.80 J	0.5 *
average			5.4	0.79	0.5	159	350	1.2	1.9	0.5
2009	10-Apr		6.0	2.3	0.5 *	160	430	5.2	3.2	0.53
	23-Nov		9.0	1.1	0.12 *	240	220	1.8	0.93	
average			7.5	1.7	0.31	200	325	3.5	2.1	0.53
2010	15-Jun			0.98	0.12 *	220	430	0.12 *	0.95	
	10-Nov		16	0.78	0.12 *	170	210	0.12 *	0.98	0.12
average			16.0	0.9	0.12	195	320	0.12	1.0	0.12
2011	02-May		6.2	1.6	0.12 *	22	300 E	4.7	12	0.39
	22-Nov		2.6	5.9	0.12 *	94 E	180 E	0.12 *	0.87	0.12 *
average			4.4	3.8	0.12	58	240	2.41	6.4	0.26
2012	01-May		3.5	4.3	0.12 *	110 E	250 E	4.7	3.5	0.12 *
	25-Oct		8.3	5.2	0.12 *	61	280 E	0.12 *	1.6	0.12 *
average			5.9	4.8	0.12 *	86	265	2.41	2.6	0.12 *
2013	03-May		3.1	6.1	0.12 *	26	220 E	2.5	3.4	0.12 *
	24-Oct		5.5	0.46	0.12 *	150 E	520 E	0.12 *	0.72	0.12 *
average			4.3	3.3	0.12 *	88	370	1.31	2.1	0.12 *
2014	07-May		1.2	0.2	0.12 *	38	320 E	2.9	4.80	0.12 *
	28-Oct		5.1	0.26	0.12 *	160	59	0.35	0.55	0.12 *
average			3.2	0.23	0.12 *	99	190 E	1.63	2.68	0.12 *
2015	15-Apr		**5.5**	0.81	0.12 *	36	340	3.3	3.00	0.12 *
	13-Nov		8.6	1.60	0.12	26	410	0.12 *	1.2	0.12 *
average			7.1	1.2	0.1 *	31.0	375.0	1.7 *	2.1	0.12 *

TABLE 2-4

1,1,1-TCA CONCENTRATION HISTORY
Former Channel Master Site, Ellenville, NY
Chemical Effectiveness Monitoring Network

Well No. / Well Screen Interval (ft bgl)		BH-1 10-20	BH-2 10-20	BH-9 10-20	BH-11A 28-38	BH-11B 10-20	BH-16 10-20	BH-17 22-32	BH-18 10-20	BH-19 41-51
2016	20-May		2.7	1.70	0.12 *	71	410	0.36	0.47	0.12 *
	04-Nov		12	0.39	0.12 *	180	450	0.12 *	0.44	0.29
average			7.4	1.05	0.12 *	126	430	0.24	0.46	0.21 *
2017	07-May		5.2	15.00	0.12 *	75	330	0.12 *	1.00	0.12 *
	22-Nov		7.14	0.12 *	0.12 *	120	990	0.12 *	0.56 J	0.12 *
average			6.2	7.56	0.12 *	98	660	0.12	0.78	0.12 *
2018	19-May		2.9	0.80 J	0.12 *	80	130	0.12 *	0.68 J	0.12 *
	20-Nov		3.4	9.60	0.12 *	18	640	0.12 *	0.72 J	0.12 *
average			3.2	5.20	0.12 *	49	385	0.12	0.70	0.12 *
2019	17-May		2.7	7.20	0.12 *	20	180	0.12 *	0.54 J	0.12 *
	25-Nov		3.6	6.20	0.61 J	36	580	0.12 *	0.64 J	0.28 J
average			3.2	6.70	0.37 *	28	380	0.12 *	0.59	0.20 *
2020	05-May		1.2	5.10	0.48 J	30	370	0.12 *	0.41 J	0.25 J
2020	24-Nov		4.8	0.56 J	0.92 J	34	340	0.32 *	0.64 J	0.28 J
average			3.0	2.83	0.70 J	32	355	0.22 *	0.53	0.27 *
(Feb 1987- December 2020)		24	29	11	2	8,652	28,942	40	269	38

NOTES:

Blank spaces indicate well was not sampled
J - estimated value; detected below quantitation limit
* - indicates a value of one-half the detection limit for samples in which TCA was not detected
E- Result exceeded calibration range, secondary dilution required
ft bgl = feet below grade level
All concentrations presented in units of ug/l.

FIGURES

Legend

1,1,1-TCA - Trichloroethane

ug/l - Micrograms per liter

ND - Not Detected

N

BH10

BH3

BH2
1,1,1-TCA 4.8 ug/l

BH15

BH14

BH19
1,1,1-TCA ND

PZ2

BH12

BH16
1,1,1-TCA 340.0 ug/l

BH9
1,1,1-TCA ND

BH17
1,1,1-TCA ND

BH20

PZ3

PZ1

BH11B
1,1,1-TCA 34.0 ug/l
BH11A
1,1,1-TCA 0.92 ug/l

BH18
1,1,1-TCA 0.64 ug/l

Recovery

BH13

BH1

BH4

BH7

0 25 50 100
Feet

Elevations: feet MSL

Document Path: G:\Project\0395052 Channel Master AVNET\GIS\ChannelMaster.mxd

NALYTICAL RESULTS NOVEMBER 25-2, 2020

ARCADIS Design & Consultancy for natural and built assets	CHANNEL MASTER ELLENVILLE, NEW YORK SEMI-ANNUAL GROUNDWATER ANALYTICAL RESULTS NOVEMBER 24, 2020	0395-052-108 **FIGURE 3-1 A**

Legend

Former Plant Area Water Table Contours (11/24/2020)

N

BH10 (297.28)

BH3 (298.06)

297.5

BH15 (297.40)

BH2 (297.31)

BH14 (298.81)

BH12 (297.18)

BH19 (300.99)

BH9 (297.30)

PZ2 (297.16)

BH16 (299.10)

BH17 (301.00)

299.5

BH20 (295.50)

PZ3 (297.10)

PZ1 (297.30)

BH11B (297.33)
BH11A (301.05)

298.5

Recovery (293.45)

295.5

BH18 (298.18)

296.5

297.5

BH13 (296.86)

BH1 (297.42)

298.5

299.5

BH4 (300.03)

BH7 (298.51)

0 25 50 100 Feet

Elevations: feet MSL.

Document Path: G:\Project\0395052 Channel Master AVNET\GIS\ChannelMaster-Nov2020.mxd

ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE, NEW YORK
WATER TABLE ELEVATION CONTOUR MAP
FORMER PLANT AREA WELLS - NOVEMBER 24, 2020

0395-052-108

FIGURE 3-1

Path: G:\Model\ChannelMaster_0395052\Channel_Master.mxd

BH6
BH3
BH10
BH2
BH14
BH15
300
BH12
30
BH16
BH19
PZ3
BH9
1
RECOVERY
WELL
BH20
BH17
PZ2
PZ1
BH18
BH11B
BH11A
0.1
BH13
BH1
BUILDIN
BH4
BH7
0 25 50 100
Feet

ARCADIS Design & Consultancy for natural and built assets

CHANNEL MASTER
ELLENVILLE NEW YORK
ISOCONCENTRATION MAP - 1,1,1-TRICHLOROETHANE (µg/l)
SHALLOW PLANT AREA WELLS – November 24, 2020

0395-052-108

FIGURE 3-2

Arcadis U.S., Inc.

17-17 Route 208 North

Fair Lawn, New Jersey 07410

Tel 201 797 7400

Fax 201 797 4399

www.arcadis.com

Estimated Annual Mean Concentration Tables

DISSOLVED METALS
FORMER CHANNEL MASTER SITE
POST-CLOSURE

ESTIMATED ANNUAL MEAN CONCENTRATIONS
(All results presented in units of ug/L)

MONITORING WELL MW-3

	SAMPLING DATE		ANNUAL MEAN	
PARAMETER [1]	May 4, 2020	November 23, 2020	LOW [2]	HIGH [3]
Dissolved Arsenic	21	ND (10)	11	13

NOTES:
1 - Only constituents detected during the year are shown on the table.
2 - "Low" values were calculated using zero for "ND" and "J" values.
3 - "High" values were calculated using estimated "J" values as reported and
one-half the detection limit for "ND" values.
J - Compound identified below the method detection limit; therefore, reported concentration is an estimate.
B - Compound also detected in laboratory blank.

DISSOLVED METALS
FORMER CHANNEL MASTER SITE
POST-CLOSURE

ESTIMATED ANNUAL MEAN CONCENTRATIONS
(All results presented in units of ug/L)

MONITORING WELL MW-8D

	SAMPLING DATE		ANNUAL MEAN	
PARAMETER [1]	May 4, 2020	November 23, 2020	LOW [2]	HIGH [3]
Dissolved Arsenic	ND (10)	ND (10)	0.0	5.0

NOTES:
1 - Only constituents detected during the year are shown on the table.
2 - "Low" values were calculated using zero for "ND" and "J" values.
3 - "High" values were calculated using estimated "J" values as reported and one-half the detection limit for "ND" values.
J - Compound identified below the method detection limit; therefore, reported concentration is an estimate.
B - Compound also detected in laboratory blank.

DISSOLVED METALS
FORMER CHANNEL MASTER SITE
POST-CLOSURE

ESTIMATED ANNUAL MEAN CONCENTRATIONS
(All results presented in units of ug/L)

MONITORING WELL MW-10S

	SAMPLING DATE		ANNUAL MEAN	
PARAMETER [1]	May 4, 2020	November 23, 2020	LOW [2]	HIGH [3]
Dissolved Arsenic	ND (10)	ND (10)	0.0	5.0

NOTES:
1 - Only constituents detected during the year are shown on the table.
2 - "Low" values were calculated using zero for "ND" and "J" values.
3 - "High" values were calculated using estimated "J" values as reported and one-half the detection limit for "ND" values.
J - Compound identified below the method detection limit; therefore, reported concentration is an estimate.
B - Compound also detected in laboratory blank.

VOLATILE COMPOUNDS (HALOCARBONS/AROMATICS)
FORMER CHANNEL MASTER SITE
CORRECTIVE ACTION

ESTIMATED ANNUAL MEAN CONCENTRATIONS
(All results presented in units of ug/L)

MONITORING WELL BH-2

	SAMPLING DATE		ANNUAL MEAN	
PARAMETER [1]	May 5, 2020	November 24, 2020	LOW [2]	HIGH [3]
1,1,1-Trichloroethane	1.20	4.80	3.00	3.00
1,1-Dichloroethane	ND (0.27)	1.00	0.50	0.64

NOTES:
1 - Only constituents detected during the year are shown on the table.
2 - "Low" values were calculated using zero for "ND" and "J" values.
3 - "High" values were calculated using estimated "J" values as reported and one-half the detection limit for "ND" values.
ND - Not detected (detection limit)
J - Compound identified below the method detection limit; therefore, reported concentration is an estimate.
B - Compound also detected in laboratory blank.

VOLATILE COMPOUNDS (HALOCARBONS/AROMATICS)
FORMER CHANNEL MASTER SITE
CORRECTIVE ACTION

ESTIMATED ANNUAL MEAN CONCENTRATIONS
(All results presented in units of ug/L)

MONITORING WELL BH-9

	SAMPLING DATE		ANNUAL MEAN	
PARAMETER [1]	May 5, 2020	November 24, 2020	LOW [2]	HIGH [3]
1,1,1-Trichloroethane	5.10	0.56 J	2.55	2.83
1,1-Dichloroethane	2.10	3.00	2.55	2.55
1,2-Dichloroethane	ND (30)	0.66 J	0.00	0.41

NOTES:
1 - Only constituents detected during the year are shown on the table.
2 - "Low" values were calculated using zero for "ND" and "J" values.
3 - "High" values were calculated using estimated "J" values as reported and
one-half the detection limit for "ND" values.
ND - Not detected (detection limit)
J - Compound identified below the method detection limit; therefore, reported concentration is an estimate.
B - Compound also detected in laboratory blank.

VOLATILE COMPOUNDS (HALOCARBONS/AROMATICS)
FORMER CHANNEL MASTER SITE
CORRECTIVE ACTION

ESTIMATED ANNUAL MEAN CONCENTRATIONS
(All results presented in units of ug/L)

MONITORING WELL BH-11A

	SAMPLING DATE		ANNUAL MEAN	
PARAMETER [1]	May 5, 2020	November 24, 2020	LOW [2]	HIGH [3]
1,1,1-Trichloroethane	0.48 J	0.92 J	0.00	0.70
Methlyene Chloride	ND (0.27)	0.32 J	0.0	0.23

NOTES:
1 - Only constituents detected during the year are shown on the table.
2 - "Low" values were calculated using zero for "ND" and "J" values.
3 - "High" values were calculated using estimated "J" values as reported and
one-half the detection limit for "ND" values.
ND - Not detected (detection limit)
J - Compound identified below the method detection limit; therefore, reported concentration is an estimate.
B - Compound also detected in laboratory blank.

VOLATILE COMPOUNDS (HALOCARBONS/AROMATICS)
FORMER CHANNEL MASTER SITE
CORRECTIVE ACTION

ESTIMATED ANNUAL MEAN CONCENTRATIONS
(All results presented in units of ug/L)

MONITORING WELL BH-11B

	SAMPLING DATE		ANNUAL MEAN	
PARAMETER [1]	May 5, 2020	November 24, 2020	LOW [2]	HIGH [3]
1,1,1-Trichloroethane	30.00	34.00	32.00	32.00
1,1,2-Trichloroethane	0.21 J	ND (0.20)	0.00	0.16
1,1-Dichloroethane	14.00	13.00	13.50	13.50
1,1-Dichloroethene	ND (0.27)	0.28 J	0.00	0.14
Chloroform	ND (0.19)	0.21 J	0.00	0.15
Methlyene Chloride	ND (0.27)	0.52 J	0.00	0.33
Tetrachloroethene	ND (0.31)	0.99 J	0.45	0.57
Trichloroethene	0.33 J	ND (0.28)	0.00	0.24

NOTES:
1 - Only constituents detected during the year are shown on the table.
2 - "Low" values were calculated using zero for "ND" and "J" values.
3 - "High" values were calculated using estimated "J" values as reported and
one-half the detection limit for "ND" values.
ND - Not detected (detection limit)
J - Compound identified below the method detection limit; therefore, reported concentration is an estimate.
B - Compound also detected in laboratory blank.

VOLATILE COMPOUNDS (HALOCARBONS/AROMATICS)
FORMER CHANNEL MASTER SITE
CORRECTIVE ACTION

ESTIMATED ANNUAL MEAN CONCENTRATIONS
(All results presented in units of ug/L)

MONITORING WELL BH-16

	SAMPLING DATE		ANNUAL MEAN	
PARAMETER [1]	May 5, 2020	November 24, 2020	LOW [2]	HIGH [3]
1,1,1-Trichloroethane	370.00 D	340 D	355.00	355.00
1,1,2 Trichloroethane	3.30	3.80	3.55	3.55
1,1-Dichloroethane	46.00 D	210.0 D	128.00	128.00
1,1-Dichloroethene	1.70 D	4.60	3.15	3.15
1,2-Dichloroethane	1.30	2.10	1.70	1.70
Chloroethane	ND (0.5)	7.30	3.65	3.90
Chloroform	0.48 J	0.68 J	0.58	0.58
Methylene Chloride	ND (0.27)	4.80	2.40	2.47
Tetrachloroethene	2.20	1.30	1.75	1.75
Trichloroethene	1.70	2.60	2.15	2.15

NOTES:
1 - Only constituents detected during the year are shown on the table.
2 - "Low" values were calculated using zero for "ND" and "J" values.
3 - "High" values were calculated using estimated "J" values as reported and
one-half the detection limit for "ND" values.
ND - Not detected (detection limit)
J - Compound identified below the method detection limit; therefore, reported concentration is an estimate.
B - Compound also detected in laboratory blank.
D - Dilution for analysis. Surrogate or matrix spike recoveries were not obtained

VOLATILE COMPOUNDS (HALOCARBONS/AROMATICS)
FORMER CHANNEL MASTER SITE
CORRECTIVE ACTION

ESTIMATED ANNUAL MEAN CONCENTRATIONS
(All results presented in units of ug/L)

MONITORING WELL BH-17

	SAMPLING DATE		ANNUAL MEAN	
PARAMETER [1]	May 5, 2020	November 24, 2020	LOW [2]	HIGH [3]
1,1,1-Trichloroethane	ND (0.24)	0.32 J	0.00	0.22

NOTES:
1 - Only constituents detected during the year are shown on the table.
2 - "Low" values were calculated using zero for "ND" and "J" values.
3 - "High" values were calculated using estimated "J" values as reported and one-half the detection limit for "ND" values.
ND - Not detected (detection limit)
J - Compound identified below the method detection limit; therefore, reported concentration is an estimate.
B - Compound also detected in laboratory blank.

VOLATILE COMPOUNDS (HALOCARBONS/AROMATICS)
FORMER CHANNEL MASTER SITE
CORRECTIVE ACTION

ESTIMATED ANNUAL MEAN CONCENTRATIONS
(All results presented in units of ug/L)

MONITORING WELL BH-18

	SAMPLING DATE		ANNUAL MEAN	
PARAMETER [1]	May 5, 2020	November 24, 2020	LOW [2]	HIGH [3]
1,1,1-Trichloroethane	0.41 J	0.64 J	0.00	0.53

NOTES:
1 - Only constituents detected during the year are shown on the table.
2 - "Low" values were calculated using zero for "ND" and "J" values.
3 - "High" values were calculated using estimated "J" values as reported and one-half the detection limit for "ND" values.
ND - Not detected (detection limit)
J - Compound identified below the method detection limit; therefore, reported concentration is an estimate.
B - Compound also detected in laboratory blank.

VOLATILE COMPOUNDS (HALOCARBONS/AROMATICS)
FORMER CHANNEL MASTER SITE
CORRECTIVE ACTION

ESTIMATED ANNUAL MEAN CONCENTRATIONS
(All results presented in units of ug/L)

MONITORING WELL BH-19

	SAMPLING DATE		ANNUAL MEAN	
PARAMETER [1]	May 5, 2020	November 24, 2020	LOW [2]	HIGH [3]
1,1,1-Trichloroethane	0.25 J	0.28 J	0.00	0.27

NOTES:
1 - Only constituents detected during the year are shown on the table.
2 - "Low" values were calculated using zero for "ND" and "J" values.
3 - "High" values were calculated using estimated "J" values as reported and
one-half the detection limit for "ND" values.
ND - Not detected (detection limit)
J - Compound identified below the method detection limit; therefore, reported concentration is an estimate.
B - Compound also detected in laboratory blank.
NS - Not sampled (monitoritng well inaccessible at time of sampling)

VOLATILE COMPOUNDS (HALOCARBONS/AROMATICS)
FORMER CHANNEL MASTER SITE
CORRECTIVE ACTION

ESTIMATED ANNUAL MEAN CONCENTRATIONS
(All results presented in units of ug/L)

PUMPING WELL BH-20

	SAMPLING DATE		ANNUAL MEAN	
PARAMETER [1]	June 30, 2020	December 14, 2020	LOW [2]	HIGH [3]
1,1,1-Trichloroethane	110 D	29.00	69.50	69.50
1,1,2-Trichloroethane	0.58 J	0.27 J	0.00	0.43
1,1-Dichloroethane	10.00	1.50	5.80	5.80
1,2-Dichloroethane	0.39 J	ND (0.30)	0.00	0.27
Chloroform	0.34 J	ND (0.19)	0.00	0.22
Trichloroethene	0.47 J	ND (0.28)	0.00	0.31

NOTES:
1 - Only constituents detected during the year are shown on the table.
2 - "Low" values were calculated using zero for "ND" and "J" values.
3 - "High" values were calculated using estimated "J" values as reported and one-half the detection limit for "ND" values.
ND - Not detected (detection limit)
J - Compound identified below the method detection limit; therefore, reported concentration is an estimate.
B - Compound also detected in laboratory blank.

VOLATILE COMPOUNDS (HALOCARBONS/AROMATICS)
FORMER CHANNEL MASTER SITE
CORRECTIVE ACTION

ESTIMATED ANNUAL MEAN CONCENTRATIONS
(All results presented in units of ug/L)

RECOVERY WELL

	SAMPLING DATE		ANNUAL MEAN	
PARAMETER [1]	June 30, 2020	December 14, 2020	LOW [2]	HIGH [3]
1,1,1-Trichloroethane	16	6.1	11.0	11.0
1,1-Dichloroethane	7.7	3.30	5.50	5.50
1,1-Dichloroethene	ND (0.27)	2.00	1.00	1.06
Vinyl chloride	ND (0.15)	0.39 J	0.00	0.23

NOTES:
1 - Only constituents detected during the year are shown on the table.
2 - "Low" values were calculated using zero for "ND" and "J" values.
3 - "High" values were calculated using estimated "J" values as reported and one-half the detection limit for "ND" values.
ND - Not detected (detection limit)
J - Compound identified below the method detection limit; therefore, reported concentration is an estimate.
B - Compound also detected in laboratory blank.

Arcadis U.S., Inc.

17-17 Route 208 North

Fair Lawn, New Jersey 07410

Tel 201 797 7400

Fax 201 797 4399

www.arcadis.com