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EPA Region 1 RAC 2 Contract No. EP-S1-06-03

July 25, 2018
Nobis Project No. 80113

Via Electronic Submittal

U.S. Environmental Protection Agency, Region 1
Attention: Ms. Lisa Thuot, Remedial Project Manager
5 Post Office Square, Suite 100
Boston, Massachusetts 02109-3919

Subject: Transmittal of the 2017-2018 Data Summary Technical Memorandum
Nyanza Chemical Waste Dump Superfund Site – Operable Unit 2, Ashland, Massachusetts
Remedial Action
EPA Task Order No. 0113-RICO-0115

Dear Ms. Thuot:

Enclosed with this correspondence is the 2017-2018 Data Summary Technical Memorandum for the Nyanza Chemical Waste Dump Superfund Site, Operable Unit 2, located in Ashland, Massachusetts.

Should you have any questions or comments, please contact me at (603) 513-7331, or jvernon@nobiseng.com.

Sincerely,

NOBIS ENGINEERING, INC.

James H. Vernon, Ph.D.
Senior Hydrogeologist

Attachment

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2017-2018 Data Summary Technical Memorandum

Nyanza Chemical Waste Dump Superfund Site
Operable Unit 2
Ashland, Massachusetts

Feasibility Study
EPA Task Order No. 0113-RICO-0115

REMEDIAL ACTION CONTRACT
No. EP-S1-06-03

FOR

US Environmental Protection Agency
Region 1

BY

Nobis Engineering, Inc.

Nobis Project No. 80113

July 2018

U.S. Environmental Protection Agency

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2017-2018 Data Summary Technical Memorandum

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Operable Unit 2
Ashland, Massachusetts
Feasibility Study
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1.0 INTRODUCTION

Nobis Engineering, Inc. (Nobis) prepared this 2017/2018 Groundwater Monitoring Data Summary Technical Memorandum (Tech Memo) for the Nyanza Chemical Waste Dump Superfund Site, Operable Unit (OU) 2 located in Ashland, Massachusetts (Site) (Figure 1-1).

This work was performed in accordance with the United States Environmental Protection Agency (EPA) Region I Remedial Action Contract 2, No. EP-S1-06-03, EPA Task Order No. 0022-RA-RA-0115, Amended Scope of Work (ASOW) dated May 30, 2017 (Nobis, 2017a).

This Tech Memo summarizes the results of the investigations conducted in Fall 2017 and follow-on investigations conducted in Spring 2018. The information in this Tech Memo will be incorporated into the Feasibility Study as appropriate. The site plan, including monitoring wells and indoor air sample locations, is shown in Figure 1-2.

2.0 FIELD INVESTIGATION

The groundwater investigation included monitoring well installation and development, groundwater sampling, and water level measurement rounds, as described below.

2.1 Well Installation and Development

Monitoring wells MW-701S and MW-702S were installed on April 6, 2018. Well construction logs are included in Appendix A. The wells were installed using a hollow-stem auger to a depth of 15 feet below ground surface (bgs). The drill cuttings consisted of a brown fine to medium sand with some gravel and little silt below topsoil. The wells were finished with a flush-mounted roadbox. Both wells were developed on April 9, 2018 using a submersible pump.

2.2 Groundwater Sampling

Groundwater sampling was conducted to characterize the nature and extent of groundwater contamination. Both overburden monitoring wells (OB) and bedrock monitoring wells (BR) exist at the Site. Wells are classified as OB, BR, or overburden/bedrock (OB/BR, screened across the bedrock interface) based on where the well screen is positioned. OB/BR wells (MW-04B, RW-1,

and MW/B-5) are considered as OB wells when calculating groundwater elevations and mapping chemical distributions.

One groundwater sampling round was conducted in 2017 to evaluate contaminant distribution in both the overburden and bedrock aquifers and to compare any seasonal variability in the results. Follow-on groundwater sampling was conducted in 2018 for only the newly-installed monitoring wells. Table 2-1 lists the wells sampled, groundwater sample identification, dates of sample collection, analyses performed, and quality control (QC) sample designation (as appropriate). Table 2-2 presents monitoring well construction details for the wells sampled.

Prior to the initial (i.e., 2012) groundwater sample collection, Nobis outfitted monitoring wells with dedicated Teflon or Teflon-lined polyethylene tubing. The tubing remains in the wells for future sampling use. Nobis used peristaltic pumps to purge wells and collect groundwater samples. Due to the nature of peristaltic pumps and the use of dedicated tubing, no peristaltic pump components required decontamination between sample points. Movable equipment was decontaminated between wells.

Nobis collected groundwater samples in accordance with the EPA Region 1 low-flow sampling procedures. Nobis monitored the purge water for stabilization of required criteria (see below) before collecting samples. Water level (drawdown), pumping rate, and water quality parameters were recorded every five minutes (or as appropriate) using a SmarTROLL MP multi-parameter and Hach 2100Q turbidity meters (or equivalent). Field data were recorded on Low-Flow Field Log Sheets (Appendix A).

Monitoring wells were considered stable and ready to be sampled when three consecutive readings of water quality parameters achieved the following conditions:

- **Temperature** (3 percent difference between readings)
- **pH** (+/- 0.1 unit between readings)
- **Oxidation Reduction Potential** (ORP) (+/- 10 millivolts [mV] between readings)
- **Dissolved Oxygen** (DO) (10 percent difference between readings or readings less than 0.5 milligrams per liter [mg/L])
- **Specific conductance** (3 percent difference between readings)

- **Turbidity** (10 percent difference between readings or readings less than 5 Nephelometric Turbidity Units [NTU])

After parameter stabilization was achieved, groundwater samples were collected from the tubing directly into the sample containers. Volatile organic compound (VOC) samples were kept free of air bubbles or air pockets to minimize evaporative loss of dissolved VOCs.

2.3 Groundwater Elevation Measurements

Prior to the 2017 sampling event, Nobis obtained site-wide synoptic groundwater elevations from all available monitoring wells. An additional limited water level measurement round was conducted in 2018 once MW-701S and MW-702S were installed to evaluate the area in the northeast portion of the groundwater plume. These data were used to develop groundwater flow maps. Overburden and bedrock groundwater elevations and flow directions derived from the fall measurement of groundwater elevations (described as “flow paths” in this report) are depicted in Figures 2-1 and 2-2 for the 2017 event and Figures 2-3 and 2-4 for the 2018 event. The depths to water and corresponding groundwater elevations for all monitoring locations are presented in Table 2-3.

2.4 Indoor Air Investigation

EPA personnel conducted an indoor air and subslab field investigation at 19 properties along Pleasant Street, Main Street, and Forest Avenue from March 26, 2018 to March 30, 2018. The sampling included ambient air at four properties, indoor air samples at ten properties, and subslab soil gas samples at seven properties. In addition, grab samples at these properties were also collected at potential entry points for soil gas, such as floor cutouts, sumps, and water/sewer line entry points; these supplemental grab samples were subjected to field screening, but were not sent for full laboratory analysis. Sample collection details are provided in the EPA’s Indoor Air Vapor Intrusion Study Report (EPA, 2018), which is included as Appendix B.

2.5 Other Field Activities

Nobis maintains the DNAPL extraction systems at MW-113A and MW/B-11. The annual operations and maintenance (O&M) reports describe activities associated with these extraction systems. The most recent report available describes activities through August 2017. As of August

2017, approximately 433 gallons of product have been removed (Nobis, 2017b). DNAPL extraction is continuing in 2018 and will be summarized in the 2018 annual O&M report.

Also, on May 2, 2018, Nobis oversaw location and elevation surveying for the two new monitoring wells and MW-40MAIN. See Appendix C for the report produced by the survey contractor (A-Plus Construction Services Corporation).

3.0 GROUNDWATER ANALYTICAL RESULTS

Groundwater laboratory analytical results for the 2017 and 2018 sampling are presented in Table 3-1 and Table 3-2, respectively. Analytical results from wells located within a potentially productive aquifer (PPA 4) were compared to both the Massachusetts Department of Environmental Protection (MassDEP) GW-1 groundwater standards and the GW-2 groundwater standard, while analytical results from wells outside of PPA 4 were compared to GW-2 standards only.

Samples from nine wells contained high levels of site contaminants; in these instances, the laboratory diluted these samples to obtain valid analytical results for the elevated constituents. Samples which were diluted may have elevated detection limits for all non-detected compounds. In some cases, this has resulted in some detection limits exceeding the applicable GW-1 and/or GW-2 standard. This problem is generally limited to highly-contaminated wells near the Nyacol and WAC pumping stations, immediately downgradient of the landfill, or within the center of the groundwater plume (Figure 1-2).

3.1 Groundwater Data Quality Assessment and Limitations

Nobis has performed a data quality assessment for both the 2017 and 2018 sampling rounds, in accordance with the WPA (Nobis, 2017a) and QAPP (Nobis, 2017c). This assessment was performed to evaluate whether the collected groundwater data would be reliable for assessing groundwater contamination at the Site. In general, the data proved reliable. Details of data requiring qualification are given below.

3.1.1 Fall 2017

The EPA Region 1 Office of Environmental Measurement and Evaluation (OEME) laboratory analyzed samples using in-house procedures for VOCs EIASOP-VOAGCMS9), metals (EIASOP-

OPTIMAS0), anions (EIASOP-INGIC13), and nitrogen as nitrate and nitrite (EIASOP-INGNO2NO30).OEME Eurofins Spectrum Analytical (Eurofins) analyzed the 2017 delivery of analytical services (DAS) samples using EPA method RSK-175 for dissolved gases, SM5310B for total organic carbon (TOC), SM5210B for biochemical oxygen demand (BOD), and SM5220D for chemical oxygen demand. The analytical results were validated via Tier 1 modified data review consistent with EPA data validation guidelines (EPA, 2013, 2016, and 2017).

Data validation qualification flags were applied to the data as described in the data validation summary in Appendix D. Tetrachloroethene (PCE) data were rejected. PCE has not been detected above screening criteria in previous sampling rounds and is not considered to be a contaminant of concern for Nyanza. In addition, three nitrate sample results were not reported due to sample color interference. No other 2017 data were rejected. The Section 3 tables include these qualification flags. Full comments on relative bias for these data are included in the data validation memos.

3.1.2 Spring 2018

OEME performed all the analyses for the 2018 samples (VOCs only). The results were validated via Tier 1 modified data review that is consistent with the *Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures* (EPA, 2013, 2016, and 2017). Data validation qualification flags were applied to these data as described in the data validation memoranda in Appendix D.

3.2 OU2 VOC Analytical Data

The VOC data were compared to the MassDEP GW-1 standards within PPA 4 (Tables 3-1a and 3-2a). All of the wells were also compared to MassDEP GW-2 standards (Tables 3-1b and 3-2b). Exceedances of GW-1 standards and GW-2 standards are discussed separately below.

3.2.1 GW-2 Standard Exceedances

The MassDEP GW-2 standard applies to all Site monitoring wells. Seven VOCs exceeded their applicable GW-2 standards in 2017, including 1,2,4-trichlorobenzene (TCB); 1,2-dichlorobenzene (DCB); 1,4-DCB; chlorobenzene; cis-1,2-dichloroethene (DCE); trichloroethene (TCE); and vinyl chloride (VC). The 2017 data is not as comprehensive as data from the prior (fall 2015) sampling round, because the SOW (Nobis, 2017a) and QAPP (Nobis, 2017c) called for sampling a limited,

selection of monitoring wells and not a full, comprehensive monitoring round. Therefore, for the sake of contouring, 2015 data are included in plume maps for locations that were not sampled in 2017. However, in the discussion below, 2017/2018 data are considered for identifying the locations with maximum concentration. Refer to the 2015 summary report (Nobis, 2016) for details regarding the 2015 samples.

Specific details for selected VOCs based on 2017/2018 data are as follows:

- **TCE:** The highest dissolved-phase TCE concentration was detected in MW/B-5, located on the WAC property. TCE distributions in overburden and bedrock wells are depicted in Figures 3-1 and 3-2, respectively.

- **1,4-DCB**: The highest concentration in 2017-2018 samples was detected in MW/B-5. Figures 3-3 and 3-4 depict the 1,4-DCB concentrations in overburden and bedrock groundwater, respectively.

- **Cis-1,2-DCE**: The highest concentration was detected in RMW-405B. Figures 3-5 and 3-6 depict the cis-1,2-DCE concentrations in overburden and bedrock groundwater, respectively.

- **1,2,4-TCB:** The highest 1,2,4-TCB concentration was detected in MW-202. Figures 3-7 and 3-8 depict the 1,2,4-TCB concentrations in overburden and bedrock groundwater, respectively.

- **1,2-DCB:** The highest 1,2-DCB concentration was detected in MW/B-5. Figures 3-9 and 3-10 depict the 1,2-DCB concentrations in overburden and bedrock groundwater, respectively.

- **Benzene:** The highest benzene concentration was detected in MW-203A. Figures 3-11 and 3-12 depict the benzene concentrations in overburden and bedrock groundwater, respectively.

- **Chlorobenzene:** The highest chlorobenzene concentration was detected in MW/B-5. Figures 3-13 and 3-14 depict the chlorobenzene concentrations in overburden and bedrock groundwater, respectively.

- **VC**: The highest concentration was detected in MW-203A; however, the laboratory was unable to detect concentrations down to detection limits that are lower than the groundwater standards for all samples analyzed. Therefore, it is possible that some VC non-detect results might also exceed the groundwater standards at other sampling locations. Figures 3-15 and 3-16 depict the VC concentrations in overburden and bedrock groundwater, respectively.

3.2.2 GW-1 Standard Exceedances

Six VOCs exceeded their applicable GW-1 standards in PPA-4 in 2017, including 1,2-DCB, 1,4-DCB, chlorobenzene, cis-1,2- DCE, TCE, and VC. Also, five VOCs exceeded their applicable GW-1 standards in PPA-4 (MW-701S) in 2018, including 1,2,4-TCB, TCE, 1,4-DCB, cis-1,2-DCE, and chlorobenzene. These exceedances in new well MW-701S indicate that the plume edge is farther north than indicated in the 2015 Groundwater Report. However, it must be remembered that in areas near the edge of the Mill Pond, groundwater flow directions can reverse depending on several factors, as discussed in the 2015 Groundwater Report. New well MW-701S has only been sampled once, so conclusions about this area must be considered tentative.

The highest VOC concentrations in PPA 4 were detected in MW-304A. Samples from MW-304B and RMW-305A also contained elevated VOC concentrations.

3.3 Metals Analytical Data

A subset of monitoring wells was also sampled for metals analyses. Table 3-3 lists results for all locations, including PPA-4. The metals analyzed for do not have applicable GW-2 standards, so applicable results were compared to GW-1 standards. The only metals which were detected in the samples were aluminum (two wells), arsenic (two wells), barium (three wells), calcium (all wells), chromium (one well), iron (eight wells), magnesium (all wells), manganese (all wells), and nickel (one well). None of the detected results in PPA-4 exceeded GW-1 standards. Note that in a few cases, the detection limit was above the GW-1 standard. The highest concentrations were generally detected in MW-115A and MW-115B.

3.4 Anion Analytical Data

Anion concentrations can be used as additional indicators of anaerobic biodegradation. When oxygen is depleted, microbes will preferentially use nitrate and sulfate as electron acceptors to anaerobically degrade hydrocarbons. Depletion of these terminal electron acceptors may be indicative of ongoing biodegradation.

Anion samples were collected in 2017 to assess groundwater capability to support natural attenuation and reductive dechlorination. Results are presented in Table 3-4 and indicate the following:

- Nitrite was detected in most samples, with the highest concentration detected in a sample from MW-203B (91 micrograms per liter [µg/L]).

- The highest nitrate concentration was encountered at MW-03B (350 µg/L) and the highest sulfate concentrations was encountered at MW-203A (3200 mg/L).

- Under certain conditions, chloride accumulation can be an indicator of anaerobic biodegradation. However, chloride concentrations can be influenced by road salt, especially in shallow monitoring wells near roadways and parking lots. The highest chloride detections were in MW-203A (6,200 mg/L).

3.5 Dissolved Gasses Analytical Data

Dissolved gas concentrations (ethane, ethylene, and methane) can be used as indicators of aerobic and anaerobic biodegradation. Anaerobic biodegradation is well suited to render site groundwater contaminants harmless compounds over time. Ethane and ethylene are recognized end products of biologic and abiotic reductive dechlorination. Methane is an indicator of strongly reducing conditions well suited to biologically-mediated reductive dechlorination (Wiedemeier et al., 2004). Ten wells were sampled for dissolved gasses in 2017, and results are presented in Table 3-4.

Ethane and ethene were detected in only one sample (MW-305B). Methane was detected in two samples, all below 30 µg/L.

3.6 Other Laboratory Parameters

The 5-day biologic oxygen demand (BOD) was generally low and was not detected in half the samples analyzed for. The highest BOD (43 mg/L) was in a sample from MW203A; other detected values were below 25 mg/L. Dissolved organic carbon (DOC) was detected in all samples, at concentrations ranging from 1.03 (MW-305B) to 95 (MW-115A). The highest concentrations (above 50 mg/L) were located in the core of the downgradient plume and included MW-115B and MW-203A in addition to MW-115A. The other DOC concentrations were below 15 mg/L.

3.7 Field Parameter Data

Field parameter data (Table 3-5) were used to establish well stability before sample collection and to assess potential for natural attenuation. The 2017 field parameter data indicate the following:

- Groundwater temperatures were generally consistent across the Site, with an average temperature of 12.6 degrees Celsius.

- The mean pH value across the Site was 6.2, with a minimum of 4.6 (MW-302) and a maximum of 8.4 (MW-203A).

- The highest specific conductance values were measured in MW-115A, MW-203A, and RMW-405B. Elevated specific conductance values correlate well with the highest measured chloride levels.

- ORP is a measurement of the tendency of a chemical species to acquire electrons and be reduced. In general, positive ORP values indicate oxidizing conditions and negative ORP values indicate reducing conditions. Reducing conditions were measured in 9 (out of 28) wells in 2017.

- Anaerobic biodegradation may begin under anoxic conditions (DO levels less than 0.5 mg/L). DO readings were below 0.5 mg/L at 23 wells. In general, these wells were downgradient of the landfill or in the center plume area.

4.0 INDOOR AIR AND SOIL GAS RESULTS

Figure 4-1 depicts indoor air results, and Figure 4-2 depicts soil gas results from the 2018 indoor air investigation. Ambient air results shown on Figure 4-1 are those that were representative for the day/atmospheric conditions that the indoor air samples were collected under. In total, four ambient air samples were collected. Complete results are included in Appendix B.

Five project target compounds have identified for indoor air: TCE, benzene, chlorobenzene, 1,4-DCB, and VC. Of these, only benzene was detected in indoor air, and was detected in every ambient and indoor air sample collected for laboratory analysis. TCE was detected in six laboratory (canister) sub-slab samples, while benzene was detected in two sub-slab samples and both chlorobenzene and 1,4-DCB were detected in one sample.

5.0 GROUNDWATER TREND EVALUATION

The 2015 Groundwater report (Nobis, 2016) used a statistical evaluation tool to determine if the groundwater concentrations at the Site may be increasing or decreasing, and to provide two sets of upper confidence limits (UCLs): one for the entire monitoring period, and one for the last sample collected. The statistical tool indicated possibly “statistically significant” (decreasing) trends of two primary contaminant indicators (TCE and 1,2-DCB) as well as (increasing) trends of two indicators of potential degradation (chlorobenzene and cis-1,2-DCE). The results were updated with 2017 data where available. Appendix E provides a discussion of the statistical tool results. Table 5-1 summarizes the results; results with 2017 sample data available are shown on Figures 5-1 through 5-8.

Wells were selected for evaluation based on the number of sampling rounds available and the number of detections. Wells were used if they had at least four detected results for at least one of the primary analytes of interest described above (TCE and 1,2-DCB). The table below provides a summary of the statistics tool evaluation.

Number of wells with at least 4 TCE detections	Number of wells with at least 4 1,2-DCB detections	Number of individual tests run	Number of statistically significant results
29	28	112	30

Of the 110 tests run, approximately 30 percent indicated increasing concentrations and approximately 50 percent indicated decreasing concentrations, as described below.

- Nine tests indicated a statistically-significant increasing trend (primarily of cis-1,2-DCE),
- 25 tests indicated a qualitative increasing trend (a mix of all four VOCs evaluated),
- 17 tests indicated an essentially flat trend line,
- 38 tests indicated a qualitative decreasing trend (all four VOCs evaluated), and
- 21 tests indicated either a statistically decreasing trend or the concentrations had dropped so much that the trend predicted negative values.

Additional data collected in 2017 allowed trends at several locations to be classified as "statistically significant" that had only qualitative trends when evaluated previously (Nobis, 2016): MW/B-5 (cis-1,2-DCE and TCE), RW-1 (all four VOCs), MW-201 (cis-1,2-DCE), MW-203A (cis-1,2-DCE and TCE), MW-203B (1,2-DCB), MW-302 (TCE), RMW-405A (chlorobenzene) and RMW-405B (1,2-DCB). In addition, the trends for one or more VOCs at MW-03B, MW-104B, MW-110, MW-115A, MW-302, MW-304A, RMW-305A, and MW-503B changed from statistically increasing to not statistically significant.

Review of Figures 5-1 through 5-8 suggests the following:

- Figure 5-1 and 5-2 (TCE): concentrations are generally decreasing in overburden but increasing in bedrock (other than at the plume edge).

- Figure 5-3 and 5-4 (1,2-DCB): concentrations are generally stable in overburden, but decreasing at the plume edge, while concentrations in bedrock are generally decreasing except in the downgradient core.

- Figure 5-5 and 5-6 (cis-1,2-DCE): concentration trends are generally upward except near Nyacol and WAC in overburden and in the plume edge in bedrock.

- Figure 5-7 and 5-8 (chlorobenzene): concentration trends are generally flat in the overburden and upward in the downgradient bedrock plume.

6.0 CONCLUSIONS

The following conclusions are based on the result of samples collected by Nobis in 2017 and 2018, supplemented by previous data as needed:

- Groundwater VOC concentrations measured in 2017 and the overall plume dimensions were generally similar to those measured in 2015 (Nobis, 2016).

- Installation and sampling of two new, shallow monitoring wells near the previously-mapped northeast edge of the plume served to refine the delineation of the plume boundary in this area. Sampling of MW-701S, near the southern end of Water Street, indicates that the edge of the plume is farther north in this area than previously indicated. However, this conclusion is based on only one sample, and groundwater/surface water interactions are known to vary in this area.

- Ambient air samples were collected from four properties and indoor air samples were collected from nine properties for full laboratory analysis. Of the five VOCs identified as indoor air target compounds, only benzene was detected, and was found in every ambient and indoor air sample collected. Soil gas sample analyses (only available from seven properties sampled in 2018) showed benzene detections at two properties, TCE detections at six properties, and chlorobenzene and 1,4-DCB detections at one property (the property closest to WAC).

- The 2017 data were used to update the previous statistical trend evaluation (Nobis, 2016). Groundwater trends were generally similar to those identified based on data collected through 2015; however, with additional data in the future, more sample result trends previously identified as not statistically significant might be classified as such.

7.0 REFERENCES

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TABLES

Table 2-1
Summary of Field Samples Collected
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Location	Sample #	EventID	Analyses	Sample Date	Sample Time	Sampler
B/MW-5	B/MW-5-111617A	Fall 2017	VOCs	11/16/2017	12:25	Allie Goldberg
MADEP-MW-1	MADEP-MW-1-111417A	Fall 2017	VOCs	11/14/2017	14:15	Erik Johnson
MW-04B	MW-04B-111517A	Fall 2017	VOCs	11/15/2017	14:40	Chris Falco
MW-04C	MW-04C-111517A	Fall 2017	VOCs	11/15/2017	13:45	Chris Falco
MW-06A	MW-06A-111617A	Fall 2017	VOCs	11/16/2017	11:43	Chris Falco
MW-06B	MW-06B-111417A	Fall 2017	VOCs	11/14/2017	14:45	Allie Goldberg
MW-104A	MW-104A-111417A	Fall 2017	VOCs, Metals, Anions, Dissolved Gasses, DOC, TOC, BOD, COD	11/14/2017	10:40	Erik Johnson
MW-104B	MW-104B-111317A	Fall 2017	VOCs, Metals, Anions, Dissolved Gasses, DOC, TOC, BOD, COD	11/13/2017	15:35	Erik Johnson
MW-110	MW-110-111517A	Fall 2017	VOCs	11/15/2017	13:10	Erik Johnson
MW-112A	MW-112A-111417A	Fall 2017	VOCs, Metals, Anions, Dissolved Gasses, DOC, TOC, BOD, COD	11/14/2017	10:45	Allie Goldberg
MW-112B	MW-112B-111417A	Fall 2017	VOCs, Metals, Anions, Dissolved Gasses, DOC, TOC, BOD, COD	11/14/2017	12:45	Allie Goldberg
MW-113B	MW-113B-111617A	Fall 2017	VOCs	11/16/2017	11:15	Allie Goldberg
MW-115A	MW-115A-111317A	Fall 2017	VOCs, Metals, Anions, Dissolved Gasses, DOC, TOC, BOD, COD	11/13/2017	11:00	Chris Falco
MW-115B	MW-115B-111317D	Fall 2017	VOCs, Metals, Anions, Dissolved Gasses, DOC, TOC, BOD, COD	11/13/2017	15:40	Allie Goldberg
MW-201	MW-201-111417A	Fall 2017	VOCs	11/14/2017	14:45	Chris Falco
MW-202	MW-202-111317A	Fall 2017	VOCs	11/13/2017	14:50	Allie Goldberg
MW-203A	MW-203A-111317A	Fall 2017	VOCs, Metals, Anions, Dissolved Gasses, DOC, TOC, BOD, COD	11/13/2017	13:50	Chris Falco
MW-203B	MW-203B-111317A	Fall 2017	VOCs, Metals, Anions, Dissolved Gasses, DOC, TOC, BOD, COD	11/13/2017	13:10	Allie Goldberg
MW-302	MW-302-111517A	Fall 2017	VOCs	11/15/2017	10:50	Chris Falco
MW-304A	MW-304A-111617A	Fall 2017	VOCs	11/15/2017	11:05	Erik Johnson
MW-304B	MW-304B-111517A	Fall 2017	VOCs	11/15/2017	12:05	Erik Johnson
RMW-305A	MW-305A-111417A	Fall 2017	VOCs	11/14/2017	13:20	Chris Falco
MW-305B	MW-305B-111417A	Fall 2017	VOCs, Metals, Anions, Dissolved Gasses, DOC, TOC, BOD, COD	11/14/2017	10:35	Chris Falco
MW-3B	MW-3B-111317A	Fall 2017	VOCs, Metals, Anions, Dissolved Gasses, DOC, TOC, BOD, COD	11/13/2017	12:00	Erik Johnson
MW-404B	MW-404B-111417A	Fall 2017	VOCs	11/14/2017	12:30	Erik Johnson
RMW-405A	MW-405A-111517A	Fall 2017	VOCs	11/15/2017	10:55	Allie Goldberg
RMW-405B	MW-405B-111517A	Fall 2017	VOCs	11/15/2017	12:30	Allie Goldberg
MW-40MAIN	MW-40MAIN-111715A	Fall 2017	VOCs	11/15/2017	15:10	Allie Goldberg
MW-701S	MW-701-050218A	Spring 2018	VOCs	5/2/2018	12:05	Alyssa Epstein
MW-702S	MW-702-050218A	Spring 2018	VOCs	5/2/2018	9:25	Alyssa Epstein
RW-01	RW-01-111617A	Fall 2017	VOCs	11/16/2017	12:46	Chris Falco

Notes:

VOCs = volatile organic compounds, SVOCs = semi-volatile organic compounds, DOC = dissolved organic carbon, TOC = total organic carbon, BOD = biological oxygen demand, COD = chemical oxygen demand

Table 2-2
Monitoring Well Construction Details
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

WELL ID	WELL TYPE	NORTHING (ft NAD83)	EASTING (ft NAD83)	GROUND ELEVATION (ft NAVD88)	TOC ELEVATION (ft NAVD88)	PVC/TUBING ELEVATION (ft NAVD88)	Constructed Depth (ft bgs)	Measured Depth (ft bmp)	Calculated Depth (ft bgs)	Depth to Bedrock (ft bgs) inferred	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Screen (ft NAVD88)	Bottom of Screen (ft NAVD88)	Midpoint of Screen (ft NAVD88)	Screen Length (ft)	Suggested Pump Intake (ft bgs)	Well Diameter (inches)	Well Constr. Material	Surface Completion
ERT-2	OB	2,919,999.69	663,215.43	197.5	197.93	197.68	30	27.20	27.02	(33.5)	*25*	*30*	172.5	167.5	170.0	*5*	28	2	PVC	SSP
MADEP-MW-1	OB	2,920,517.64	664,615.07	196.4	196.36	NA	15	15.00	15.00	BNE	10	15	186.4	181.4	183.9	*5*	13	0.75	S	FM
MADEP-MW-2	OB	2,920,508.24	664,493.86	197.4	197.44	NA	20	20.00	19.96	BNE	15	20	182.4	177.4	179.9	*5*	18	0.75	S	FM
MW/B-05	OB/BR	2,920,130.48	663,154.39	195.5	195.50	195.36	46	48.30	48.44	42	39	46	156.5	149.5	153.0	*7*	43	2	SS	FM
MW/B-11	BR	2,919,925.82	663,121.72	199.6	202.98	202.82	23.5	27.97	24.75	9	11.25	21.25	188.4	178.4	183.4	*10*	16	2	SS	SP
MW-03A	OB/BR	2,919,964.65	662,684.75	196.1	197.50	197.50	36	--	--	(35)	11	36	185.1	160.1	172.6	*25*	24	2	PVC	SP
MW-03B	BR	2,919,957.85	662,684.98	196.1	197.63	197.28	43	--	--	35	38	43	158.1	153.1	155.6	*5*	41	2	PVC	SP
MW-04A	OB	2,920,197.50	662,623.31	199.2	199.82	199.18	24	20.95	20.97	(67)	4	24	195.2	175.2	185.2	*20*	14	2	PVC	SSP
MW-04B	OB/BR	2,920,198.92	662,599.97	199.1	199.61	199.07	68	67.11	67.14	(67)	48	68	151.1	131.1	141.1	*20*	58	2	PVC	SSP
MW-04C	BR	2,920,203.33	662,571.13	198.9	199.33	198.89	78	77.60	77.61	67	73	78	125.9	120.9	123.4	*5*	76	2	PVC	SSP
MW-06A	OB	2,920,048.01	663,958.94	192.9	192.85	193.66	12	12.07	11.26	(58)	7	12	185.9	180.9	183.4	*5*	10	2	PVC	FM
MW-06B	OB	2,919,962.20	664,553.80	191.0	192.80	190.79	18	18.18	18.39	(26.6)	8	18	183	173	178	*10*	13	2	PVC	SP
MW-08	OB	2,919,995.67	663,211.23	197.5	198.49	198.23	UNK	46.45	45.72	(33.5)	UNK	UNK	UNK	UNK	UNK	UNK	30	2	PVC	SSP
MW-09A	OB	2,919,499.64	663,602.89	198.0	198.22	198.22	33	28.60	28.38	(33)	5.5	33	193	165	179	*27.5*	19	2	PVC	SSP
MW-09B	BR	2,919,497.33	663,605.50	197.9	197.96	197.82	41.7	41.50	41.58	33	34.7	41.7	163.2	156.2	159.7	*7*	38	2	PVC	SSP
MW-09C	OB	2,919,468.66	663,595.84	198.2	197.91	197.65	16	--	--	(33)	11	16	187.2	182.2	184.7	*5*	14	2	PVC	SSP
MW-10A	OB/BR	2,919,959.39	662,676.26	243.3	243.26	242.76	11.8	--	--		6.8	11.8	236.48	231.48	233.98	*5*	9	2	PVC	--
MW-10B	BR	2,919,968.28	662,684.04	243.4	243.42	242.21	20	--	--	10.8	15	20	228.42	223.42	225.92	*5*	18	2	PVC	--
MW-11	OB	2,919,955.99	663,749.13	195.6	195.23	195.18	16	--	--	BNE	6	16	189.6	179.6	184.6	*10*	11	2	PVC	FM
RMW-102	OB	2,920,746.09	662,298.79	192.4	194.66	193.96	10	12.12	10.56	BNE	5	10	187.4	182.4	184.9	*5*	8	2	PVC	SP
MW-102A	BR	2,919,126.58	663,573.86	196.2	199.25	199.04	30	--	--	21	25	30	171.2	166.2	168.7	*5*	28	2	PVC	FM
MW-102B	OB	2,919,139.95	663,569.85	196.8	199.63	199.46	15.6	--	--	(21)	10.6	15.6	186.2	181.2	183.7	*5*	13	2	PVC	FM
MW-103	OB	2,919,417.23	664,220.04	198.0	200.85	200.67	15	19.00	16.33	BNE	10	15	188	183	185.5	*5*	13	2	PVC	SP
MW-104A	BR	2,919,573.20	663,382.96	201.2	202.93	202.70	40.1	42.25	40.75	19.3	35.1	40.1	166.1	161.1	163.6	*5*	38	2	SS	SP
MW-104B	OB	2,919,585.86	663,379.92	200.9	203.84	203.58	15.4	17.82	15.14	(19.3)	10.4	15.4	190.5	185.5	188	*5*	13	2	SS	SP
MW-105	OB	2,919,872.60	664,432.16	194.7	194.44	193.91	25.5	--	--	BNE	20.5	25.5	174.2	169.2	171.7	*5*	23	2	PVC	FM
MW-106	OB	2,919,951.78	664,633.08	190.6	190.58	190.30	23.8	22.97	23.25	BNE	18.8	23.8	171.78	166.78	169.28	*5*	21	2	PVC	FM
MW-107	BR	2,919,966.34	664,542.62	191.6	194.02	191.15	35.9	38.34	38.79	26.6	30.9	35.9	160.7	155.7	158.2	*5*	33	2	PVC	SP
MW-110	BR	2,920,043.95	663,931.26	193.8	193.80	193.36	69.1	69.80	70.24	58	64.1	69.1	129.7	124.7	127.2	*5*	67	2	PVC	FM
MW-112A	BR	2,920,077.59	663,489.86	195.3	197.93	197.81	43	46.65	44.14	35	38	43	157.3	152.3	154.8	*5*	41	2	SS	SP
MW-112B	OB	2,920,081.74	663,486.68	195.5	198.00	197.88	30	31.67	29.29	(35)	25	30	170.5	165.5	168	*5*	28	2	SS	SP
MW-113A	BR	2,920,145.57	663,136.34	195.6	195.59	195.36	51	53.90	54.13	43	46	51	149.59	144.59	147.09	*5*	49	2	SS	FM
MW-113B	OB	2,920,156.69	663,139.12	195.1	195.10	194.85	29.5	32.09	32.34	(43)	24.5	29.5	170.6	165.6	168.1	*5*	27	2	SS	FM
MW-115A	BR	2,920,354.89	664,995.07	192.2	192.21	192.10	91	91.85	91.96	70	86	91	106.208	101.208	103.708	*5*	89	2	PVC	FM
MW-115B	OB	2,920,359.83	664,988.95	192.0	192.02	191.84	48.5	47.26	47.44	(70)	43.5	48.5	148.52	143.52	146.02	*5*	46	2	PVC	FM
RMW-116A	BR	2,921,434.47	664,916.03	191.2	193.81	193.44	--	39.15	36.91	21	31.5	36.5	159.7	154.7	157.2	*5*	34	2	PVC	SP
RMW-117A	BR	2,921,491.08	663,221.66	209.9	212.70	211.94	--	--	--	19.5	29.5	34.5	180.4	175.4	177.9	*5*	32	2	PVC	SP
MW-201	OB	2,920,422.07	664,542.31	197.2	199.90	196.88	20	22.67	22.99	BNE	15	20	182.2	177.2	179.7	*5*	18	2	PVC	SP
MW-202	OB	2,920,440.93	664,295.53	198.3	198.33	195.14	25	28.08	31.24	BNE	20	25	178.3	173.3	175.8	*5*	23	2	PVC	SP
MW-203A	BR	2,920,302.23	664,195.74	194.0	194.22	193.59	78.7	78.82	79.23	68	73.7	78.7	120.3	115.3	117.8	*5*	76	2	SS	SSP
MW-203B	OB	2,920,306.93	664,196.64	193.9	194.23	193.88	32	31.91	31.93	(68)	27	32	166.9	161.9	164.4	*5*	30	2	PVC	SSP
MW-204A	BR	2,920,398.95	663,091.99	198.6	198.60	198.14	52	49.60	50.06	36.5	47	52	151.6	146.6	149.1	*5*	50	2	SS	FM
MW-204B	OB	2,920,408.53	663,096.97	199.0	198.97	198.63	28.6	--	--	(36.5)	23.6	28.6	175.37	170.37	172.87	*5*	26	2	SS	FM
MW-301	OB	2,918,909.77	663,492.44	207.2	209.20	209.00	22	--	--	BNE	17	22	190.2	185.2	187.7	*5*	20	2	PVC	SP
MW-302	OB	2,920,161.87	665,179.77	193.4	193.36	193.25	25	24.26	24.37	BNE	20	25	173.36	168.36	170.86	*5*	23	2	PVC	FM
MW-304A	BR	2,920,648.80	663,820.55	192.5	192.54	192.29	55	83.86	84.11	45	50	55	142.54	137.54	140.04	*5*	53	2	PVC	FM
MW-304B	OB	2,920,649.81	663,826.21	192.7	192.72	192.45	30.7	30.15	30.42	(45)	25.7	30.7	167.02	162.02	164.52	*5*	28	2	PVC	FM
RMW-305A	BR	2,920,636.40	663,453.20	196.5	196.47	196.32	54	54.64	54.79	47	49	54	147.47	142.47	144.97	*5*	52	2	SS	FM
MW-305B	OB	2,920,630.87	663,437.69	196.6	196.58	196.38	19.8	29.89	30.09	(44)	14.8	19.8	181.78	176.78	179.28	*5*	17	2	PVC	FM
MW-401	BR	2,920,096.98	663,287.63	196.7	196.66	196.20	98	97.82	98.28	41	83	98	113.66	98.66	106.16	*15*	91	2	SS	FM
MW-402	BR	2,919,650.65	663,160.83	220.2	222.98	222.92	108.5	77.30	74.58	14	93.5	108.5	126.7	111.7	119.2	*15*	101	2	SS	SP
MW-403A	BR	2,920,818.01	665,661.99	184.6	187.25	186.96	44.9	47.28	44.92	37	41	44.9	143.6	139.7	141.65	*3.9*	43	2	PVC	SP
RMW-403B	OB	2,920,797.07	665,698.53	185.0	187.53	187.13	19.5	21.83	19.70	(37)	14.5	19.5	170.5	165.5	168	*5*	17	2	PVC	SP

Table 2-2
Monitoring Well Construction Details
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

WELL ID	WELL TYPE	NORTHING (ft NAD83)	EASTING (ft NAD83)	GROUND ELEVATION (ft NAVD88)	TOC ELEVATION (ft NAVD88)	PVC/TUBING ELEVATION (ft NAVD88)	Constructed Depth (ft bgs)	Measured Depth (ft bmp)	Calculated Depth (ft bgs)	Depth to Bedrock (ft bgs) inferred	Top of Screen (ft bgs)	Bottom of Screen (ft bgs)	Top of Screen (ft NAVD88)	Bottom of Screen (ft NAVD88)	Midpoint of Screen (ft NAVD88)	Screen Length (ft)	Suggested Pump Intake (ft bgs)	Well Diameter (inches)	Well Constr. Material	Surface Completion
MW-404A	BR	2,919,293.71	665,480.83	189.0	191.90	191.70	135	--	--	111	130	135	59	54	56.5	5	133	2	PVC	SP
MW-404B	OB	2,919,302.01	665,466.81	188.9	191.73	191.67	37	39.34	36.57	(111)	32	37	156.9	151.9	154.4	5	35	2	PVC	SP
RMW-405A	BR	2,920,585.67	665,606.47	180.5	180.48	180.10	73.5	75.13	75.51	57.5	68.5	73.5	111.98	106.98	109.48	5	71	2	SS	FM
RMW-405B	OB	2,920,593.64	665,617.87	181.0	180.95	180.24	45.5	46.23	46.94	(57.5)	40.5	45.5	140.45	135.45	137.95	5	43	2	SS	FM
MW-406A	BR	2,919,818.16	666,143.33	186.6	186.57	186.20	66	62.78	63.15	45.9	61	66	125.57	120.57	123.07	5	64	2	PVC	FM
MW-406B	OB	2,919,819.88	666,131.82	186.7	186.66	186.34	43	42.41	42.73	(45.9)	38	43	148.66	143.66	146.16	5	41	2	PVC	FM
MW-407A	BR	2,918,882.58	666,800.77	183.6	186.47	186.42	108.6	--	--	87	103.6	108.6	80	75	77.5	5	106	2	PVC	SP
MW-407B	OB	2,918,888.71	666,816.81	183.6	186.64	186.34	47.5	--	--	(87)	42.5	47.5	141.1	136.1	138.6	5	45	2	PVC	SP
MW-408A	BR	2,919,702.12	667,239.50	184.4	187.34	187.12	46.9	--	--	32	41.9	46.9	142.5	137.5	140	5	44	2	PVC	SP
MW-408B	OB	2,919,706.77	667,224.35	184.8	187.65	187.38	29.7	--	--	(32)	24.7	29.7	160.1	155.1	157.6	5	27	2	PVC	SP
MW-501A	OB	2,918,629.54	662,177.08	285.3	288.41	287.32	10.5	--	--	10.5	5.3	10.3	280	275	277.5	5	8	2	SS	--
MW-501B	BR	2,918,657.26	662,129.42	285.1	287.88	287.34	28.5	--	--	13.5	18	28	267.1	257.1	262.1	10	23	2	SS	--
MW-502B	BR	2,918,653.35	662,419.86	261.6	265.25	264.99	18	--	--	3.5	7.8	17.8	253.8	243.8	248.8	10	13	2	SS	--
MW-503A	OB	2,919,549.62	663,120.36	238.8	241.67	240.77	15	17.80	15.83	(16)	5	15	233.8	223.8	228.8	10	10	2	SS	SP
MW-503B	BR	2,919,535.46	663,125.69	239.2	241.92	241.49	31	33.80	31.51	16	21	31	218.2	208.2	213.2	10	26	2	SS	SP
MW-504A	OB	2,918,796.40	663,126.00	221.7	223.74	223.65	10.5	--	--	10.5	5	10	216.7	211.7	214.2	5	8	2	SS	--
MW-504B	BR	2,918,767.69	663,103.85	221.6	224.25	223.51	25.5	--	--	10	15	25	206.6	196.6	201.6	10	20	2	SS	--
MW-505A	OB	2,919,667.34	662,683.36	229.8	233.06	232.82	14	--	--	(14.5)	9	14	220.8	215.8	218.3	5	12	2	SS	SP
MW-505B	BR	2,919,668.76	662,676.08	229.4	232.78	232.41	29.5	--	--	14.5	19.5	29.5	209.9	199.9	204.9	10	25	2	SS	SP
MW-506A	OB	2,919,304.26	662,344.39	231.9	235.09	234.71	14.5	--	--	14.5	9	14	222.9	217.9	220.4	5	12	2	SS	--
MW-506B	BR	2,919,288.93	662,332.41	230.5	232.55	231.99	31.5	--	--	16	21	31	209.5	199.5	204.5	10	26	2	SS	--
MW-701S	OB	2,920,568.75	664,574.64	195.7	195.76	195.56	15	14.70	14.84		5	15	190.7	180.7	185.7	10	10	2	PVC	FM
MW-702S	OB	2,920,839.71	664,842.44	192.7	192.72	192.51	15	14.86	15.05		5	15	187.7	177.7	182.7	10	10	2	PVC	FM
P-1	OB	2,920,124.26	663,192.12	196.2	196.20	195.88	42	--	--	42	39	42	157	154	156	3	40	2	PVC	FM
P-1B	BR	2,920,129.02	663,195.17	196.3	196.28	195.87	53	--	--	43	50	53	146.28	143.28	144.78	3	52	2	PVC	FM
P-1S	OB	2,920,124.68	663,196.58	196.4	196.35	195.99	18	19.79	20.15	43	8	18	188.35	178.35	183.35	10	13	2	PVC	FM
P-2	OB	2,920,123.55	663,235.35	197.1	197.11	196.80	43.2	--	--	45.5	40.2	43.2	156.9	153.9	155.4	3	42	2	PVC	FM
P-4	OB	2,920,119.27	663,159.43	196.3	196.3	195.83	32.5	32.09	32.56	33	29.5	32.5	166.8	163.8	165.3	3	31	2	PVC	FM
P-5	OB	2,920,153.71	663,184.28	197.0	197.04	196.57	43	--	--	43	38	43	159	154	157	5	40	2	PVC	FM
RW-1	OB/BR	2,920,141.47	663,177.40	196.2	196.22	195.90	54	40.20	40.52	41	36	51	160.22	145.22	152.72	15	44	6	SS	FM
RWS-1	OB	2,920,141.47	663,177.40	196.2	196.22	195.16	--	--	--	41	0	46	196.22	150.22	173.22	46	23	1.5	PVC	FM
SB-600	BR	2,919,958.29	663,128.34	199.1	201.99	201.19	--	46.95	44.86	19.6	UNK	UNK	UNK	UNK	UNK	UNK	44	--	--	SP
SB-601	BR	2,920,159.80	663,387.87	193.4	193.42	192.79	55.06	--	--	32.1	UNK	UNK	UNK	UNK	UNK	UNK	UNK			FM
WP-101	OB	2,918,821.87	664,061.26	192.0	NA	195.21	10	--	--	BNE	8	10	184	182	183	2	9	1.25	S	SP
WP-105	OB	2,920,732.84	664,512.80	191.5	NA	193.36	11	12.69	10.83	BNE	9	11	182.5	180.5	181.5	2	10	1.25	S	SP
MW-40MAIN	OB	2920722.53	665140.77	191.7	194.71	194.59	22	24.60	21.71		16	21	175.7	170.7	173.2	5	23	1	PVC	SP
SG-1A	Stream	2,920,640.48	661,455.08	TOP OF BRIDGE DECK		200.70	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SG-1B	Stream	2,920,532.29	661,912.79	TOP OF ROCK		194.79	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SG-2	Stream	2,920,691.53	663,451.64	TOP OF GAUGE = 2.18'		190.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SG-2A	Stream	2920671.16	662030.61	TOP NAIL IN TREE		195.17	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SG-2B	Stream	2921138.7	665024.61	TOP DAM WALL		191.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SG-3A	Stream	2921280.67	665088.94	TOP BRIDGE ABUTMENT		182.86	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SG-3B	Stream	292581.52	666076.77	TOP OF NUT		185.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

1. ft NAD83	Location reference datum
2. ft NAVD88	Elevation reference datum
3. ft	Feet
4. ft bgs	Feet below ground surface
5. --	No data
6. NA	Not Applicable
7. UNK	Unknown
8. Well Type:	OB: Well screen completely in the overburden soils; OB/BR: Well screen straddles the bedrock contact; BR: Well screen completely in bedrock
9. Bedrock Data :	(36) Inferred bedrock depth based on neighboring well/boring data; BNE: Bedrock Not Encountered
10. Surface Completion:	FM: Flush Mount; SP: Standpipe; SSP: Short Standpipe
11. Well Construction:	SS: Stainless Steel; S: Steel; PVC: Polyvinyl Chloride

Table 2-3
Synoptic Groundwater Gauging Results
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Well ID		Depth Below Measuring Point (feet)									
		Date									
		08/13/12	11/05/12	05/20/13	11/04/13	04/28/14	11/03/14	05/11/15	11/30/15	11/13/17	05/02/18
ERT-2	OB	--	--	6.29	8.05	3.98	5.33	5.02	6.51	5.39	--
MADEP-MW-1	OB	--	--	--	--	--	--	--	--	--	--
MADEP-MW-2	OB	--	--	--	--	--	--	--	--	--	--
MW/B-05	OB/BR	4.08	2.45	4.04	5.71	1.92	3.13	2.84	4.24	3.52	1.96
MW/B-11	BR	9.39	5.39	9.06	12.21	--	8.56	6.90	9.54	8.98	--
MW-03A	OB/BR	NO WELL KEY				2.53	NO WELL KEY		4.88	3.81	2.43
MW-03B	BR	--	--	4.72	3.94	2.75	3.87	3.51	5.02	4.05	2.71
MW-04A	OB	7.17	5.62	6.94	8.89	5.03	5.52	5.61	7.08	6.11	--
MW-04B	OB/BR	7.12	5.63	6.89	8.75	5.07	5.95	5.66	7.05	6.14	4.98
MW-04C	BR	6.83	5.37	6.45	8.52	4.78	5.65	5.33	6.70	5.79	4.67
MW-06A	OB	3.51	2.37	3.87	5.27	2.08	2.77	2.81	3.74	3.21	2.20
MW-06B	OB	--	--	5.37	6.26	3.82	3.10	2.98	3.51	3.44	2.21
MW-08	OB	--	--	5.54	8.33	2.52	4.99	4.40	5.82	5.53	--
MW-09A	OB	6.43	5.39	6.05	7.60	4.16	5.94	5.26	6.47	6.04	--
MW-09B	BR	6.05	4.99	5.68	7.20	3.85	5.58	4.92	6.10	5.66	--
MW-09C	OB	--	--	5.42	6.99	3.57	5.36	4.67	5.89	5.45	--
MW-11	OB	--	--	4.73	6.26	2.55	3.56	3.43	4.58	3.97	--
RMW-102	OB	--	--	3.91	4.66	2.91	4.29	3.59	3.87	4.41	--
MW-102A	BR	7.02	5.78	5.96	7.93	4.30	6.67	5.14	6.87	6.39	--
MW-102B	OB	--	--	6.42	8.34	4.79	7.11	5.65	7.29	6.02	--
MW-103	OB	9.36	8.06	8.83	10.42	7.13	--	8.29	9.04	8.77	--
MW-104A	BR	9.95	8.64	8.64	11.65	6.15	9.76	7.35	10.47	9.88	6.30
MW-104B	OB	10.82	9.22	8.83	12.51	4.91	10.59	6.75	11.38	10.75	4.75
MW-105	OB	NOT FOUND									
MW-106	OB	--	--	3.12	4.24	1.36	2.56	2.29	2.98	2.93	--
MW-107	BR	--	--	6.19	7.27	4.47	2.88	2.65	3.34	3.22	1.77
MW-110	BR	3.03	1.92	3.42	4.85	1.81	2.32	2.27	3.28	2.71	1.70
MW-112A	BR	7.13	5.79	7.28	8.61	5.33	6.37	6.15	7.31	6.74	5.29
MW-112B	OB	7.07	5.65	7.27	8.70	5.23	6.27	6.14	7.29	6.69	5.23
MW-113A	BR	3.94	2.22	3.95	6.73	--	3.06	2.67	4.22	3.35	1.82
MW-113B	OB	3.59	2.00	3.58	5.21	1.49	2.69	2.41	3.77	3.08	1.51
MW-115A	BR	8.54	6.95	8.43	9.20	7.11	8.13	7.76	8.00	8.47	7.03
MW-115B	OB	8.29	7.51	8.11	8.90	6.88	8.09	7.48	8.27	8.35	6.73
RMW-116A	BR	31.94 [1]	14.04	6.64	5.39	7.56	5.51	6.80	5.37	5.12	4.28
RMW-117A	BR	--	--	13.10	17.41	11.47	17.96	11.97	18.52	18.08	--
MW-201	OB	13.77	12.77	13.72	14.24	12.32	10.16	10.28	10.61	9.72	9.45
MW-202	OB	11.08	10.11	11.07	11.66	9.70	7.45	7.49	7.97	7.86	6.73
MW-203A	BR	6.15	6.13	5.96	6.73	4.61	4.99	5.44	5.44	5.69	4.19
MW-203B	OB	5.82	4.85	5.84	8.67	4.48	5.24	5.19	5.75	5.52	4.44
MW-204A	BR	8.11	7.18	8.05	9.06	6.84	7.56	7.26	8.14	7.67	--
MW-204B	OB	--	--	8.32	9.46	6.92	7.69	7.47	8.44	7.93	--
MW-301	OB	--	14.87	14.91	19.47	13.30	16.21	13.97	21.60	5.49	--
MW-302	OB	10.87	9.97	10.73	11.53	9.27	10.42	9.91	9.88	10.67	9.24
MW-304A	BR	3.93	3.49	4.08	4.25	3.10	3.55	3.53	3.81	3.73	3.09
MW-304B	OB	4.06	3.57	4.18	4.38	3.22	3.70	3.67	4.00	3.84	3.21
RMW-305A	BR	7.18	6.46	7.17	7.68	6.27	6.78	6.68	7.15	6.92	6.20
MW-305B	OB	7.35	6.81	7.43	7.89	6.68	7.10	7.04	7.45	7.23	6.90
MW-401	BR	5.43	3.87	5.19	6.76	3.23	4.39	4.00	5.36	4.81	--
MW-402	BR	24.16	22.03	21.42	26.84	19.13	24.85	20.03	25.79	24.88	--

Table 2-3
Synoptic Groundwater Gauging Results
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Well ID		Depth Below Measuring Point (feet)									
		Date									
		08/13/12	11/05/12	05/20/13	11/04/13	04/28/14	11/03/14	05/11/15	11/30/15	11/13/17	05/02/18
MW-403A	BR	7.79	6.98	7.67	9.02	6.46	8.08	7.20	8.37	8.19	6.31
RMW-403B	OB	8.40	7.20	8.24	9.59	6.77	8.51	7.70	8.82	8.66	6.66
MW-404A	BR	11.22	10.07	10.65	12.35	8.69	11.20	9.46	11.64	11.17	--
MW-404B	OB	10.19	9.04	9.71	11.89	7.78	10.64	8.70	11.24	10.58	--
RMW-405A	BR	2.07	1.65	1.12	2.05	0.03	1.38	0.98	1.49	1.43	0.04
RMW-405B	OB	1.91	1.42	1.83	2.79	0.89	2.05	1.54	2.20	2.11	0.50
MW-406A	BR	8.93	8.07	8.78	10.04	7.57	9.10	8.20	9.52	9.32	--
MW-406B	OB	9.04	8.20	8.90	10.18	7.71	9.23	8.36	9.61	9.43	--
MW-407A	BR	--	--	11.43	12.62	10.35	11.72	10.88	11.94	11.96	--
MW-407B	OB	--	--	11.37	12.53	10.29	11.66	10.82	11.88	11.90	--
MW-408A	BR	--	--	14.41	15.91	13.52	14.31	14.12	15.00	15.05	--
MW-408B	OB	--	--	14.84	15.47	13.97	14.69	14.57	15.46	15.49	--
MW-503A	OB	DRY	14.88	16.52	DRY	15.21	DRY	15.73	DRY	DRY	--
MW-503B	BR	30.49	27.58	27.73	31.31	24.05	30.28	24.04	30.51	30.40	--
MW-505A	OB	--	--	17.57	17.52	15.66	16.57	22.70	16.95	16.23	--
MW-505B	BR	--	--	22.31	22.88	22.23	22.71	17.12	22.75	22.32	--
MW-701S	OB	--	--	--	--	--	--	--	--	--	8.62
MW-702S	OB	--	--	--	--	--	--	--	--	--	8.21
P-1	OB	--	--	4.63	6.30	2.51	3.70	3.46	4.87	4.17	--
P-1B	BR	--	--	4.49	6.21	2.18	3.47	3.20	4.65	3.98	--
P-1S	OB	--	--	4.59	6.32	2.33	3.58	3.31	4.78	4.03	--
P-2	OB	--	--	5.95	6.37	3.46	5.01	4.73	6.01	5.36	--
P-4	OB	--	--	3.79	--	1.55	--	2.61	3.99	3.40	--
P-5	OB	--	--	5.42	7.01	3.30	4.53	4.24	5.59	4.90	--
RW-1	OB/BR	4.63	3.02	4.63	6.27	2.54	3.72	3.45	4.85	4.10	--
RWS-1	OB	--	--	3.87	5.51	FULL	F	2.24	0.80	FULL	--
SB-600	BR	8.52	6.13	7.57	11.26	4.58	8.61	5.41	9.33	8.09	--
SB-601	BR	--	--	2.24	3.59	> tape	1.38	1.21	2.32	1.78	--
WP-101	OB	NOT FOUND									
WP-105	OB	6.92	6.68	6.98	7.27	5.34	5.87	6.43	6.83	4.94	--
MW-40MAIN	OB	--	--	--	--	--	--	--	--	18.42	18.24
SG-1A		--	--	7.38	7.49	6.82	7.03	7.12	7.09	7.28	6.85
SG-1B		--	--	1.46	1.64	0.97	1.16	1.27	1.19	1.48	--
SG-2		0.42	0.44	DRY	0.26	0.61	0.28	0.38	0.24	0.26	0.70
SG-2A		--	--	1.88	DRY	5.40	6.10	5.93	DRY	2.02	--
SG-2B		--	--	2.77	2.84	2.49	2.89	2.71	2.88	2.74	2.40
SG-3A		--	--	2.61	2.83	2.13	2.60	2.53	2.69	2.94	2.19
SG-3B		--	--	10.98	11.24	10.20	10.99	10.87	11.40	11.09	9.72

Notes:

1. ft — Feet
2. ft bgs — Feet below ground surface
3. -- — No data - No Key, damaged well/roadbox, unable to find, etc.
4. NA — Not Applicable

5. 2012 gauging rounds completed before wells 304A/B and 404A were re-cut and re-surveyed. Calculated elevation data for these gauging rounds were entered manually with reference to the pre-existing measuring point elevations and are not calculated via spreadsheet formulas. 2013 calculated data references updated survey data.

6. MW-10A, MW-10B, MW-501A, MW-501B, MW-502B, MW-504A, MW-504B, MW-506A, MW-506B are on worksheet 2-2 but not 2-3. Line numbers do not correspond.

7. Yellow shading indicates anomalous reading not used for evaluation.

Table 2-3
Synoptic Groundwater Gauging Results
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Well ID		Calculated Depth to Groundwater (feet bgs)									
		Date									
		08/13/12	11/05/12	05/20/13	11/04/13	04/28/14	11/03/14	05/11/15	11/30/15	11/13/17	05/02/18
ERT-2	OB	--	--	6.11	7.87	3.80	5.15	4.84	6.33	5.21	--
MADEP-MW-1	OB	--	--	--	--	--	--	--	--	--	--
MADEP-MW-2	OB	--	--	--	--	--	--	--	--	--	--
MW/B-05	OB/BR	4.22	2.59	4.18	5.85	2.06	3.27	2.98	4.38	3.66	2.10
MW/B-11	BR	6.17	2.17	5.84	8.99	--	5.34	3.68	6.32	5.76	--
MW-03A	OB/BR	NO WELL KEY				1.13	NO WELL KEY		3.48	2.41	1.03
MW-03B	BR	--	--	3.54	2.76	1.57	2.69	2.33	3.84	2.87	1.53
MW-04A	OB	7.19	5.64	6.96	8.91	5.05	5.54	5.63	7.10	6.13	--
MW-04B	OB/BR	7.15	5.66	6.92	8.78	5.10	5.98	5.69	7.08	6.17	5.01
MW-04C	BR	6.84	5.38	6.46	8.53	4.79	5.66	5.34	6.71	5.80	4.68
MW-06A	OB	2.70	1.56	3.06	4.46	1.27	1.96	2.00	2.93	2.40	1.39
MW-06B	OB	--	--	3.92	4.81	2.37	3.31	3.19	3.72	3.65	2.42
MW-08	OB	--	--	4.81	7.60	1.79	4.26	3.67	5.09	4.80	--
MW-09A	OB	6.21	5.17	5.83	7.38	3.94	5.72	5.04	6.25	5.82	--
MW-09B	BR	6.13	5.07	5.76	7.28	3.93	5.66	5.00	6.18	5.74	--
MW-09C	OB	--	--	5.97	7.54	4.12	5.91	5.22	6.44	6.00	--
MW-11	OB	--	--	5.15	6.68	2.97	3.98	3.85	5.00	4.39	--
RMW-102	OB	--	--	2.35	3.10	1.35	2.73	2.03	2.31	2.85	--
MW-102A	BR	4.18	2.94	3.12	5.09	1.46	3.83	2.30	4.03	3.55	--
MW-102B	OB	--	--	3.76	5.68	2.13	4.45	2.99	4.63	3.36	--
MW-103	OB	6.69	5.39	6.16	7.75	4.46	--	5.62	6.37	6.10	--
MW-104A	BR	8.45	7.14	7.14	10.15	4.65	8.26	5.85	8.97	8.38	4.80
MW-104B	OB	8.14	6.54	6.15	9.83	2.23	7.91	4.07	8.70	8.07	2.07
MW-105	OB	NOT FOUND									
MW-106	OB	--	--	3.40	4.52	1.64	2.84	2.57	3.26	3.21	--
MW-107	BR	--	--	3.88	4.96	2.16	3.33	3.10	3.79	3.67	2.22
MW-110	BR	3.47	2.36	3.86	5.29	2.25	2.76	2.71	3.72	3.15	2.14
MW-112A	BR	4.62	3.28	4.77	6.10	2.82	3.86	3.64	4.80	4.23	2.78
MW-112B	OB	4.69	3.27	4.89	6.32	2.85	3.89	3.76	4.91	4.31	2.85
MW-113A	BR	4.17	2.45	4.18	6.96	--	3.29	2.90	4.45	3.58	--
MW-113B	OB	3.84	2.25	3.83	5.46	1.74	2.94	2.66	4.02	3.33	--
MW-115A	BR	8.65	7.06	8.54	9.31	7.22	8.24	7.87	8.11	8.58	7.14
MW-115B	OB	8.47	7.69	8.29	9.08	7.06	8.27	7.66	8.45	8.53	6.91
RMW-116A	BR	--	11.80	4.40	3.15	5.32	3.27	4.56	3.13	2.88	2.04
RMW-117A	BR	--	--	11.06	15.37	9.43	15.92	9.93	16.48	16.04	--
MW-201	OB	11.24	10.24	11.19	11.71	9.79	10.48	10.60	10.93	10.04	9.77
MW-202	OB	11.27	10.30	11.26	11.85	9.89	10.61	10.65	11.13	11.02	9.89
MW-203A	BR	6.19	6.17	6.00	6.77	4.65	5.40	5.85	5.85	6.10	4.60
MW-203B	OB	5.85	4.88	5.87	8.70	4.51	5.26	5.21	5.77	5.54	4.46
MW-204A	BR	8.57	7.64	8.51	9.52	7.30	8.02	7.72	8.60	8.13	--
MW-204B	OB	--	--	8.66	9.80	7.26	8.03	7.81	8.78	8.27	--
MW-301	OB	--	13.07	13.11	17.67	11.50	14.41	12.17	19.80	3.69	--
MW-302	OB	10.98	10.08	10.84	11.64	9.38	10.53	10.02	9.99	10.78	9.35
MW-304A	BR	4.18	3.74	4.33	4.50	3.35	3.80	3.78	4.06	3.98	3.34
MW-304B	OB	4.33	3.84	4.45	4.65	3.49	3.97	3.94	4.27	4.11	3.48
RMW-305A	BR	7.33	6.61	7.32	7.83	6.42	6.93	6.83	7.30	7.07	6.35
MW-305B	OB	7.55	7.01	7.63	8.09	6.88	7.30	7.24	7.65	7.43	7.10
MW-401	BR	5.89	4.33	5.65	7.22	3.69	4.85	4.46	5.82	5.27	--
MW-402	BR	21.44	19.31	18.70	24.12	16.41	22.13	17.31	23.07	22.16	--

Table 2-3
Synoptic Groundwater Gauging Results
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Well ID		Calculated Depth to Groundwater (feet bgs)									
		Date									
		08/13/12	11/05/12	05/20/13	11/04/13	04/28/14	11/03/14	05/11/15	11/30/15	11/13/17	05/02/18
MW-403A	BR	5.43	4.62	5.31	6.66	4.10	5.72	4.84	6.01	5.83	3.95
RMW-403B	OB	6.27	5.07	6.11	7.46	4.64	6.38	5.57	6.69	6.53	4.53
MW-404A	BR	8.52	7.37	7.95	9.65	5.99	8.50	6.76	8.94	8.47	--
MW-404B	OB	7.42	6.27	6.94	9.12	5.01	7.87	5.93	8.47	7.81	--
RMW-405A	BR	2.45	2.03	1.50	2.43	0.41	1.76	1.36	1.87	1.81	0.42
RMW-405B	OB	2.62	2.13	2.54	3.50	1.60	2.76	2.25	2.91	2.82	1.21
MW-406A	BR	9.30	8.44	9.15	10.41	7.94	9.47	8.57	9.89	9.69	--
MW-406B	OB	9.36	8.52	9.22	10.50	8.03	9.55	8.68	9.93	9.75	--
MW-407A	BR	--	--	8.61	9.80	7.53	8.90	8.06	9.12	9.14	--
MW-407B	OB	--	--	8.63	9.79	7.55	8.92	8.08	9.14	9.16	--
MW-408A	BR	--	--	11.69	13.19	10.80	11.59	11.40	12.28	12.33	--
MW-408B	OB	--	--	12.26	12.89	11.39	12.11	11.99	12.88	12.91	--
MW-503A	OB	--	12.91	14.55	--	13.24	--	13.76	--		
MW-503B	BR	28.20	25.29	25.44	29.02	21.76	27.99	21.75	28.22	28.11	--
MW-505A	OB	--	--	14.55	14.50	12.64	13.55	19.68	13.93	13.21	--
MW-505B	BR	--	--	19.30	19.87	19.22	19.70	14.11	19.74	19.31	--
MW-701S	OB	--	--	--	--	--	--	--	--	--	8.76
MW-702S	OB	--	--	--	--	--	--	--	--	--	8.40
P-1	OB	--	--	4.95	6.62	2.83	4.02	3.78	5.19	4.49	--
P-1B	BR	--	--	4.90	6.62	2.59	3.88	3.61	5.06	4.39	--
P-1S	OB	--	--	4.95	6.68	2.69	3.94	3.67	5.14	4.39	--
P-2	OB	--	--	6.26	6.68	3.77	5.32	5.04	6.32	5.67	--
P-4	OB	--	--	4.26	--	--	--	3.08	4.46	3.87	--
P-5	OB	--	--	5.89	7.48	3.77	5.00	4.71	6.06	5.37	--
RW-1	OB/BR	4.95	3.34	4.95	6.59	2.86	4.04	3.77	5.17	4.42	--
RWS-1	OB	--	--	4.93	6.57	--	--	3.30	1.86		--
SB-600	BR	6.43	4.04	5.48	9.17	2.49	6.52	3.32	7.24	6.00	--
SB-601	BR	--	--	2.87	4.22	--	2.01	1.84	2.95	2.41	--
WP-101	OB	NOT FOUND									
WP-105	OB	5.06	4.82	5.12	5.41	3.48	4.01	4.57	4.97	3.08	--
MW-40MAIN	OB	--	--	--	--	--	--	--	--	15.53	15.35
SG-1A		NA	NA	NA	NA	NA	NA	NA	NA	NA	
SG-1B		NA	NA	NA	NA	NA	NA	NA	NA	NA	
SG-2		NA	NA	NA	NA	NA	NA	NA	NA	NA	
SG-2A		NA	NA	NA	NA	NA	NA	NA	NA	NA	
SG-2B		NA	NA	NA	NA	NA	NA	NA	NA	NA	
SG-3A		NA	NA	NA	NA	NA	NA	NA	NA	NA	
SG-3B		NA	NA	NA	NA	NA	NA	NA	NA	NA	

Notes:

1. ft — Feet
2. ft bgs — Feet below ground surface
3. -- — No data - No Key, damaged well/roadbox, unable to find, etc.
4. NA — Not Applicable

5. 2012 gauging rounds completed before wells 304A/B and 404A were re-cut and re-surveyed. Calculated elevation data for these gauging rounds were entered manually with reference to the pre-existing measuring point elevations and are not calculated via spreadsheet formulas. 2013 calculated data references updated survey data.

6. MW-10A, MW-10B, MW-501A, MW-501B, MW-502B, MW-504A, MW-504B, MW-506A, MW-506B are on worksheet 2-2 but not 2-3. Line numbers do not correspond.

7. Yellow shading indicates anomalous reading not used for evaluation.

Table 2-3
Synoptic Groundwater Gauging Results
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Well ID		Calculated Groundwater Elevation (MSL)									
		Date									
		08/13/12	11/05/12	05/20/13	11/04/13	04/28/14	11/03/14	05/11/15	11/30/15	11/13/17	05/02/18
ERT-2	OB	--	--	191.39	189.63	193.70	192.35	192.66	191.17	192.29	--
MADEP-MW-1	OB	--	--	--	--	--	--	--	--	--	--
MADEP-MW-2	OB	--	--	--	--	--	--	--	--	--	--
MW/B-05	OB/BR	191.28	192.91	191.32	189.65	193.44	192.23	192.52	191.12	191.84	193.40
MW/B-11	BR	193.43	197.43	193.76	190.61	--	194.26	195.92	193.28	193.84	--
MW-03A	OB/BR	NO WELL KEY				194.97	NO WELL KEY		192.62	193.69	195.07
MW-03B	BR	--	--	192.56	193.34	194.53	193.41	193.77	192.26	193.23	194.57
MW-04A	OB	192.01	193.56	192.24	190.29	194.15	193.66	193.57	192.10	193.07	--
MW-04B	OB/BR	191.95	193.44	192.18	190.32	194.00	193.12	193.41	192.02	192.93	194.09
MW-04C	BR	192.06	193.52	192.44	190.37	194.11	193.24	193.56	192.19	193.10	194.22
MW-06A	OB	190.15	191.29	189.79	188.39	191.58	190.89	190.85	189.92	190.45	191.46
MW-06B	OB	--	--	187.08	186.19	188.63	187.69	187.81	187.28	187.35	188.58
MW-08	OB	--	--	192.69	189.90	195.71	193.24	193.83	192.41	192.70	--
MW-09A	OB	191.79	192.83	192.17	190.62	194.06	192.28	192.96	191.75	192.18	--
MW-09B	BR	191.77	192.83	192.14	190.62	193.97	192.24	192.90	191.72	192.16	--
MW-09C	OB	--	--	192.23	190.66	194.08	192.29	192.98	191.76	192.20	--
MW-11	OB	--	--	190.45	188.92	192.63	191.62	191.75	190.60	191.21	--
RMW-102	OB	--	--	190.05	189.30	191.05	189.67	190.37	190.09	189.55	--
MW-102A	BR	192.02	193.26	193.08	191.11	194.74	192.37	193.90	192.17	192.65	--
MW-102B	OB	--	--	193.04	191.12	194.67	192.35	193.81	192.17	193.44	--
MW-103	OB	191.31	192.61	191.84	190.25	193.54	--	192.38	191.63	191.90	--
MW-104A	BR	192.75	194.06	194.06	191.05	196.55	192.94	195.35	192.23	192.82	196.40
MW-104B	OB	192.76	194.36	194.75	191.07	198.67	192.99	196.83	192.20	192.83	198.83
MW-105	OB	NOT FOUND									
MW-106	OB	--	--	187.18	186.06	188.94	187.74	188.01	187.32	187.37	--
MW-107	BR	--	--	187.72	186.64	189.44	188.27	188.50	187.81	187.93	189.38
MW-110	BR	190.33	191.44	189.94	188.51	191.55	191.04	191.09	190.08	190.65	191.66
MW-112A	BR	190.68	192.02	190.53	189.20	192.48	191.44	191.66	190.50	191.07	192.52
MW-112B	OB	190.81	192.23	190.61	189.18	192.65	191.61	191.74	190.59	191.19	192.65
MW-113A	BR	191.42	193.14	191.41	188.63	--	192.30	192.69	191.14	192.01	193.54
MW-113B	OB	191.26	192.85	191.27	189.64	193.36	192.16	192.44	191.08	191.77	193.34
MW-115A	BR	183.56	185.15	183.67	182.90	184.99	183.97	184.34	184.10	183.63	185.07
MW-115B	OB	183.55	184.33	183.73	182.94	184.96	183.75	184.36	183.57	183.49	185.11
RMW-116A	BR	--	179.40	186.80	188.05	185.88	187.93	186.64	188.07	188.32	189.16
RMW-117A	BR	--	--	198.84	194.53	200.47	193.98	199.97	193.42	193.86	--
MW-201	OB	185.96	186.96	186.01	185.49	187.41	186.72	186.60	186.27	187.16	187.43
MW-202	OB	187.03	188.00	187.04	186.45	188.41	187.69	187.65	187.17	187.28	188.41
MW-203A	BR	187.81	187.83	188.00	187.23	189.35	188.60	188.15	188.15	187.90	189.40
MW-203B	OB	188.05	189.02	188.03	185.20	189.39	188.64	188.69	188.13	188.36	189.44
MW-204A	BR	190.03	190.96	190.09	189.08	191.30	190.58	190.88	190.00	190.47	--
MW-204B	OB	--	--	190.31	189.17	191.71	190.94	191.16	190.19	190.70	--
MW-301	OB	--	194.13	194.09	189.53	195.70	192.79	195.03	187.40	203.51	--
MW-302	OB	182.38	183.28	182.52	181.72	183.98	182.83	183.34	183.37	182.58	184.01
MW-304A	BR	188.36	188.80	188.21	188.04	189.19	188.74	188.76	188.48	188.56	189.20
MW-304B	OB	188.39	188.88	188.27	188.07	189.23	188.75	188.78	188.45	188.61	189.24
RMW-305A	BR	189.14	189.86	189.15	188.64	190.05	189.54	189.64	189.17	189.40	190.12
MW-305B	OB	189.03	189.57	188.95	188.49	189.70	189.28	189.34	188.93	189.15	189.48
MW-401	BR	190.77	192.33	191.01	189.44	192.97	191.81	192.20	190.84	191.39	--
MW-402	BR	198.76	200.89	201.50	196.08	203.79	198.07	202.89	197.13	198.04	--

Table 2-3
Synoptic Groundwater Gauging Results
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Well ID		Calculated Groundwater Elevation (MSL)									
		Date									
		08/13/12	11/05/12	05/20/13	11/04/13	04/28/14	11/03/14	05/11/15	11/30/15	11/13/17	05/02/18
MW-403A	BR	179.17	179.98	179.29	177.94	180.50	178.88	179.76	178.59	178.77	180.65
RMW-403B	OB	178.73	179.93	178.89	177.54	180.36	178.62	179.43	178.31	178.47	180.47
MW-404A	BR	180.48	181.63	181.05	179.35	183.01	180.50	182.24	180.06	180.53	--
MW-404B	OB	181.48	182.63	181.96	179.78	183.89	181.03	182.97	180.43	181.09	--
RMW-405A	BR	178.03	178.45	178.98	178.05	180.07	178.72	179.12	178.61	178.67	180.06
RMW-405B	OB	178.33	178.82	178.41	177.45	179.35	178.19	178.70	178.04	178.13	179.74
MW-406A	BR	177.27	178.13	177.42	176.16	178.63	177.10	178.00	176.68	176.88	--
MW-406B	OB	177.30	178.14	177.44	176.16	178.63	177.11	177.98	176.73	176.91	--
MW-407A	BR	--	--	174.99	173.80	176.07	174.70	175.54	174.48	174.46	--
MW-407B	OB	--	--	174.97	173.81	176.05	174.68	175.52	174.46	174.44	--
MW-408A	BR	--	--	172.71	171.21	173.60	172.81	173.00	172.12	172.07	--
MW-408B	OB	--	--	172.54	171.91	173.41	172.69	172.81	171.92	171.89	--
MW-503A	OB	--	225.89	224.25	--	--	--	225.04	--	--	--
MW-503B	BR	211.00	213.91	213.76	210.18	217.44	211.21	217.45	210.98	211.09	--
MW-505A	OB	--	--	215.25	215.30	217.16	216.25	210.12	215.87	216.59	--
MW-505B	BR	--	--	210.10	209.53	210.18	209.70	215.29	209.66	210.09	--
MW-701S	OB	--	--	--	--	--	--	--	--	--	186.94
MW-702S	OB	--	--	--	--	--	--	--	--	--	184.30
P-1	OB	--	--	191.25	189.58	193.37	192.18	192.42	191.01	191.71	--
P-1B	BR	--	--	191.38	189.66	193.69	192.40	192.67	191.22	191.89	--
P-1S	OB	--	--	191.40	189.67	193.66	192.41	192.68	191.21	191.96	--
P-2	OB	--	--	190.85	190.43	193.34	191.79	192.07	190.79	191.44	--
P-4	OB	--	--	192.04	--	--	--	193.22	191.84	192.43	--
P-5	OB	--	--	191.15	189.56	193.27	192.04	192.33	190.98	191.67	--
RW-1	OB/BR	191.27	192.88	191.27	189.63	193.36	192.18	192.45	191.05	191.80	--
RWS-1	OB	--	--	191.29	189.65	--	--	192.92	194.36	--	--
SB-600	BR	192.67	195.06	193.62	189.93	196.61	192.58	195.78	191.86	193.10	--
SB-601	BR	--	--	190.55	189.20	--	191.41	191.58	190.47	191.01	--
WP-101	OB	NOT FOUND									
WP-105	OB	186.44	186.68	186.38	186.09	188.02	187.49	186.93	186.53	188.42	--
MW-40MAIN	OB	--	--	--	--	--	--	--	--	176.17	176.35
SG-1A		--	--	193.32	193.21	193.88	193.67	193.58	193.61	193.42	193.85
SG-1B		--	--	193.33	193.15	193.82	193.63	193.52	193.60	193.31	--
SG-2		189.82	189.80	DRY	189.98	189.63	189.96	189.86	190.00	189.98	189.54
SG-2A		--	--	193.29	DRY	189.77	189.07	189.24	--	--	--
SG-2B		--	--	188.39	188.32	188.67	188.27	188.45	188.28	188.42	188.76
SG-3A		--	--	180.25	180.03	180.73	180.26	180.33	180.17	179.92	180.67
SG-3B		--	--	174.07	173.81	174.85	174.06	174.18	173.65	173.96	175.33

Notes:

1. ft — Feet
2. ft bgs — Feet below ground surface
3. -- — No data - No Key, damaged well/roadbox, unable to find, etc.
4. NA — Not Applicable

5. 2012 gauging rounds completed before wells 304A/B and 404A were re-cut and re-surveyed. Calculated elevation data for these gauging rounds were entered manually with reference to the pre-existing measuring point elevations and are not calculated via spreadsheet formulas. 2013 calculated data references updated survey data.

6. MW-10A, MW-10B, MW-501A, MW-501B, MW-502B, MW-504A, MW-504B, MW-506A, MW-506B are on worksheet 2-2 but not 2-3. Line numbers do not correspond.

7. Yellow shading indicates anomalous reading not used for evaluation.

Table 3-1a
2017 Groundwater Data - VOC Analytical Results Compared to GW-1 (PPA-4)
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

	Sample Location	MADEP-MW-1	MW-304A		MW-304B	MW-305B	RMW-305A
	Sample ID	MADEP-MW-1-111417A	MW-304A-111617A	MW-304A-111517D	MW-304B-111517A	MW-305B-111417A	MW-305A-111417A
	Sample Date	11/14/17	11/15/17	11/15/17	11/15/17	11/14/17	11/14/17
Chemical Name	**GW-1 Standard**						
Volatile Organic Compounds (VOCs)							
1,1,1,2-Tetrachloroethane	5	1 U	50 U	50 U	5 U	1 U	50 U
1,1,1-Trichloroethane	200	1 U	50 U	50 U	5 U	1 U	50 U
1,1,2,2-Tetrachloroethane	2	1 U	50 U	50 U	5 U	1 U	50 U
1,1,2-Trichloro-1,2,2-trifluoroethane	--	1 U	50 U	50 U	5 U	1 U	50 U
1,1,2-Trichloroethane	5	1 U	50 U	50 U	5 U	1 U	50 U
1,1-Dichloroethane	70	1 U	50 U	50 U	5 U	1 U	50 U
1,1-Dichloroethene	7	1 U	50 U	50 U	5 U	1 U	50 U
1,1-Dichloropropene	--	1 U	50 U	50 U	5 U	1 U	50 U
1,2,3-Trichlorobenzene	--	1 U	50 U	50 U	5 U	1 U	50 U
1,2,3-Trichloropropane	--	1 U	50 U	50 U	5 U	1 U	50 U
1,2,4-Trichlorobenzene	70	1 U	50 U	50 U	12	1 U	50 U
1,2,4-Trimethylbenzene	--	1 U	50 U	50 U	5 U	1 U	50 U
1,2-Dibromo-3-chloropropane	--	1 U	50 U	50 U	5 U	1 U	50 U
1,2-Dibromoethane	0.02	1 U	50 U	50 U	5 U	1 U	50 U
1,2-Dichlorobenzene	**600**	1.3	**1200**	**1100**	190	1 U	**660**
1,2-Dichloroethane	5	1 U	50 U	50 U	5 U	1 U	50 U
1,2-Dichloropropane	5	1 U	50 U	50 U	5 U	1 U	50 U
1,3,5-Trimethylbenzene	--	1 U	50 U	50 U	5 U	1 U	50 U
1,3-Dichlorobenzene	100	1 U	50 U	50 U	5 U	1 U	50 U
1,3-Dichloropropane	--	1 U	50 U	50 U	5 U	1 U	50 U
1,4-Dichlorobenzene	**5**	1 U	**230**	**210**	**37**	1 U	**140**
2,2-Dichloropropane	--	1 U	50 U	50 U	5 U	1 U	50 U
2-Butanone	4000	1 U	50 U	50 U	5 U	1 U	50 U
2-Chlorotoluene	--	1 U	50 U	50 U	5 U	1 U	50 U
2-Hexanone	--	1 U	50 U	50 U	5 U	1 U	50 U
4-Chlorotoluene	--	1 U	50 U	50 U	5 U	1 U	50 U
4-Isopropyltoluene	--	1 U	50 U	50 U	5 U	1 U	50 U
4-Methyl-2-pentanone	350	1 U	50 U	50 U	5 U	1 U	50 U
Acetone	6300	3.4	50 U	50 U	5 U	1 U	50 U
Acrylonitrile	--	1 U	50 U	50 U	5 U	1 U	50 U
Benzene	5	1 U	50 U	50 U	5 U	1 U	50 U
Bromobenzene	--	1 U	50 U	50 U	5 U	1 U	50 U
Bromochloromethane	--	1 U	50 U	50 U	5 U	1 U	50 U
Bromodichloromethane	3	1 U	50 U	50 U	5 U	1 U	50 U
Bromoform	4	1 U	50 U	50 U	5 U	1 U	50 U
Bromomethane	10	1 U	50 U	50 U	5 U	1 U	50 U
Carbon disulfide	--	1 U	50 U	50 U	5 U	1 U	50 U

Table 3-1a
2017 Groundwater Data - VOC Analytical Results Compared to GW-1 (PPA-4)
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

	Sample Location	MADEP-MW-1	MW-304A		MW-304B	MW-305B	RMW-305A
	Sample ID	MADEP-MW-1-111417A	MW-304A-111617A	MW-304A-111517D	MW-304B-111517A	MW-305B-111417A	MW-305A-111417A
	Sample Date	11/14/17	11/15/17	11/15/17	11/15/17	11/14/17	11/14/17
Chemical Name	**GW-1 Standard**						
Volatile Organic Compounds (VOCs)							
Carbon tetrachloride	5	1 U	50 U	50 U	5 U	1 U	50 U
Chlorobenzene	**100**	1 U	**1100**	**1000**	99	1 U	**280**
Chloroethane	--	1 U	50 U	50 U	5 U	1 U	50 U
Chloroform	70	1 U	50 U	50 U	5 U	1 U	50 U
Chloromethane	--	1 U	50 U	50 U	5 U	1 U	50 U
cis-1,2-Dichloroethene	**70**	1 U	**660**	**610**	**130**	1 U	**99**
cis-1,3-Dichloropropene	--	1 U	50 U	50 U	5 U	1 U	50 U
Dibromochloromethane	2	1 U	50 U	50 U	5 U	1 U	50 U
Dibromomethane	--	1 U	50 U	50 U	5 U	1 U	50 U
Dichlorodifluoromethane	--	1 U	50 U	50 U	5 U	1 U	50 U
Diethyl ether	--	1 U	50 U	50 U	5 U	1 U	50 U
Ethylbenzene	700	1 U	50 U	50 U	5 U	1 U	50 U
Hexachlorobutadiene	0.6	1 U	50 U	50 U	5 U	1 U	50 U
Isopropylbenzene	--	1 U	50 U	50 U	5 U	1 U	50 U
m,p-Xylene	--	2 U	100 U	100 U	10 U	2 U	100 U
Methyl tert-butyl ether	70	1 U	50 U	50 U	5 U	1 U	50 U
Methylene chloride	5	1 U	50 U	50 U	5 U	1 U	50 U
Naphthalene	140	1 U	50 U	50 U	5 U	1 U	50 U
n-Butylbenzene	--	1 U	50 U	50 U	5 U	1 U	50 U
n-Propylbenzene	--	1 U	50 U	50 U	5 U	1 U	50 U
o-Xylene	--	1 U	50 U	50 U	5 U	1 U	50 U
sec-Butylbenzene	--	1 U	50 U	50 U	5 U	1 U	50 U
Styrene	100	1 U	50 U	50 U	5 U	1 U	50 U
tert-Butylbenzene	--	1 U	50 U	50 U	5 U	1 U	50 U
Tetrachloroethene	5	1 U	50 U	50 U	5 U	1 U	50 U
Tetrahydrofuran	--	1 U	50 U	50 U	5 U	1 U	50 U
Toluene	1000	1 U	50 U	50 U	5 U	1 U	50 U
trans-1,2-Dichloroethene	100	1 U	50 U	50 U	5 U	1 U	50 U
trans-1,3-Dichloropropene	--	1 U	50 U	50 U	5 U	1 U	50 U
Trichloroethene	**5**	1 U	**1800**	**1800**	**90**	1 U	**850**
Trichlorofluoromethane	--	1 U	50 U	50 U	5 U	1 U	50 U
Vinyl acetate	--	1 U	50 U	50 U	5 U	1 U	50 U
Vinyl chloride	**2**	1 U	**190**	**180**	5 U	1 U	50 U

Notes:
1. All concentrations reported in micrograms per liter (µg/L).
2. Bold concentrations exceed MADEP GW-1 Standards.
3. U qualified data not detected above laboratory detection limit.
4. J qualified data is an estimated value.
5. R qualified data rejected due to lab interference/calibration errors.
6. NA = not analyzed.

Table 3-1b
2017 Groundwater Data - VOC Analytical Results Compared to GW-2 (All Results)
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

	Sample Location	MADEP-MW-1	MW-03B	MW-04B	MW-04C	MW-06A	MW-06B	MW-40MAIN	MW-104A	MW-104B	MW-110	MW-112A	MW-112B	MW-113B	MW-115A	MW-115B	
	Station ID	MADEP-MW-1-111417A	MW-3B-111317A	MW-04B-111517A	MW-04C-111517A	MW-06A-111617A	MW-06B-111417A	MW-40MAIN-111715A	MW-104A-111417A	MW-104B-111317A	MW-110-111517A	MW-112A-111417A	MW-112B-111417A	MW-113B-111617A	MW-115A-111317A	MW-115B-111317A	MW-115B-111317D
	Sample Date	11/14/17	11/13/17	11/15/17	11/15/17	11/16/17	11/14/17	11/15/17	11/14/17	11/13/17	11/15/17	11/14/17	11/14/17	11/16/17	11/13/17	11/13/17	11/13/17
Chemical	**GW-2**	N	N														Duplicate
1,1,1,2-Tetrachloroethane	10	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,1,1-Trichloroethane	4000	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,1,2,2-Tetrachloroethane	9	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,1,2-Trichloro-1,2,2-trifluoroethane	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,1,2-Trichloroethane	900	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,1-Dichloroethane	2000	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,1-Dichloroethene	80	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,1-Dichloropropene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,2,3-Trichlorobenzene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	9	1 U	1 U	10 U	100 U	100 U	100 U
1,2,3-Trichloropropane	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,2,4-Trichlorobenzene	**200**	1 U	10 U	1 U	1 U	2.6	15	1 U	50 U	1 U	37	1 U	1.4	10 U	100 U	180	130
1,2,4-Trimethylbenzene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,2-Dibromo-3-chloropropane	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,2-Dibromoethane	2	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,2-Dichlorobenzene	**8000**	1.3	10 U	1 U	1 U	4.9	410	1 U	1700	1.1	49	7.3	9	150	1400	1600	1500
1,2-Dichloroethane	5	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,2-Dichloropropane	3	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,3,5-Trimethylbenzene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,3-Dichlorobenzene	6000	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,3-Dichloropropane	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
1,4-Dichlorobenzene	**60**	1 U	10 U	1 U	1 U	2.2	54	1 U	**180**	1 U	9	1.3	1.8	32	**260**	**290**	**280**
2,2-Dichloropropane	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
2-Butanone	50000	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
2-Chlorotoluene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
2-Hexanone	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
4-Chlorotoluene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
4-Isopropyltoluene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
4-Methyl-2-pentanone	50000	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Acetone	50000	3.4	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Acrylonitrile	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Benzene	1000	1 U	10 U	1 U	1 U	1 U	12	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Bromobenzene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Bromochloromethane	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Bromodichloromethane	6	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Bromoform	700	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U

Table 3-1b
2017 Groundwater Data - VOC Analytical Results Compared to GW-2 (All Results)
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

	Sample Location	MADEP-MW-1	MW-03B	MW-04B	MW-04C	MW-06A	MW-06B	MW-40MAIN	MW-104A	MW-104B	MW-110	MW-112A	MW-112B	MW-113B	MW-115A	MW-115B	
	Station ID	MADEP-MW-1-111417A	MW-3B-111317A	MW-04B-111517A	MW-04C-111517A	MW-06A-111617A	MW-06B-111417A	MW-40MAIN-111715A	MW-104A-111417A	MW-104B-111317A	MW-110-111517A	MW-112A-111417A	MW-112B-111417A	MW-113B-111617A	MW-115A-111317A	MW-115B-111317A	MW-115B-111317D
	Sample Date	11/14/17	11/13/17	11/15/17	11/15/17	11/16/17	11/14/17	11/15/17	11/14/17	11/13/17	11/15/17	11/14/17	11/14/17	11/16/17	11/13/17	11/13/17	11/13/17
Chemical	**GW-2**	N	N														Duplicate
Bromomethane	7	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Carbon disulfide	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Carbon tetrachloride	2	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Chlorobenzene	**200**	1 U	10 U	1 U	1 U	9.7	170	1 U	50 U	1 U	27	2.4	2.3	90	**2700**	**1400**	**1400**
Chloroethane	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Chloroform	50	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Chloromethane	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
cis-1,2-Dichloroethene	**20**	1 U	10 U	1 U	1.2	12	**170**	3.3	**130**	10	**43**	2.4	1 U	**89**	**170**	**410**	**390**
cis-1,3-Dichloropropene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Dibromochloromethane	20	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Dibromomethane	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Dichlorodifluoromethane	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Diethyl ether	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Ethylbenzene	20000	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Hexachlorobutadiene	50	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Isopropylbenzene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
m,p-Xylene	--	2 U	20 U	2 U	2 U	2 U	10 U	2 U	100 U	2 U	10 U	2 U	2 U	20 U	200 U	200 U	200 U
Methyl tert-butyl ether	50000	1 U	10 U	1 U	1 U	1 U	5.5	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Methylene chloride	2000	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Naphthalene	700	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
n-Butylbenzene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
n-Propylbenzene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
o-Xylene	--	1 U	10 U	1 U	1 U	1 U	6.1	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
sec-Butylbenzene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Styrene	100	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
tert-Butylbenzene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Tetrachloroethene	50	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Tetrahydrofuran	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Toluene	50000	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
trans-1,2-Dichloroethene	80	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
trans-1,3-Dichloropropene	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Trichloroethene	**5**	1 U	**130**	**8.3**	**14**	2.9	**7.3**	4.1	**340**	**5.6**	**16**	3.6	1 U	**200**	**2200**	**2000**	**1900**
Trichlorofluoromethane	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Vinyl acetate	--	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U
Vinyl chloride	**2**	1 U	10 U	1 U	1 U	1 U	5 U	1 U	50 U	1 U	5 U	1 U	1 U	10 U	100 U	100 U	100 U

Notes:
1. SVOC = semi-volatile organic compound.
2. All concentrations listed in micrograms per liter (µg/L).
3. MCP = Massachusetts Contingency Plan (February 2008).
4. Bold text indicates concentrations that exceed the MCP Method 1 GW-2 standard.
5. U = below detection limit.
6. J = Estimated Value.

Table 3-1b
2017 Groundwater Data - VOC Analytical Results Compared to GW-2 (All Results)
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

	Sample Location	MW-201	MW-202	MW-203A	MW-203B	MW-302	MW-304A		MW-304B	MW-305B	MW-404B	MW/B-5	RMW-305A	RMW-405A	RMW-405B	RW-1
	Station ID	MW-201-111417A	MW-202-111317A	MW-203A-111317A	MW-203B-111317A	MW-302-111517A	MW-304A-111617A	MW-304A-111517D	MW-304B-111517A	MW-305B-111417A	MW-404B-111417A	B/MW-5-111617A	MW-305A-111417A	MW-405A-111517A	MW-405B-111517A	RW-01-111617A
	Sample Date	11/14/17	11/13/17	11/13/17	11/13/17	11/15/17	11/15/17	11/15/17	11/15/17	11/14/17	11/14/17	11/16/17	11/14/17	11/15/17	11/15/17	11/16/17
Chemical	**GW-2**							Duplicate								
1,1,1,2-Tetrachloroethane	10	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,1,1-Trichloroethane	4000	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,1,2,2-Tetrachloroethane	9	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,1,2-Trichloroethane	900	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,1-Dichloroethane	2000	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,1-Dichloroethene	80	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,1-Dichloropropene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,2,3-Trichlorobenzene	--	25	98	50 U	92	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,2,3-Trichloropropane	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,2,4-Trichlorobenzene	**200**	120	**440**	50 U	**380**	10	50 U	50 U	12	1 U	1 U	**320**	50 U	5 U	120	1 U
1,2,4-Trimethylbenzene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,2-Dibromo-3-chloropropane	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,2-Dibromoethane	2	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,2-Dichlorobenzene	**8000**	430	1800	1900	1600	370	1200	1100	190	1 U	1 U	**35000**	660	12	1600	1 U
1,2-Dichloroethane	5	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,2-Dichloropropane	3	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,3,5-Trimethylbenzene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,3-Dichlorobenzene	6000	8.2	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	1400	50 U	5 U	100 U	1 U
1,3-Dichloropropane	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
1,4-Dichlorobenzene	**60**	**77**	**320**	**290**	**280**	53	**230**	**210**	37	1 U	1 U	**8200**	**140**	5 U	**300**	1 U
2,2-Dichloropropane	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
2-Butanone	50000	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
2-Chlorotoluene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
2-Hexanone	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
4-Chlorotoluene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
4-Isopropyltoluene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
4-Methyl-2-pentanone	50000	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Acetone	50000	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Acrylonitrile	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Benzene	1000	6.1	50 U	130	50 U	26	50 U	50 U	5 U	1 U	1 U	65	50 U	5 U	100 U	1 U
Bromobenzene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Bromochloromethane	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Bromodichloromethane	6	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Bromoform	700	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U

Table 3-1b
2017 Groundwater Data - VOC Analytical Results Compared to GW-2 (All Results)
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

	Sample Location	MW-201	MW-202	MW-203A	MW-203B	MW-302	MW-304A		MW-304B	MW-305B	MW-404B	MW/B-5	RMW-305A	RMW-405A	RMW-405B	RW-1
	Station ID	MW-201-111417A	MW-202-111317A	MW-203A-111317A	MW-203B-111317A	MW-302-111517A	MW-304A-111617A	MW-304A-111517D	MW-304B-111517A	MW-305B-111417A	MW-404B-111417A	B/MW-5-111617A	MW-305A-111417A	MW-405A-111517A	MW-405B-111517A	RW-01-111617A
	Sample Date	11/14/17	11/13/17	11/13/17	11/13/17	11/15/17	11/15/17	11/15/17	11/15/17	11/14/17	11/14/17	11/16/17	11/14/17	11/15/17	11/15/17	11/16/17
Chemical	**GW-2**							Duplicate								
Bromomethane	7	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Carbon disulfide	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Carbon tetrachloride	2	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Chlorobenzene	**200**	**360**	**1800**	**7600**	**1600**	**340**	**1100**	**1000**	99	1 U	1 U	**24000**	**280**	31	**2300**	1 U
Chloroethane	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Chloroform	50	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Chloromethane	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
cis-1,2-Dichloroethene	**20**	**160**	**580**	50 U	**610**	**190**	**660**	**610**	**130**	1 U	1 U	**55**	**99**	19	**2300**	1 U
cis-1,3-Dichloropropene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Dibromochloromethane	20	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Dibromomethane	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Dichlorodifluoromethane	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Diethyl ether	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Ethylbenzene	20000	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Hexachlorobutadiene	50	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Isopropylbenzene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
m,p-Xylene	--	10 U	100 U	100 U	100 U	20 U	100 U	100 U	10 U	2 U	2 U	100 U	100 U	10 U	200 U	2 U
Methyl tert-butyl ether	50000	5 U	50 U	50 U	50 U	21	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Methylene chloride	2000	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Naphthalene	700	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
n-Butylbenzene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
n-Propylbenzene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
o-Xylene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
sec-Butylbenzene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Styrene	100	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
tert-Butylbenzene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Tetrachloroethene	50	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Tetrahydrofuran	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Toluene	50000	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
trans-1,2-Dichloroethene	80	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
trans-1,3-Dichloropropene	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Trichloroethene	**5**	**170**	**640**	**170**	**370**	**130**	**1800**	**1800**	**90**	1 U	1 U	**24000**	**850**	**35**	100 U	1.5
Trichlorofluoromethane	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Vinyl acetate	--	5 U	50 U	50 U	50 U	10 U	50 U	50 U	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U
Vinyl chloride	**2**	5 U	50 U	**1200**	50 U	10 U	**190**	**180**	5 U	1 U	1 U	50 U	50 U	5 U	100 U	1 U

Notes:
1. SVOC = semi-volatile organic compound.
2. All concentrations listed in micrograms per liter (µ
3. MCP = Massachusetts Contingency Plan (Februa
4. Bold text indicates concentrations that exceed the
5. U = below detection limit.
6. J = Estimated Value.

Table 3-2a
2018 Groundwater Data - VOC Analytical Results Compared to GW-1 (PPA-4)
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

	Sample Location	MW-701
	Sample ID	MW-701-050218A
	Sample Date	05/02/18
Chemical Name	**GW-1 Standard**	
1,1,1,2-Tetrachloroethane	5	10 U
1,1,1-Trichloroethane	200	10 U
1,1,2,2-Tetrachloroethane	2	10 U
1,1,2-Trichloro-1,2,2-trifluoroethane	--	10 U
1,1,2-Trichloroethane	5	10 U
1,1-Dichloroethane	70	10 U
1,1-Dichloroethene	7	10 U
1,1-Dichloropropene	--	10 U
1,2,3-Trichlorobenzene	--	19
1,2,3-Trichloropropane	--	10 U
1,2,4-Trichlorobenzene	**70**	**89**
1,2,4-Trimethylbenzene	--	10 U
1,2-Dibromo-3-chloropropane	--	10 U
1,2-Dibromoethane	0.02	10 U
1,2-Dichlorobenzene	600	380
1,2-Dichloroethane	5	10 U
1,2-Dichloropropane	3	10 U
1,3,5-Trimethylbenzene	--	10 U
1,3-Dichlorobenzene	100	10 U
1,3-Dichloropropane	--	10 U
1,4-Dichlorobenzene	**5**	**70**
2,2-Dichloropropane	--	10 U
2-Butanone	4,000	10 U

Table 3-2a
2018 Groundwater Data - VOC Analytical Results Compared to GW-1 (PPA-4)
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

	Sample Location	MW-701
	Sample ID	MW-701-050218A
	Sample Date	05/02/18
Chemical Name	**GW-1 Standard**	
2-Chlorotoluene	--	10 U
2-Hexanone	--	10 U
4-Chlorotoluene	--	10 U
4-Isopropyltoluene	--	10 U
4-Methyl-2-pentanone	350	10 U
Acetone	6,300	10 U
Acrylonitrile	--	10 U
Benzene	5	10 U
Bromobenzene	--	10 U
Bromochloromethane	--	10 U
Bromodichloromethane	3	10 U
Bromoform	4	10 U
Bromomethane	10	10 U
Carbon disulfide	--	10 U
Carbon tetrachloride	5	10 U
Chlorobenzene	**100**	**370**
Chloroethane	--	10 U
Chloroform	70	10 U
Chloromethane	--	10 U
cis-1,2-Dichloroethene	**70**	**170**
cis-1,3-Dichloropropene	--	10 U
Dibromochloromethane	--	10 U
Dibromochloromethane	2	10 U
Dichlorodifluoromethane	--	10 U

Table 3-2a
2018 Groundwater Data - VOC Analytical Results Compared to GW-1 (PPA-4)
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

	Sample Location	MW-701
	Sample ID	MW-701-050218A
	Sample Date	05/02/18
Chemical Name	**GW-1 Standard**	
Diethyl ether	--	10 U
Ethylbenzene	700	10 U
Hexachlorobutadiene	0.6	10 U
Isopropylbenzene	--	10 U
m,p-Xylene	--	20 U
Methyl tert-butyl ether	70	10 U
Methylene chloride	5	10 U
Naphthalene	140	10 U
n-Butylbenzene	--	10 U
n-Propylbenzene	--	10 U
o-Xylene	--	10 U
sec-Butylbenzene	--	10 U
Styrene	100	10 U
tert-Butylbenzene	--	10 U
Tetrachloroethene	5	10 U
Tetrahydrofuran	--	10 U
Toluene	1,000	10 U
trans-1,2-Dichloroethene	100	10 U
trans-1,3-Dichloropropene	--	10 U
Trichloroethene	**5**	**200**
Trichlorofluoromethane	--	10 U
Vinyl acetate	--	10 U
Vinyl chloride	2	10 U

Notes:

1. All concentrations reported in micrograms per liter (µg/L).
2. Bold concentrations exceed MADEP GW-1 Standards.
3. U qualified data not detected above laboratory detection limit.
4. NA = not analyzed

Table 3-2b
2018 Groundwater Data - VOC Analytical Results Compared to GW-2 (All Results)
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

	Sample Location	MW-701	MW-702	
	Sample ID	MW-701-050218A	MW-702-050218A	MW-702-050218D
	Sample Date & Time	05/02/18	05/02/18	05/02/18
Chemical Name	**GW-2 Standard**			Duplicate
1,1,1,2-Tetrachloroethane	10	10 U	1 U	1 U
1,1,1-Trichloroethane	4000	10 U	1 U	1 U
1,1,2,2-Tetrachloroethane	9	10 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	--	10 U	1 U	1 U
1,1,2-Trichloroethane	900	10 U	1 U	1 U
1,1-Dichloroethane	2000	10 U	1 U	1 U
1,1-Dichloroethene	80	10 U	1 U	1 U
1,1-Dichloropropene	--	10 U	1 U	1 U
1,2,3-Trichlorobenzene	--	19	1 U	1 U
1,2,3-Trichloropropane	--	10 U	1 U	1 U
1,2,4-Trichlorobenzene	200	89	1 U	1 U
1,2,4-Trimethylbenzene	--	10 U	1 U	1 U
1,2-Dibromo-3-chloropropane	--	10 U	1 U	1 U
1,2-Dibromoethane	2	10 U	1 U	1 U
1,2-Dichlorobenzene	8000	380	1 U	1 U
1,2-Dichloroethane	5	10 U	1 U	1 U
1,2-Dichloropropane	3	10 U	1 U	1 U
1,3,5-Trimethylbenzene	--	10 U	1 U	1 U
1,3-Dichlorobenzene	6000	10 U	1 U	1 U
1,3-Dichloropropane	--	10 U	1 U	1 U
1,4-Dichlorobenzene	**60**	**70**	1 U	1 U
2,2-Dichloropropane	--	10 U	1 U	1 U
2-Butanone	50000	10 U	1 U	1 U
2-Chlorotoluene	--	10 U	1 U	1 U
2-Hexanone	--	10 U	1 U	1 U
4-Chlorotoluene	--	10 U	1 U	1 U
4-Isopropyltoluene	--	10 U	1 U	1 U
4-Methyl-2-pentanone	50000	10 U	1 U	1 U
Acetone	50000	10 U	1 U	1 U
Acrylonitrile	--	10 U	1 U	1 U
Benzene	1000	10 U	1 U	1 U
Bromobenzene	--	10 U	1 U	1 U
Bromochloromethane	--	10 U	1 U	1 U
Bromodichloromethane	6	10 U	1 U	1 U
Bromoform	700	10 U	1 U	1 U
Bromomethane	7	10 U	1 U	1 U
Carbon disulfide	--	10 U	1 U	1 U
Carbon tetrachloride	2	10 U	1 U	1 U

Table 3-2b
2018 Groundwater Data - VOC Analytical Results Compared to GW-2 (All Results)
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

	Sample Location	MW-701	MW-702	
	Sample ID	MW-701-050218A	MW-702-050218A	MW-702-050218D
	Sample Date & Time	05/02/18	05/02/18	05/02/18
Chemical Name	**GW-2 Standard**			Duplicate
Chlorobenzene	**200**	**370**	1 U	1 U
Chloroethane	--	10 U	1 U	1 U
Chloroform	50	10 U	1 U	1 U
Chloromethane	--	10 U	1 U	1 U
cis-1,2-Dichloroethene	**20**	**170**	1 U	1 U
cis-1,3-Dichloropropene	--	10 U	1 U	1 U
Dibromochloromethane	20	10 U	1 U	1 U
Dibromomethane	--	10 U	1 U	1 U
Dichlorodifluoromethane	--	10 U	1 U	1 U
Diethyl ether	--	10 U	1 U	1 U
Ethylbenzene	20000	10 U	1 U	1 U
Hexachlorobutadiene	50	10 U	1 U	1 U
Isopropylbenzene	--	10 U	1 U	1 U
m,p-Xylene	--	20 U	2 U	2 U
Methyl tert-butyl ether	50000	10 U	1 U	1 U
Methylene chloride	2000	10 U	1 U	1 U
Naphthalene	700	10 U	1 U	1 U
n-Butylbenzene	--	10 U	1 U	1 U
n-Propylbenzene	--	10 U	1 U	1 U
o-Xylene	--	10 U	1 U	1 U
sec-Butylbenzene	--	10 U	1 U	1 U
Styrene	100	10 U	1 U	1 U
tert-Butylbenzene	--	10 U	1 U	1 U
Tetrachloroethene	50	10 U	1 U	1 U
Tetrahydrofuran	--	10 U	1 U	1 U
Toluene	50000	10 U	1 U	1 U
trans-1,2-Dichloroethene	80	10 U	1 U	1 U
trans-1,3-Dichloropropene	--	10 U	1 U	1 U
Trichloroethene	**5**	**200**	1 U	1 U
Trichlorofluoromethane	--	10 U	1 U	1 U
Vinyl acetate	--	10 U	1 U	1 U
Vinyl chloride	2	10 U	1 U	1 U

Notes:
1. All concentrations reported in micrograms per liter (µg/L).
2. Bold concentrations exceed MADEP GW-2 Standards.
3. U qualified data not detected above laboratory detection limit.
4. NA = not analyzed.

Table 3-3
2017 Groundwater Data - Metals Analytical Results (All Results)
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

	Sample Location	MW-03B	MW-104A	MW-104B	MW-112A	MW-112B	MW-115A	MW-115B		MW-203A	MW-203B	*MW-305B*
	Station ID	MW-3B-111317A	MW-104A-111417A	MW-104B-111317A	MW-112A-111417A	MW-112B-111417A	MW-115A-111317A	MW-115B-111317A	MW-115B-111317D	MW-203A-111317A	MW-203B-111317A	*MW-305B-111417A*
	Sample Date	11/13/17	11/14/17	11/13/17	11/14/17	11/14/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	*11/14/17*
Chemical	**GW-1[4]**								Duplicate			
Aluminum	--	110 U	110 U	110 U	110 U	110 U	550 U	1,200	1,100	550 U	110 U	*160*
Antimony	*6*	20 U	20 U	20 U	20 U	20 U	100 U	100 U	100 U	100 U	20 U	*20 U*
Arsenic	*10*	20 U	20 U	20 U	20 U	24	100 U	100 U	100 U	100 U	25	*20 U*
Barium	*2000*	20 U	37	20 U	20 U	34	100 U	100 U	100 U	100 U	20 U	*41*
Beryllium	*4*	8 U	8 U	8 U	8 U	8 U	40 U	40 U	40 U	40 U	8 U	*8 U*
Cadmium	*5*	10 U	10 U	10 U	10 U	10 U	50 U	50 U	50 U	50 U	10 U	*10 U*
Calcium	--	42,000	170,000	130,000	18,000	15,000	920,000	100,000	100,000	460,000	28,000	*6,700*
Chromium	*100*	20 U	20 U	20 U	20 U	20 U	100 U	100 U	100 U	100 U	22	*20 U*
Cobalt	--	20 U	20 U	20 U	20 U	20 U	100 U	100 U	100 U	100 U	20 U	*20 U*
Copper	--	20 U	20 U	20 U	20 U	20 U	100 U	100 U	100 U	100 U	20 U	*20 U*
Iron	--	40 U	210	18,000	5,600	23,000	27,000	200,000	200,000	97,000	38,000	*40 U*
Lead	*15*	20 U	20 U	20 U	20 U	20 U	100 U	100 U	100 U	100 U	20 U	*20 U*
Magnesium	--	1,900	25,000	2,300	2,700	1,500	140,000	39,000	39,000	170,000	8,100	*700*
Manganese	--	28	1,300	720	1,300	430	46,000	13,000	13,000	17,000	3,500	*130*
Nickel	*100*	20 U	20 U	20 U	24	20 U	100 U	100 U	100 U	100 U	20 U	*20 U*
Selenium	*50*	40 U	40 U	40 U	40 U	40 U	200 U	200 U	200 U	200 U	40 U	*40 U*
Silver	*100*	10 U	10 U	10 U	10 U	10 U	50 U	50 U	50 U	50 U	10 U	*10 U*
Thallium	*2*	20 U	20 U	20 U	20 U	20 U	100 U	100 U	100 U	100 U	20 U	*20 U*
Vanadium	*30*	20 U	40 U	20 U	20 U	20 U	100 U	100 U	100 U	100 U	20 U	*20 U*
Zinc	*5000*	40 U	20 U	40 U	40 U	40 U	200 U	200 U	200 U	200 U	40 U	*40 U*

Notes:
1. All concentrations listed in micrograms per liter (µg/L).
2. U qualified data not detected above laboratory detection limit.
3. J qualified data is an estimated value.
4. GW-1 standard is only applicable to GW-305b (in *italics*)

Table 3-4
2017 Groundwater Data - Other Analytical Results (All Results)
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Sample Location		MW-03B	MW-104A	MW-104B	MW-112A	MW-112B	MW-115A	MW-115B		MW-203A	MW-203B	MW-305B
Station ID		MW-3B-111317A	MW-104A-111417A	MW-104B-111317A	MW-112A-111417A	MW-112B-111417A	MW-115A-111317A	MW-115B-111317A	MW-115B-111317D	MW-203A-111317A	MW-203B-111317A	MW-305B-111417A
Sample Date		11/13/17	11/14/17	11/13/17	11/14/17	11/14/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/14/17
Chemical	**Units**								Duplicate			
General Chemistry												
Bromide	mg/L	0.1 U	1 U	2 U	1 U	1 U	5 U	2 U	2 U	5 U	2 U	1 U
Chloride	mg/L	14	170	17	190	190	3500	1600	1900	6200	230	61
Fluoride	mg/L	0.34	1 U	2 U	1 U	1 U	5 U	8.3	11	5	2 U	1 U
Nitrate	ug/L	350	NA	23 U	NA	NA	23 UJ	23 UJ	23 U	23 U	23 U	240
Nitrite	ug/L	12 U	44	45	15	43	12	78	80	41	91	12 U
Sulfate	mg/L	72	270	290	84	26	1900	1600	1900	3200	380	42
Total Organic Carbon	mg/L	1.35	4.45	7.76	10.5	4.15	97.8	87.6	88.4	80.8	15	1 U
Methane, Ethane, Ethene												
Ethane	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	31
Ethene	ug/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	54
Methane	ug/L	2.2 U	14	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	29	2.2 U	2.2 U	2.2 U
Other Analyses												
Biologic Oxygen Demand, Five Day	mg/L	3 U	3 U	12	3 U	3 U	23	20	18	43	18	3 U
Dissolved Organic Carbon	mg/L	1.26	3.58	6.12	9.72	2.96	95	88.8	88.4	76.9	13.5	1.03

Notes:
1. U qualified data not detected above laboratory detection limit.
2. J qualified data is an estimated value.

Table 3-5
Groundwater Field Parameter Results
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Sample Location		MW-03B	MW-04B	MW-04C	MW-06A	MW-06B	MW-40MAIN	MW-104A	MW-104B	MW-110	MW-112A
Sample Date		11/13/17	11/15/17	11/15/17	11/16/17	11/14/17	11/15/17	11/14/17	11/13/17	11/15/17	11/14/17
Chemical	**Units**										
Dissolved Oxygen	ppm	4.61	0.41	0.22	0.11	0.13	3.3	0.22	0.07	0.13	0.25
Oxidation-Reduction Potential	mV	63.3	190.3	165.5	57.5	23.8	71.1	-19.7	-63.4	-34.1	-16.4
pH, Field	S.U.	6.38	6.24	6.47	5.78	5.91	5.42	7.18	6.29	6.43	6.85
Specific Conductivity	uS/cm	343.22	626.74	606.47	631.65	2483.3	1074.1	1352	839.93	314.43	1089.8
Temperature	deg C	11.29	12.18	11.39	14.17	12.86	15.55	12.32	12.91	12.36	12.46
Turbidity	NTU	0.33	0.93	6.62	6.89	9.93	8.72	0.41	7.03	2.86	6.14

Notes:
DO - Dissolved Oxygen
mg/L - milligrams per liter
mV - millivolts
NTU - nephelometric turbidity units
ORP - Oxygen Reduction Potential
µS - microsiemens
SU - Standard Unit

Table 3-5
Groundwater Field Parameter Results
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Sample Location		MW-112B	MW-113B	MW-115A	MW-115B	MW-201	MW-202	MW-203A	MW-203B	MW-302	MW-304A
Sample Date		11/14/17	11/16/17	11/13/17	11/13/17	11/14/17	11/13/17	11/13/17	11/13/17	11/15/17	11/15/17
Chemical	**Units**										
Dissolved Oxygen	ppm	0.26	0.11	0.16	0.22	0.21	0.22	-0.02	0.13	0.2	0 U
Oxidation-Reduction Potential	mV	-1.8	43.4	202.4	70.2	214	181.5	-196.5	43.9	207.3	-224.9
pH, Field	S.U.	6.33	5.88	6.48	5.94	5.66	5.71	8.42	6.39	4.64	6.51
Specific Conductivity	uS/cm	825.78	565.48	12253	7478.4	1612.2	2253.5	21937	1851.2	2892.8	8719.6
Temperature	deg C	12.23	12.28	12.14	12.23	13.95	12.17	11.95	12.26	12.6	11.7
Turbidity	NTU	51.1	2.66	6.13	6.91	4.99	4.33	28.1	3.2	2.37	4.61

Notes:
DO - Dissolved Oxygen
mg/L - milligrams per liter
mV - millivolts
NTU - nephelometric turbidity units
ORP - Oxygen Reduction Potential
µS - microsiemens
SU - Standard Unit

Table 3-5
Groundwater Field Parameter Results
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Sample Location		MW-304B	MW-305B	MW-404B	MW-701S	MW-701S	MW/B-5	RMW-305A	RMW-405A	RMW-405B	RW-1
Sample Date		11/15/17	11/14/17	11/14/17	05/02/18	05/02/18	11/16/17	11/14/17	11/15/17	11/15/17	11/16/17
Chemical	**Units**										
Dissolved Oxygen	ppm	0.12	0.3	6.22	0.69	5.8	0.23	0.17	0.19	0.07	4.73
Oxidation-Reduction Potential	mV	-18.5	302.8	92.7	-26.2	9.7	41.4	219.1	-66.4	-69	164.8
pH, Field	S.U.	6.46	4.74	5.81	5.23	6.21	6.27	5.65	7.69	6.06	5.94
Specific Conductivity	uS/cm	4013.6	335.65	817.28	1696	210	1335.4	965.23	1491	10682	114.09
Temperature	deg C	12.02	12.62	13	14.25	9.72	12.37	12.33	13.65	14.11	12.58
Turbidity	NTU	1.33	0.92	2.44	3.23	5.15	4.8	1.81	3.7	6.48	3.73

Notes:
DO - Dissolved Oxygen
mg/L - milligrams per liter
mV - millivolts
NTU - nephelometric turbidity units
ORP - Oxygen Reduction Potential
µS - microsiemens
SU - Standard Unit

Table 5-1
Statistical Tool Result Summary
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Well ID	Location Type	Chemical of Concern	Cleanup Level	Concentration Mean	95% UCL	95% UCL at last sampling event	Statistical Slope Trend	Qualitative Slope Trend	Change from 2015?
MW-03B	BR - cross gradient	1,2-DCB	8,000	5	10	13	no trend	no trend	No
		Chlorobenzene	200	3	7	9	no trend	no trend	No
		cis-1,2-DCE	20	13	**27**	**36**	no trend	increasing	No
		TCE	5	**350**	**500**	**1,000**	no trend	increasing	No
MW-04B	OB - cross gradient	cis-1,2-DCE	20	unable to calculate - fewer than 4 detected data points					
		TCE	5	**38**	**61**	**77**	no trend	decreasing	NA
MW-04C	BR - cross gradient	cis-1,2-DCE	20	4.1	9.0	9.4	no trend	decreasing	NA
		TCE	5	**46**	**77**	**139**	no trend	decreasing	Yes
MW/B-5	BR/OB - WAC	1,2-DCB	8,000	**31,000**	**41,000**	**48,300**	no trend	increasing	No
		Chlorobenzene	200	**22,000**	**26,000**	**33,700**	no trend	no trend	No
		cis-1,2-DCE	20	**260**	**790**	5	decreasing	--	Yes
		TCE	5	**18,000**	**23,000**	**34,600**	increasing	--	Yes
MW-06A	OB - south plume edge	1,2-DCB	8,000	32	46	79	no trend	decreasing	Yes
		Chlorobenzene	200	61	83	123	no trend	decreasing	Yes
		cis-1,2-DCE	20	**48**	**62**	**83**	no trend	decreasing	Yes
		TCE	5	**15**	**19**	**25**	no trend	decreasing	Yes
MW-09B	BR - cross gradient	1,2-DCB	8,000	86	120	133	increasing		NA
		Chlorobenzene	200	unable to calculate - fewer than 4 detected data points					
		cis-1,2-DCE	20	**23**	**31**	**34**	Increasing	--	NA
		TCE	5	**12**	**20**	**38**	no trend	increasing	NA
MW/B-11	BR - Nyacol	1,2-DCB	8,000	**49,000**	**98,000**	**179,000**	no trend	decreasing	NA
		Chlorobenzene	200	**26,000**	**51,000**	**78,800**	no trend	decreasing	NA
		cis-1,2-DCE	20	**350**	**5,070**	**1,040**	no trend	increasing	NA
		TCE	5	**6,500**	**26,100**	**39,900**	no trend	decreasing	NA
MW-104A	BR - down gradient of landfill	1,2-DCB	8,000	2,200	3,640	3,640	no trend	decreasing	No
		Chlorobenzene	200	37	66	52	no trend	decreasing	No
		cis-1,2-DCE	20	**390**	**610**	**330**	decreasing	--	No
		TCE	5	**1,100**	**1,800**	**2,050**	no trend	decreasing	No
MW-104B	OB - down gradient of landfill	1,2-DCB	8,000	7	11	12	no trend	no trend	No
		Chlorobenzene	200	unable to calculate - fewer than 4 detected data points					
		cis-1,2-DCE	20	**47**	**73**	**112**	no trend	decreasing	Yes
		TCE	5	**16**	**25**	**45**	no trend	decreasing	Yes
MW-110	BR - south plume edge	1,2-DCB	8,000	41	70	98	no trend	increasing	Yes
		Chlorobenzene	200	36	77	111	no trend	increasing	Yes
		cis-1,2-DCE	20	**72**	**174**	**253**	no trend	increasing	No
		TCE	5	**18**	**41**	**77**	no trend	increasing	No

Table 5-1
Statistical Tool Result Summary
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Well ID	Location Type	Chemical of Concern	Cleanup Level	Concentration Mean	95% UCL	95% UCL at last sampling event	Statistical Slope Trend	Qualitative Slope Trend	Change from 2015?
MW-112A	BR - west of plume	1,2-DCB	8,000	72	168	132	no trend	decreasing	NA
		Chlorobenzene	200	33	58	57	no trend	decreasing	NA
		cis-1,2-DCE	20	**85**	**180**	**262**	no trend	decreasing	NA
		TCE	5	**87**	**170**	**235**	no trend	decreasing	NA
MW-112B	OB - west of plume	1,2-DCB	8,000	20	29	35	no trend	no trend	NA
		Chlorobenzene	200	6	9	12	no trend	decreasing	NA
MW-113A	BR - WAC	1,2-DCB	8,000	**55,000**	**83,000**	**135,000**	no trend	increasing	NA
		Chlorobenzene	200	**37,000**	**59,000**	**105,000**	no trend	increasing	NA
		cis-1,2-DCE	20	**73**	**150**	**26.8**	no trend	decreasing	NA
		TCE	5	**36,000**	**65,000**	**127,000**	no trend	increasing	NA
MW-113B	OB - WAC	1,2-DCB	8,000	210	260	322	no trend	decreasing	Yes
		Chlorobenzene	200	87	100	152	no trend	increasing	No
		cis-1,2-DCE	20	**88**	**100**	**150**	no trend	increasing	No
		TCE	5	**330**	**410**	**476**	no trend	decreasing	No
MW-115A	BR - down gradient south plume	1,2-DCB	8,000	1,100	1,800	2,000	no trend	increasing	No
		Chlorobenzene	200	**2,100**	**3,300**	**4,500**	no trend	increasing	Yes
		cis-1,2-DCE	20	**150**	**260**	**303**	no trend	no trend	No
		TCE	5	**2,000**	**3,200**	**3,900**	no trend	increasing	No
MW-115B	OB - down gradient south plume	1,2-DCB	8,000	1,700	1,800	2,060	no trend	no trend	No
		Chlorobenzene	200	**1,500**	**1,700**	**2,050**	no trend	no trend	Yes
		cis-1,2-DCE	20	**330**	**360**	**487**	increasing	--	No
		TCE	5	**2,400**	**2,800**	**3,340**	no trend	no trend	No
MW-201	OB - down gradient north plume	1,2-DCB	8,000	410	460	586	no trend	no trend	No
		Chlorobenzene	200	**340**	**390**	**508**	no trend	no trend	No
		cis-1,2-DCE	20	**130**	**160**	**242**	increasing	--	Yes
		TCE	5	**190**	**220**	**283**	no trend	no trend	Yes
MW-202	OB - down gradient north plume	1,2-DCB	8,000	2,200	2,500	2,260	decreasing	--	Yes
		Chlorobenzene	200	**2,200**	**2,500**	**2,200**	decreasing	--	Yes
		cis-1,2-DCE	20	**480**	**570**	**702**	increasing	--	No
		TCE	5	**1,200**	**1,500**	**862**	decreasing	--	No
MW-203A	BR - down gradient north plume	1,2-DCB	8,000	2,300	2,600	1,900	decreasing	--	No
		Chlorobenzene	200	**6,700**	**7,200**	**8,680**	no trend	increasing	Yes
		cis-1,2-DCE	20	**180**	**380**	**239**	decreasing	--	Yes
		TCE	5	unable to calculate: negative values predicted			decreasing	--	Yes

Table 5-1
Statistical Tool Result Summary
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Well ID	Location Type	Chemical of Concern	Cleanup Level	Concentration Mean	95% UCL	95% UCL at last sampling event	Statistical Slope Trend	Qualitative Slope Trend	Change from 2015?
MW-203B	OB - down gradient north plume	1,2-DCB	8,000	**2,000**	**2,200**	**1,950**	decreasing		Yes
		Chlorobenzene	200	**1,900**	**2,100**	**2,930**	no trend	decreasing	Yes
		cis-1,2-DCE	20	**540**	**610**	**870**	increasing	--	No
		TCE	5	**780**	**920**	**675**	decreasing	--	No
MW-204A	BR - cross gradient	1,2-DCB	8,000	59	91	178	no trend	no trend	NA
		Chlorobenzene	200	28	42	71	no trend	decreasing	NA
		cis-1,2-DCE	20	**27**	**46**	**96**	no trend	increasing	NA
		TCE	5	**200**	**390**	**881**	no trend	decreasing	NA
MW-302	OB - cross gradient	1,2-DCB	8,000	560	630	494	decreasing	--	No
		Chlorobenzene	200	**410**	**440**	**481**	no trend	decreasing	Yes
		cis-1,2-DCE	20	**220**	**250**	**332**	no trend	increasing	Yes
		TCE	5	**310**	**370**	**326**	decreasing	--	Yes
MW-304A	BR - down gradient north plume	1,2-DCB	8,000	1,200	2,000	1,320	no trend	decreasing	No
		Chlorobenzene	200	**1,200**	**1,700**	**1,310**	no trend	no trend	Yes
		cis-1,2-DCE	20	**560**	**670**	**1,060**	Increasing	--	Yes
		TCE	5	**1,900**	**2,200**	**3,270**	no trend	increasing	Yes
MW-304B	OB - down gradient north plume	1,2-DCB	8,000	240	290	399	no trend	no trend	No
		Chlorobenzene	200	120	140	196	no trend	increasing	No
		cis-1,2-DCE	20	**170**	**200**	**280**	no trend	decreasing	Yes
		TCE	5	**120**	**140**	**187**	no trend	decreasing	Yes
RMW-305A	BR - cross gradient	1,2-DCB	8,000	770	840	963	no trend	decreasing	No
		Chlorobenzene	200	**300**	**380**	**430**	no trend	increasing	No
		cis-1,2-DCE	20	**110**	**130**	**221**	no trend	increasing	No
		TCE	5	**940**	**1,000**	**1,070**	no trend	decreasing	No
MW-402	BR - down gradient of landfill	1,2-DCB	8,000	500	780	830	no trend	decreasing	NA
		Chlorobenzene	200	unable to calculate - fewer than 4 detected data points					
		cis-1,2-DCE	20	**500**	**540**	**582**	no trend	decreasing	NA
		TCE	5	**10,000**	**14,000**	**23,600**	no trend	decreasing	NA

Table 5-1
Statistical Tool Result Summary
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Well ID	Location Type	Chemical of Concern	Cleanup Level	Concentration Mean	95% UCL	95% UCL at last sampling event	Statistical Slope Trend	Qualitative Slope Trend	Change from 2015?
RMW-405A	BR - down gradient edge	1,2-DCB	8,000	47	110	90	no trend	decreasing	No
		Chlorobenzene	200	unable to calculate: negative values predicted			decreasing	--	Yes
		cis-1,2-DCE	20	**27**	**47**	**53**	no trend	decreasing	No
		TCE	5	**74**	**150**	**138**	no trend	decreasing	Yes
RMW-405B	OB - down gradient edge	1,2-DCB	8,000	1,800	2,000	1,920	decreasing	--	Yes
		Chlorobenzene	200	**2,500**	**2,700**	**2,550**	no trend	decreasing	No
		cis-1,2-DCE	20	**1,700**	**2,600**	**3,530**	increasing	--	No
		TCE	5	unable to calculate: negative values predicted			decreasing	--	No
MW-503B	BR - down gradient of landfill	1,2-DCB	8,000	29	100	118	no trend	no trend	NA
		Chlorobenzene	200	7	21	22	no trend	no trend	NA
		cis-1,2-DCE	20	**56**	**190**	**213**	no trend	decreasing	NA
		TCE	5	**2,000**	**6,600**	**8,380**	no trend	increasing	NA
MW-505B	BR - down gradient of landfill	cis-1,2-DCE	20	1.3	2	0.7	decreasing	--	NA
		TCE	5	**9**	**16**	**7**	decreasing	--	NA
RW-1	BR/OB - WAC	1,2-DCB	8,000	unable to calculate: negative values predicted			decreasing	--	Yes
		Chlorobenzene	200	unable to calculate: negative values predicted			decreasing	--	Yes
		cis-1,2-DCE	20	unable to calculate: negative values predicted			decreasing	--	Yes
		TCE	5	unable to calculate: negative values predicted			decreasing	--	Yes

Notes:
All units in µg/L (micrograms per liter)
Bold = result above target screening level (GW-2). Note that a lower standard was set for 1,2-DCB (2,000 µg/L) for graph clarity.
Only trend data including 2017 samples shown.
Abbreviations:
OB = overburden, BR = bedrock
1,2-DCB = dichlorobenzene, cis-1,2-DCE = dichloroethene, and TCE = trichloroethene
UCL = upper concentration limit

'= increasing concentrations (statistically significant)
'= increasing concentrations (not statistically significant)
'= decreasing concentrations (not statistically significant)
'= decreasing concentrations (statistically significant)

FIGURES

USGS Topographic Map
Ashland, Massachusetts
Revised 1982

N

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FIGURE 1-1

SITE LOCUS PLAN
NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JL
PROJECT NO. 80113	DATE: FEBRUARY 2018

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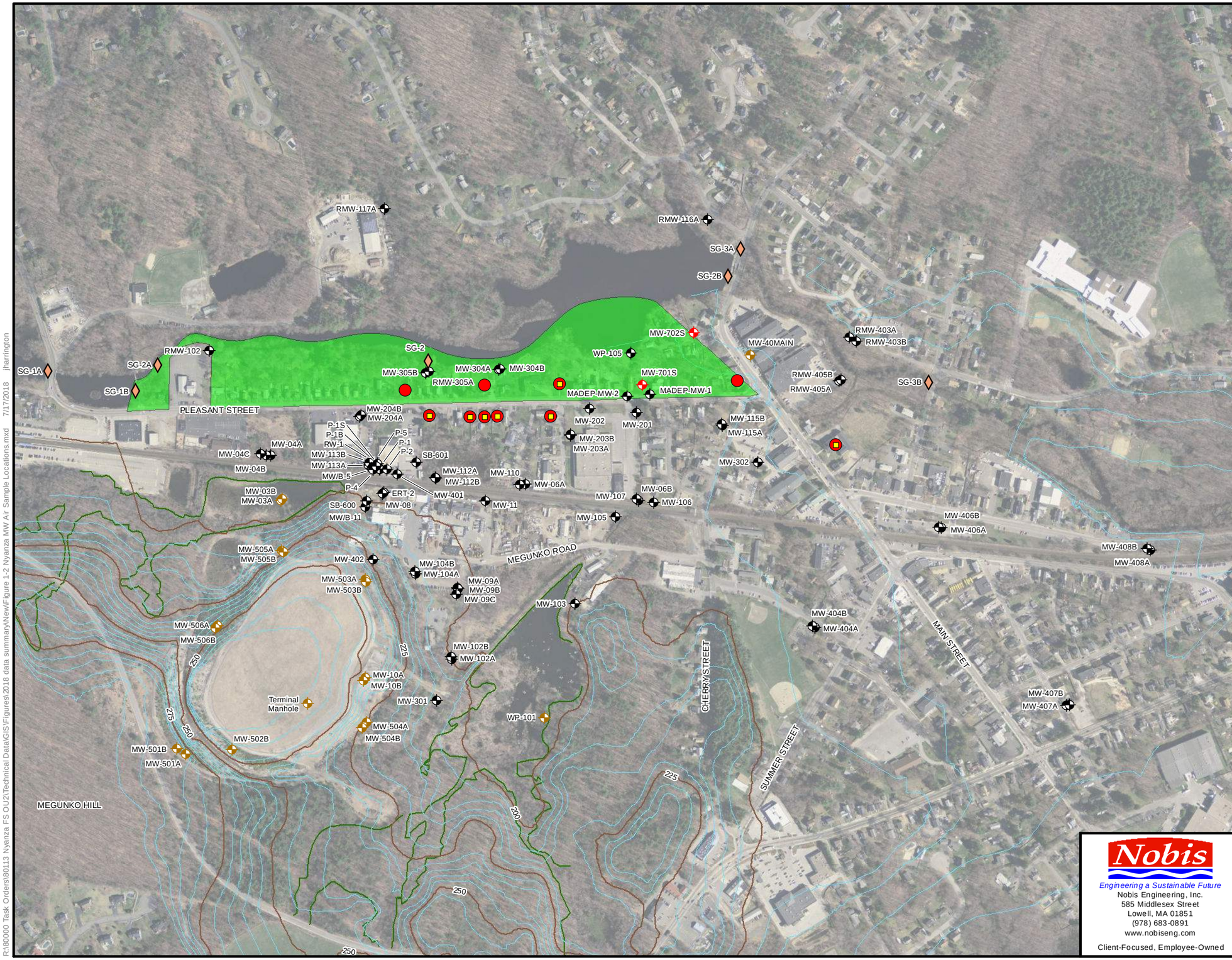

Notes:

1. This site plan was created from a site plan titled "Base Mapping and Well Survey" by A-Plus Construction, Dated September 25, 2012.

2. Contours were interpolated from 3 meter contours obtained from the MassGIS website. Aerial photo from MassGIS web map service, 2013.

3. Horizontal Datum is in reference to the North American Datum of 1983 (NAD83); Vertical Datum is in reference to the North American Vertical Datum of 1988 (NAVD88).

4. PPA4 delineation from MassDEP Groundwater Use and Value Determination, February 25, 2014.

5. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- OU1 Monitoring Well
- OU2 Monitoring Well
- Staff Gauge
- OU2 Monitoring Well Installed in 2018
- Indoor Air Samples
- Soil Gas Samples
- Potentially Productive Aquifer 4 (PPA4; see text)
- Wetland Delineation Line
- 25 Foot Contour
- 5 Foot Contour

0 200 400 800

Feet

1 inch = 500 feet

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FIGURE 1-2

MONITORING WELL AND
AIR SAMPLE LOCATIONS
NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JL
PROJECT NO. 80113	DATE: JULY 2018

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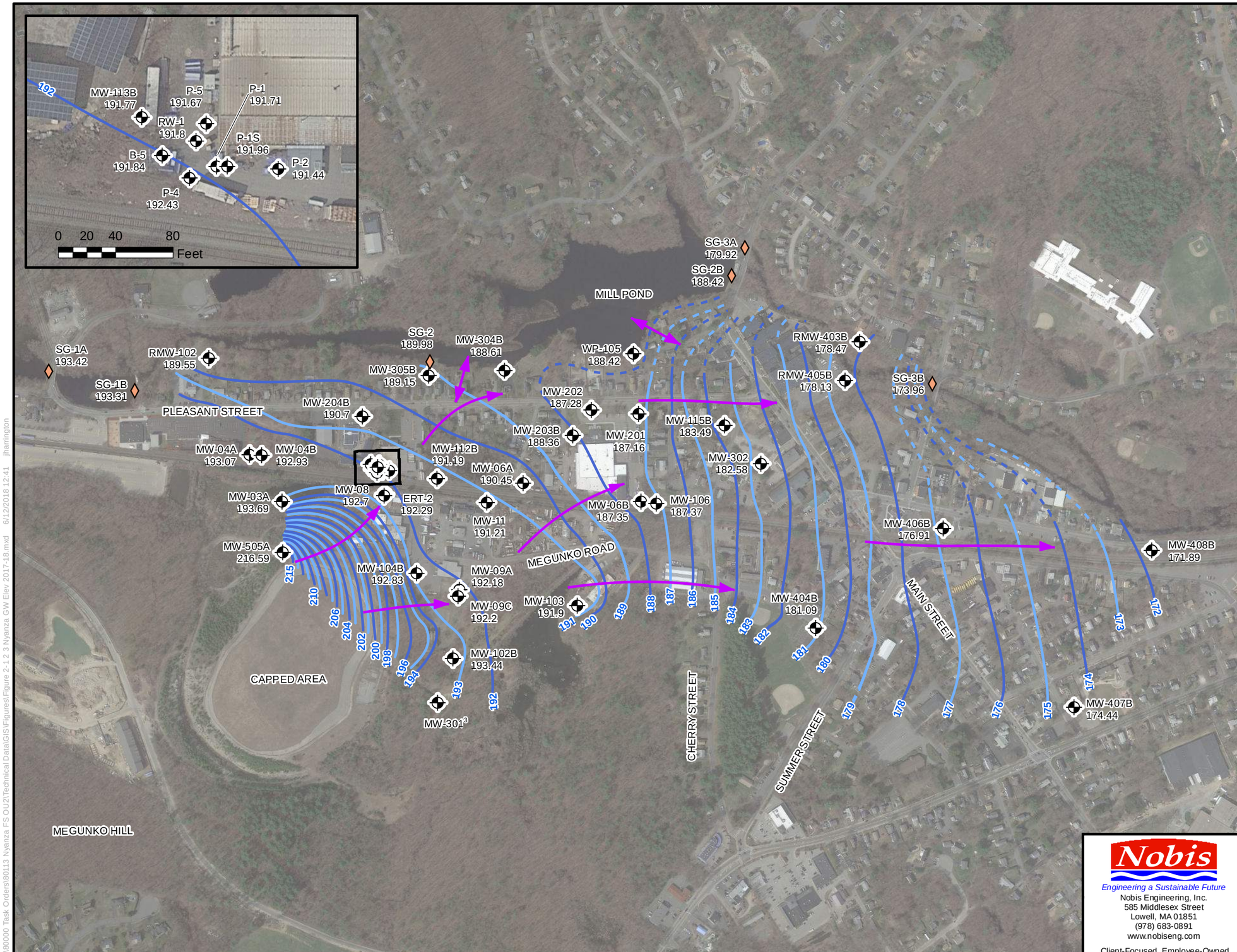

NOTES:

1. Potentiometric surface generated from ESRI Spatial Analyst version 10.6 using the natural neighbor method. Other interpretations are possible.

2. Double headed arrows indicate that conditions favor flow between surface water and groundwater at some times, and the opposite at other times.

3. Anomalous data from MW-301 not included for contouring.

4. Aerial photograph from MassGIS/Google Earth web map service, 2017.

5. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Monitoring Well with Groundwater Elevation 11/13/17 (ft msl)
- Staff Gauge with Surface Water Elevation 11/13/17 (ft msl)
- Overburden Potentiometric Surface with Groundwater Elevation 11/13/17 (ft msl)
- Inferred Overburden Groundwater Contour
- Groundwater Flow Direction

N

0 250 500 1,000

Feet

1 inch = 500 feet

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FIGURE 2-1

OVERBURDEN GROUNDWATER ELEVATIONS AND POTENTIOMETRIC SURFACE - FALL 2017

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JUNE 2018

R:\80000 Task Orders\80113 Nyanza FS OU2\Technical Data\GIS\Figures\Figure 2-1 2 3 Nyanza GW Elev 2017-18.mxd 6/12/2018 12:41 jharrington

NOTES:

1. Potentiometric surface generated from ESRI Spatial Analyst version 10.6 using the natural neighbor method. Other interpretations are possible.

2. Aerial photograph from MassGIS/Google Earth web map service, 2017.

3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Bedrock Monitoring Well with Groundwater Elevation 11/13/17 (ft msl)
- Bedrock Potentiometric Surface with Groundwater Elevation, 11/13/17 (ft msl)
- Inferred Bedrock Groundwater Contour

N

0 250 500 1,000

Feet

1 inch = 500 feet

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FIGURE 2-2

BEDROCK GROUNDWATER ELEVATIONS AND POTENTIOMETRIC SURFACE - FALL 2017

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: MAY 2018

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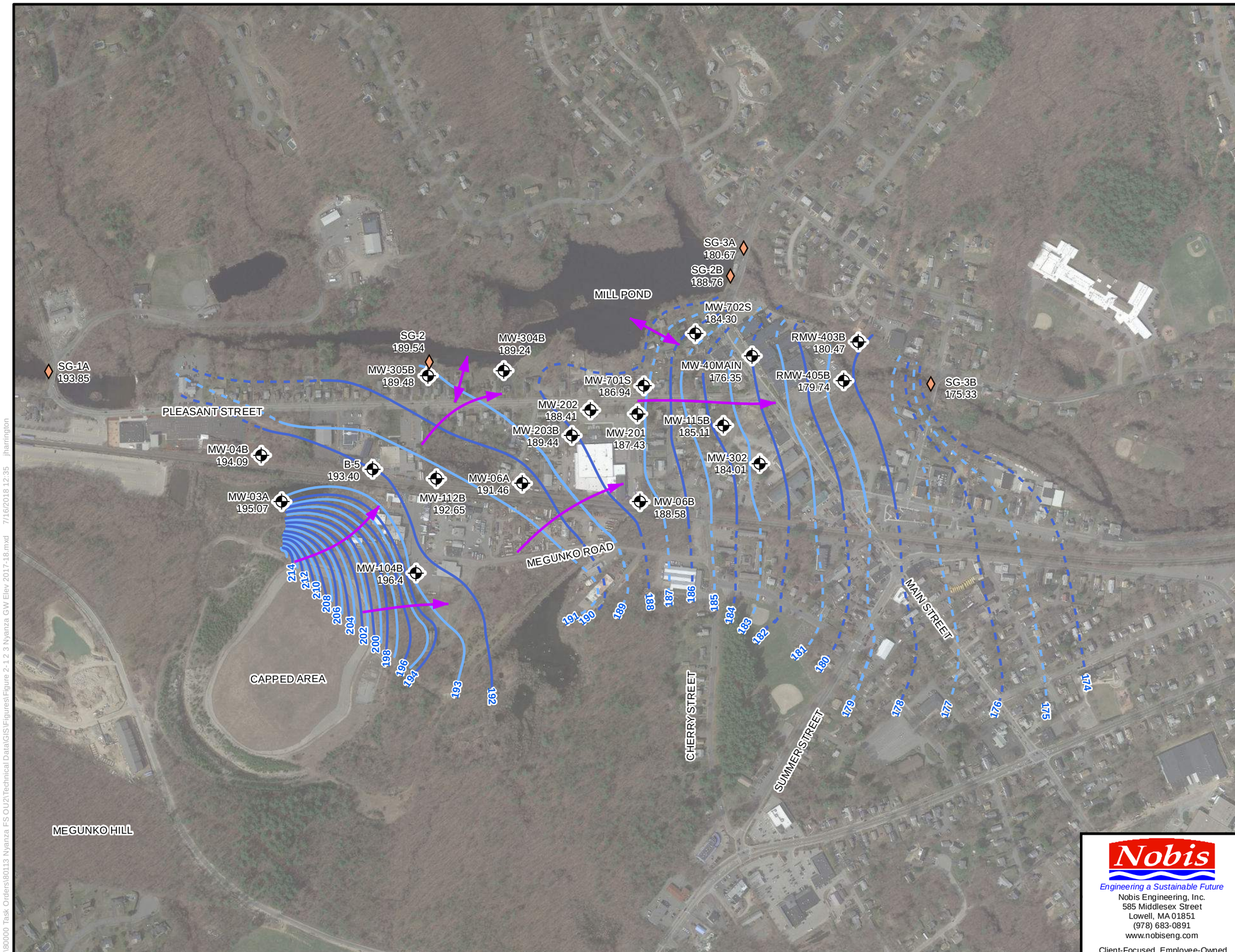

NOTES:

1. Potentiometric surface generated from ESRI Spatial Analyst version 10.6 using the natural neighbor method. Other interpretations are possible.

2. Double headed arrows indicate that conditios favor flow between surface water and groundwater at some times, and the opposite at other times.

4. Aerial photograph from MassGIS/Google Earth web map service, 2017.

5. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Monitoring Well with Groundwater Elevation 5/2/18 (ft msl)
- Staff Gauge with Surface Water Elevation 5/2/18 (ft msl)
- Overburden Potentiometric Surface with Groundwater Elevation 5/2/18 (ft msl)
- Inferred Overburden Groundwater Contour
- Groundwater Flow Direction

N

0 250 500 1,000

Feet

1 inch = 500 feet

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FIGURE 2-3

OVERBURDEN GROUNDWATER ELEVATIONS AND POTENTIOMETRIC SURFACE - SPRING 2018

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

R:\80000 Task Orders\80113 Nyanza FS OU2\Technical Data\GIS\Figures\Figure 2-1 2 3 Nyanza GW Elev 2017-18.mxd 7/16/2018 12:35 jharrington

NOTES:

1. Potentiometric surface generated from ESRI Spatial Analyst version 10.6 using the natural neighbor method. Other interpretations are possible.

2. MW-104A not used for contouring, well damaged.

3. Aerial photograph from MassGIS/Google Earth web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Bedrock Monitoring Well with Groundwater Elevation 5/2/18 (ft msl)
- Bedrock Potentiometric Surface with Groundwater Elevation, 5/2/18 (ft msl)
- Inferred Bedrock Groundwater Contour

N

0 250 500 1,000

Feet

1 inch = 500 feet

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FIGURE 2-4

BEDROCK GROUNDWATER ELEVATIONS AND POTENTIOMETRIC SURFACE - SPRING 2018

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

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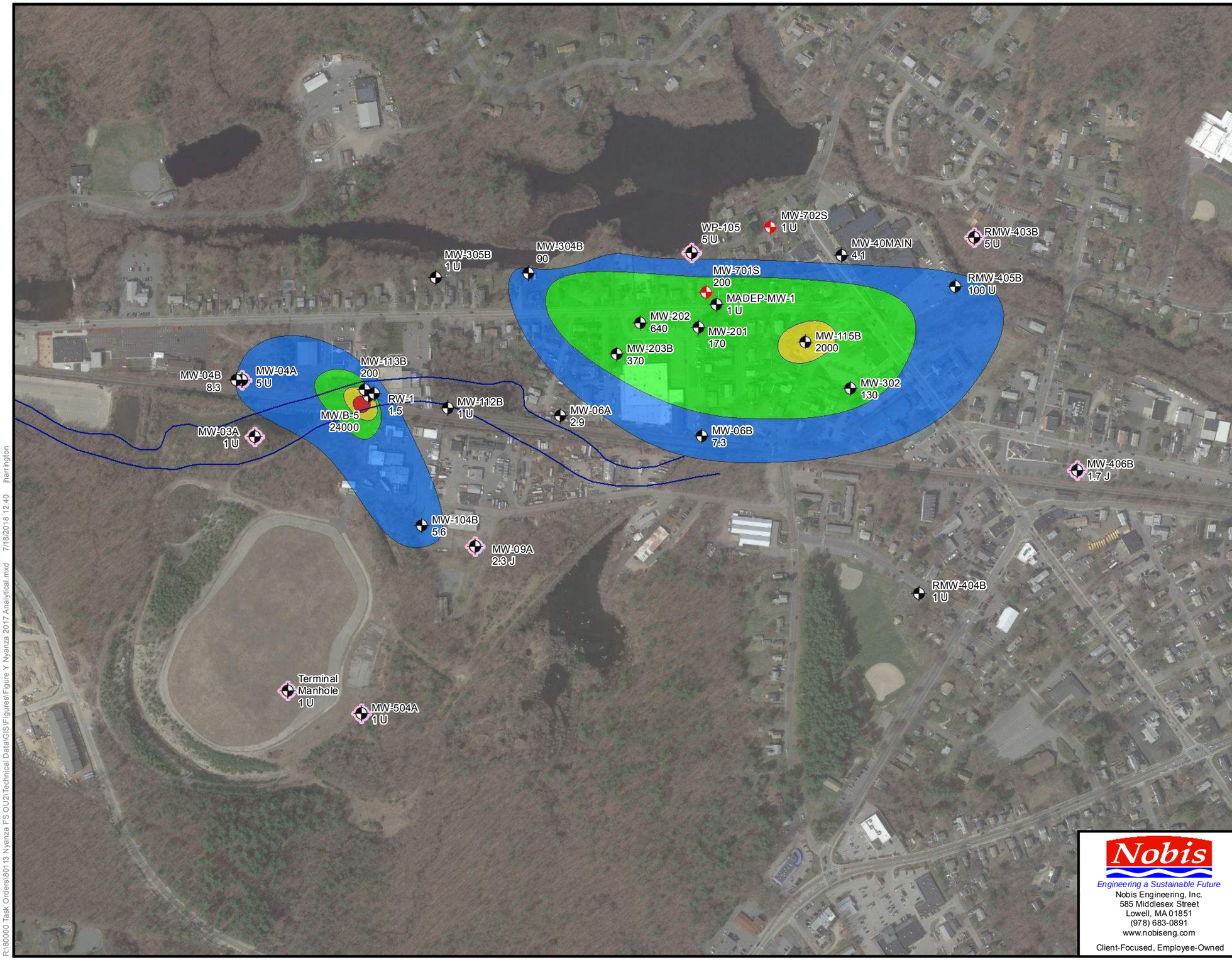

NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater Trichloroethene is 5 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Monitoring Well with Trichloroethene Concentration (µg/L)
- May 2, 2018 Data
- Sample Collected Fall 2015

TCE Concentration (µg/L)

- > 5 ≤ 100
- > 100 ≤ 1,000
- > 1,000 ≤ 10,000
- > 10,000
- Approximate Former Sudbury River Stream Channel

0 200 400 800
Feet
1 inch = 400 feet

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FIGURE 3-1

OVERBURDEN GROUNDWATER TRICHLOROETHENE RESULTS - FALL 2017

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

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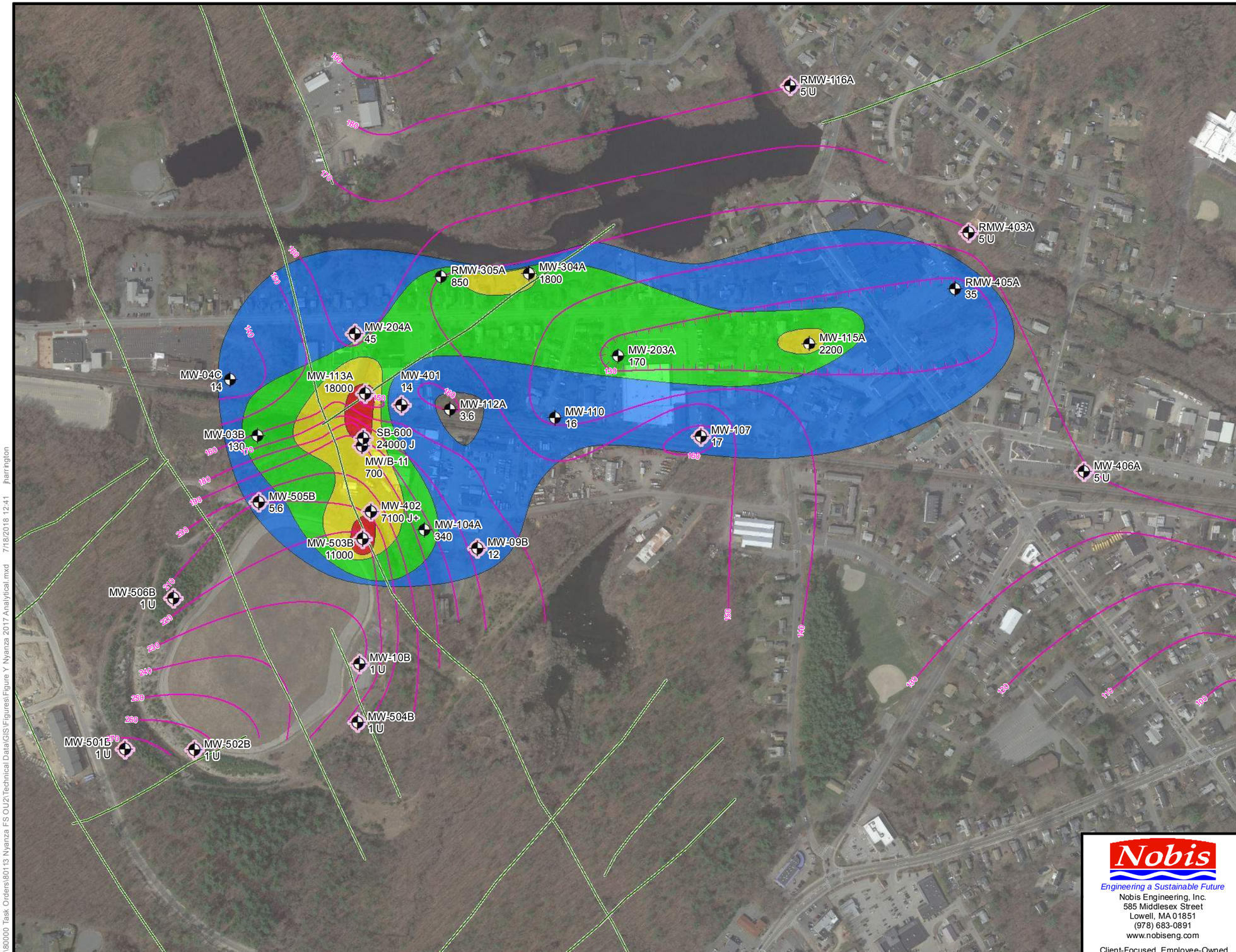

NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater Trichloroethene is 5 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

Bedrock Monitoring Well with Trichloroethene Concentration (µg/L)

Sample Collected Fall 2015

TCE Concentration (µg/L)

- > 5 ≤ 100
- > 100 ≤ 1,000
- > 1,000 ≤ 10,000
- > 10,000

Top of Bedrock Elevation Contour (ft NAVD88)

Depression Bedrock Contour

Photolineaments

0 200 400 800
Feet
1 inch = 400 feet

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FIGURE 3-2

BEDROCK GROUNDWATER
TRICHLOROETHENE RESULTS - FALL 2017

NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

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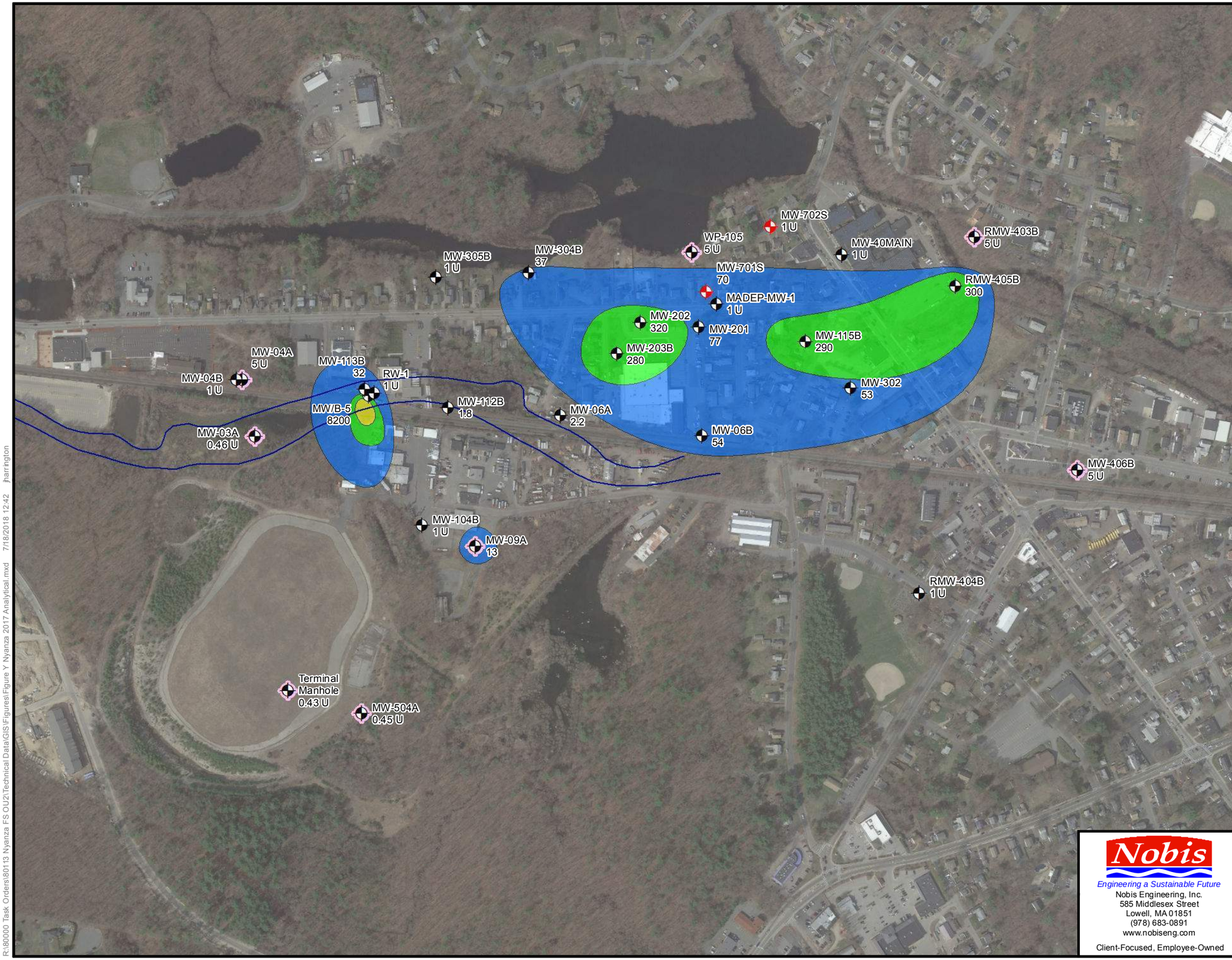

NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater 1,4-Dichlorobenzene is 5 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Monitoring Well with 1,4-Dichlorobenzene Concentration (µg/L)
- May 2, 2018 Data
- Sample Collected Fall 2015

1,4-DCB Concentration (µg/L)

- > 5 ≤ 100
- > 100 ≤ 1,000
- > 1,000
- Approximate Former Sudbury River Stream Channel

0 200 400 800
Feet
1 inch = 400 feet

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FIGURE 3-3

OVERBURDEN GROUNDWATER
1,4-DICHLOROBENZENE RESULTS - FALL 2017
NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

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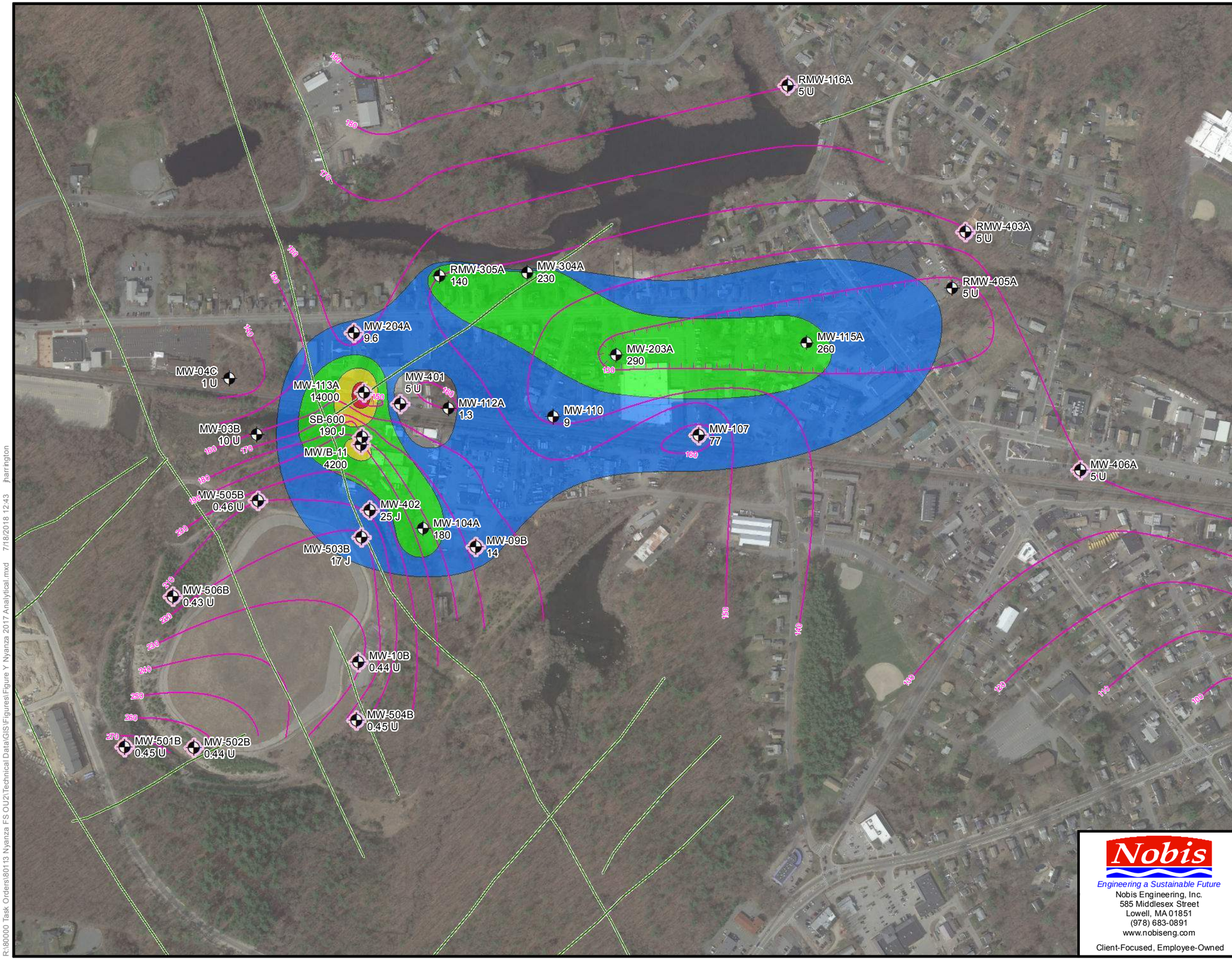

NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater 1,4-Dichlorobenzene is 5 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

Bedrock Monitoring Well with 1,4-Dichlorobenzene Concentration (µg/L)

Sample Collected Fall 2015

1,4-DCB Concentration (µg/L)

- > 5 ≤ 100
- > 100 ≤ 1,000
- > 1,000 ≤ 10,000
- > 10,000

Top of Bedrock Elevation Contour (ft NAVD88)

Depression Bedrock Contour

Photolineaments

0 200 400 800
Feet
1 inch = 400 feet

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FIGURE 3-4

BEDROCK GROUNDWATER
1,4-DICHLOROBENZENE RESULTS - FALL 2017
NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

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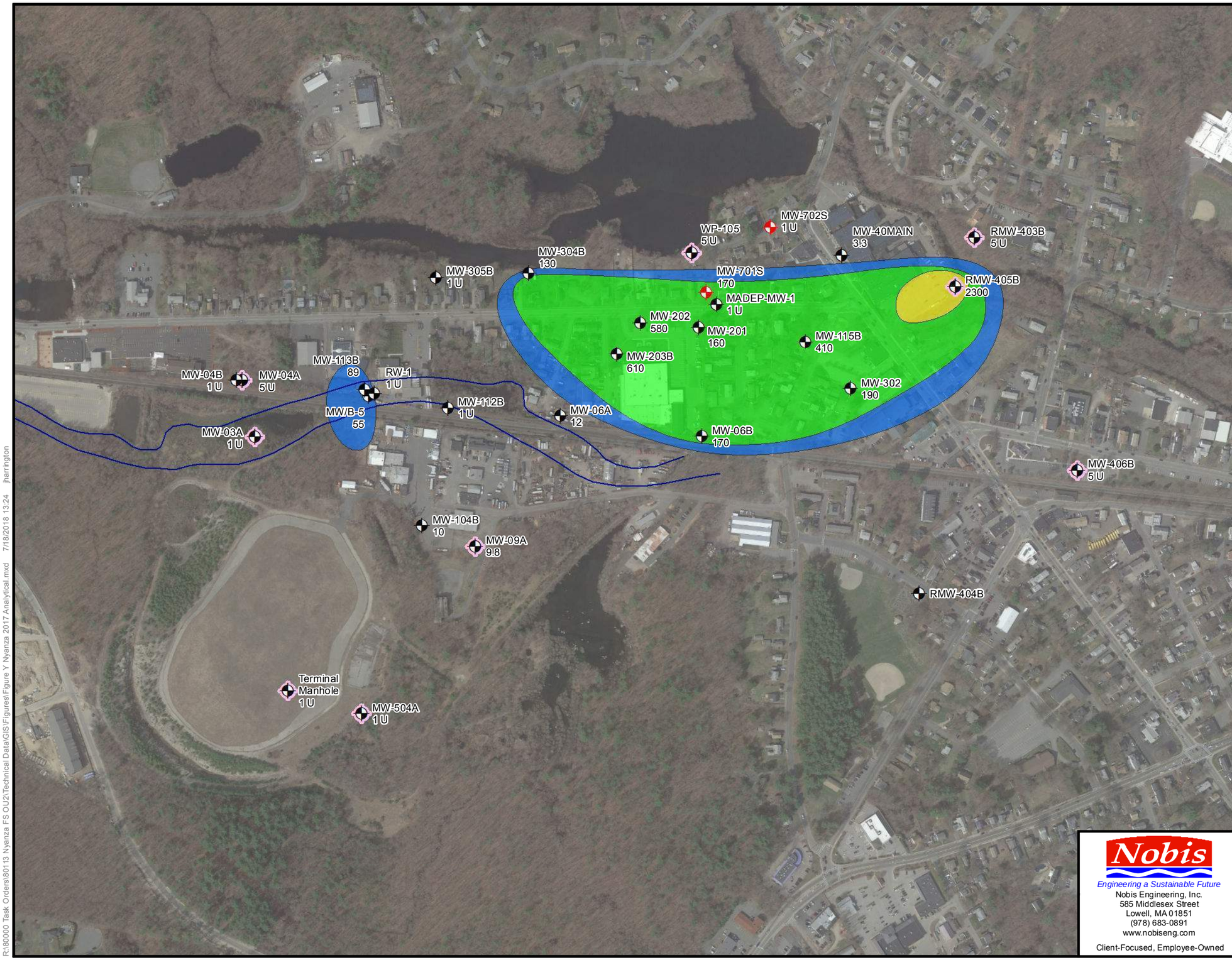

NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater cis-1,2-Dichloroethene is 70 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Monitoring Well with cis-1,2-Dichloroethene Concentration (µg/L)
- May 2, 2018 Data
- Sample Collected Fall 2015

cis-1,2-DCE Concentration (µg/L)

- > 70 ≤ 100
- > 100 ≤ 1,000
- > 1,000
- Approximate Former Sudbury River Stream Channel

0 200 400 800
Feet
1 inch = 400 feet

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FIGURE 3-5

OVERBURDEN GROUNDWATER
cis-1,2-DICHLOROETHENE RESULTS - FALL 2017
NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
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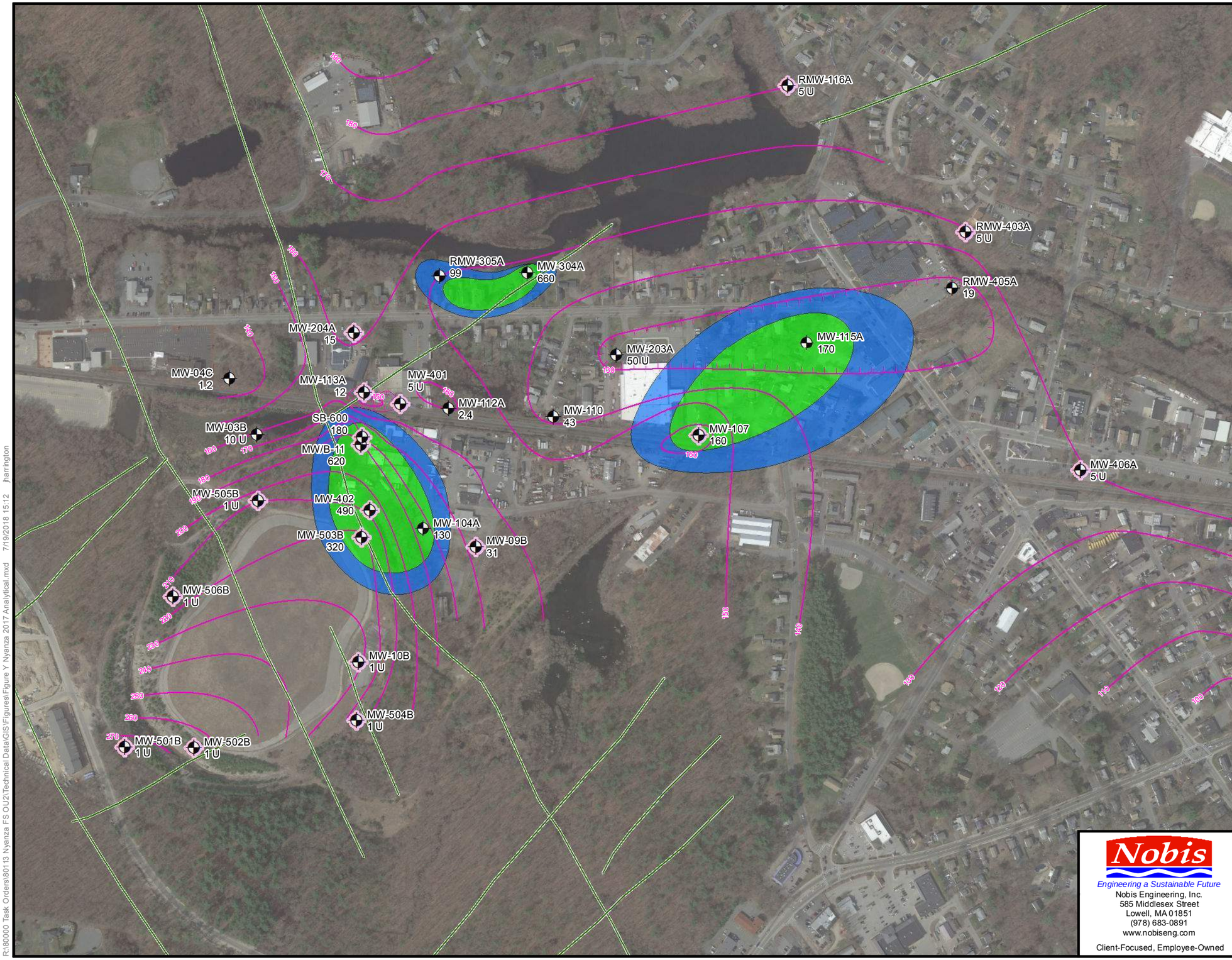

NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater cis-1,2-Dichloroethene is 70 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Bedrock Monitoring Well with cis-1,2-Dichloroethene Concentration (µg/L)
- Sample Collected Fall 2015

cis-1,2-DCE Concentration (µg/L)

- > 70 ≤ 100
- > 100
- Top of Bedrock Elevation Contour (ft NAVD88)
- Depression Bedrock Contour
- Photolineaments

0 200 400 800
Feet
1 inch = 400 feet

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FIGURE 3-6

BEDROCK GROUNDWATER
cis-1,2-DICHLOROETHENE RESULTS - FALL 2017
NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

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NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater 1,2,4-Trichlorobenzene is 70 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Monitoring Well with 1,2,4-Trichlorobenzene Concentration (µg/L)
- May 2, 2018 Data
- Sample Collected Fall 2015

1,2,4-TCB Concentration (µg/L)

- > 70 ≤ 1,000
- Approximate Former Sudbury River Stream Channel

0 200 400 800
Feet
1 inch = 400 feet

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FIGURE 3-7

OVERBURDEN GROUNDWATER
1,2,4-TRICHLOROBENZENE RESULTS - FALL 2017
NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

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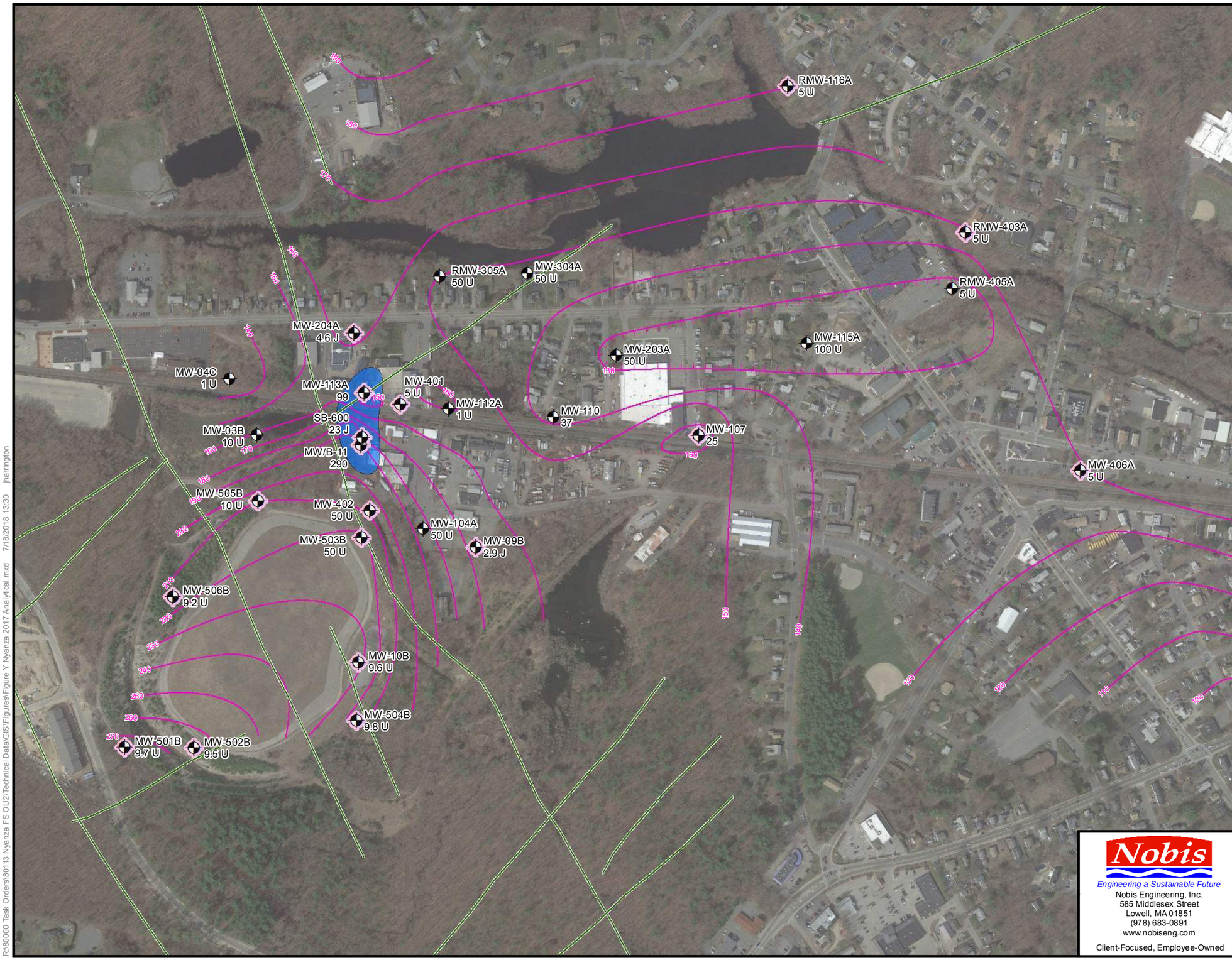

NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater 1,2,4-Trichlorobenzene is 70 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Bedrock Monitoring Well with 1,2,4-Trichlorobenzene Concentration (µg/L)
- Sample Collected Fall 2015

1,2,4-TCB Concentration (µg/L)

- > 70 ≤ 1,000
- Photolineaments
- Top of Bedrock Elevation Contour (ft NAVD88)
- Depression Bedrock Contour

0 200 400 800
Feet

1 inch = 400 feet

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FIGURE 3-8

BEDROCK GROUNDWATER
1,2,4-TRICHLOROBENZENE RESULTS - FALL 2017
NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
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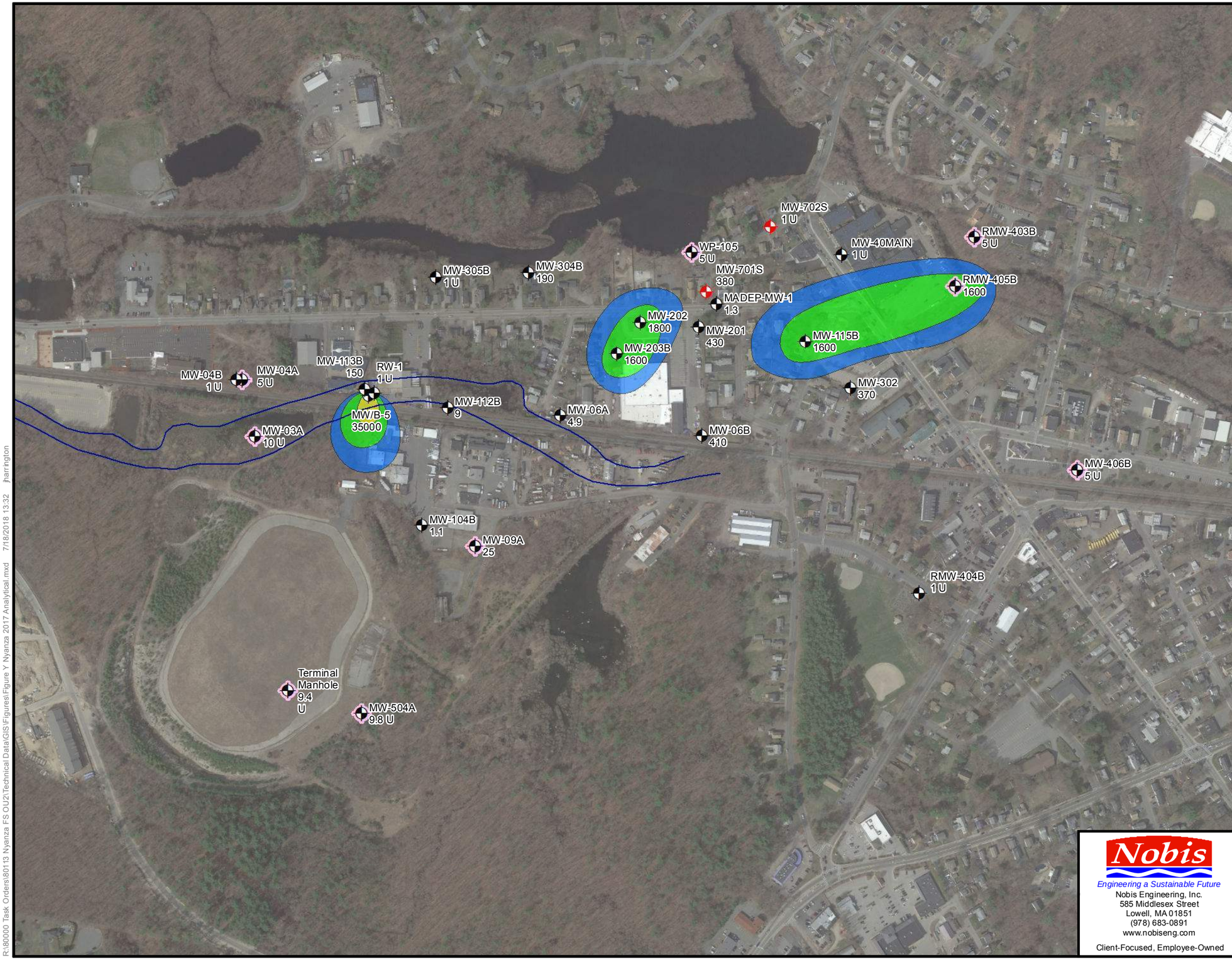

NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater 1,2-Dichlorobenzene is 600 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Monitoring Well with 1,2-Dichlorobenzene Concentration (µg/L)
- May 2, 2018 Data
- Sample Collected Fall 2015

1,2-DCB Concentration (µg/L)

- > 600 ≤ 1,000
- > 1,000 ≤ 10,000
- > 10,000
- Approximate Former Sudbury River Stream Channel

0 200 400 800
Feet
1 inch = 400 feet

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FIGURE 3-9

OVERBURDEN GROUNDWATER
1,2-DICHLOROBENZENE RESULTS - FALL 2017
NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
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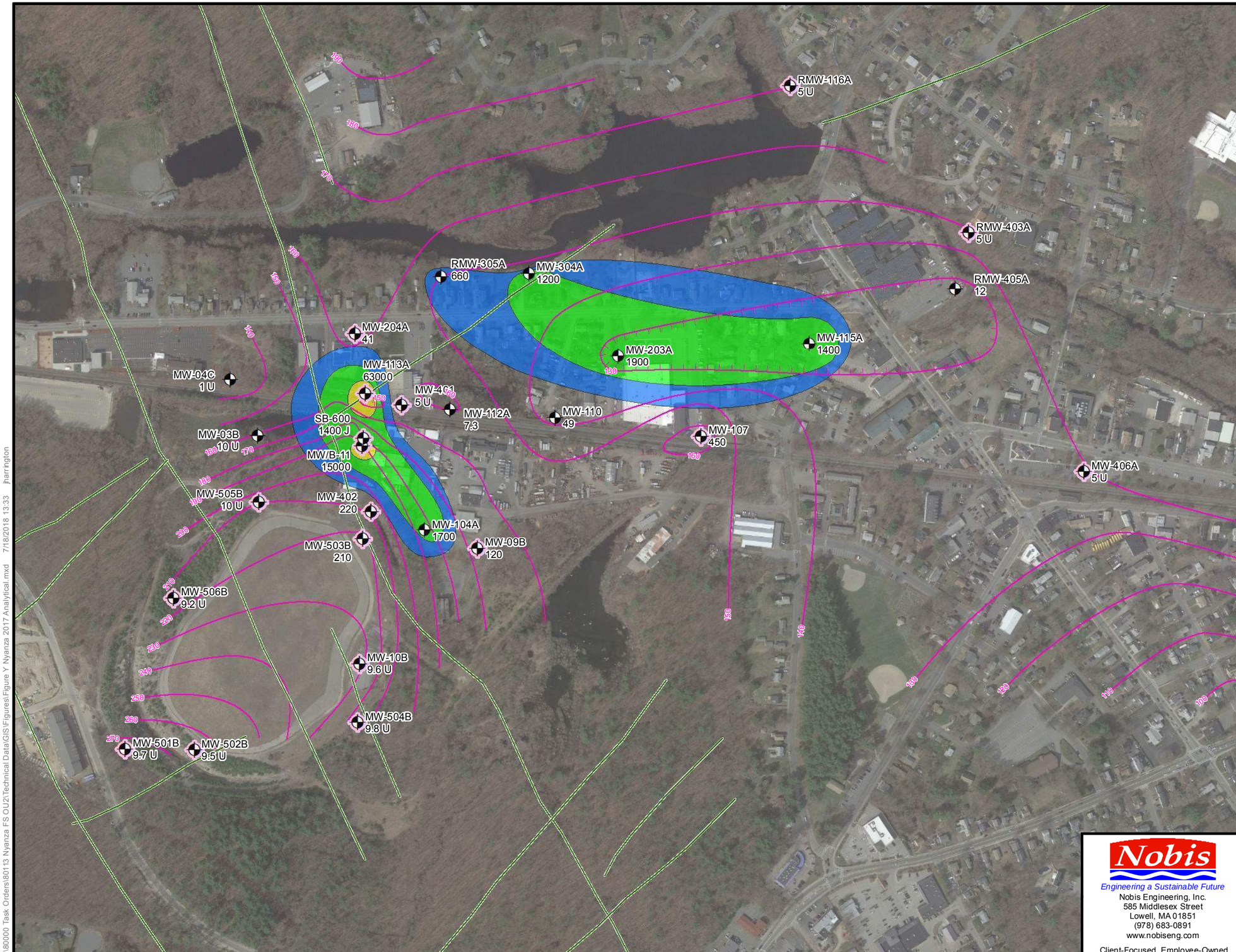
FIGURES



NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater 1,2-Dichlorobenzene is 600 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

Bedrock Monitoring Well with1,2-Dichlorobenzene Concentration (µg/L)

Sample Collected Fall 2015

1,2-DCB Concentration (µg/L)

> 600 ≤ 1,000

> 1,000 ≤ 10,000

> 10,000

Photolineaments

Top of Bedrock Elevation Contour (ft NAVD88)

Depression Bedrock Contour

0 200 400 800

Feet

1 inch = 400 feet

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FIGURE 3-10

BEDROCK GROUNDWATER
1,2-DICHLOROBENZENE RESULTS - FALL 2017

NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

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PROJECT NO. 80113	DATE: JULY 2018

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NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater Benzene is 5 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Monitoring Well with Benzene Concentration (µg/L)
- May 2, 2018 Data
- Sample Collected Fall 2015

Benzene Concentration (µg/L)

- > 5 ≤ 100
- Approximate Former Sudbury River Stream Channel

0 200 400 800
Feet
1 inch = 400 feet

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FIGURE 3-11

OVERBURDEN GROUNDWATER BENZENE RESULTS - FALL 2017

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

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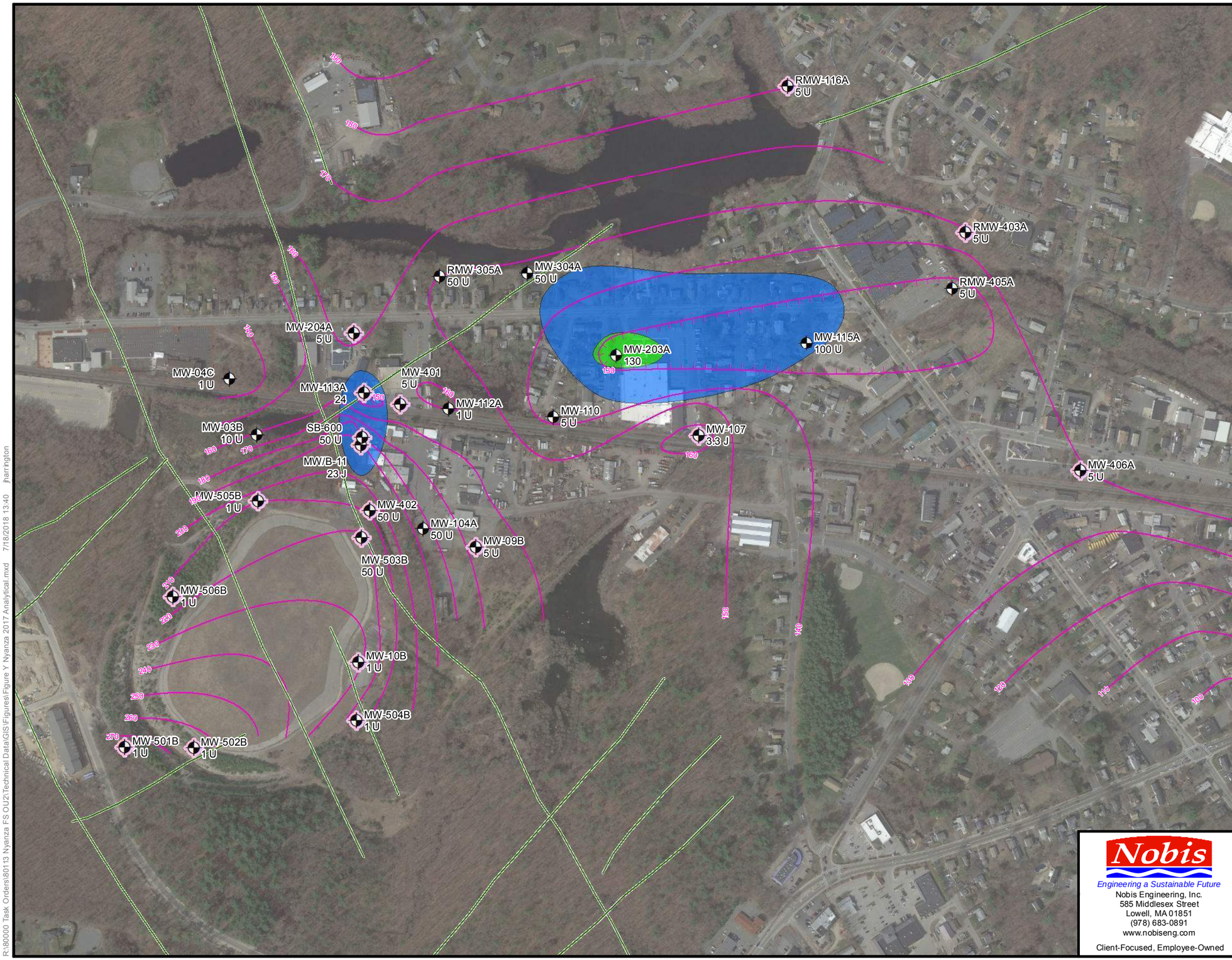

NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater Benzene is 5 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Bedrock Monitoring Well with Benzene Concentration (µg/L)
- Sample Collected Fall 2015

Benzene Concentration (µg/L)

- > 5 ≤ 100
- > 100 ≤ 1,000
- Photolineaments
- Top of Bedrock Elevation Contour (ft NAVD88)
- Depression Bedrock Contour

0 200 400 800
Feet
1 inch = 400 feet

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FIGURE 3-12

BEDROCK GROUNDWATER
BENZENE RESULTS - FALL 2017

NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

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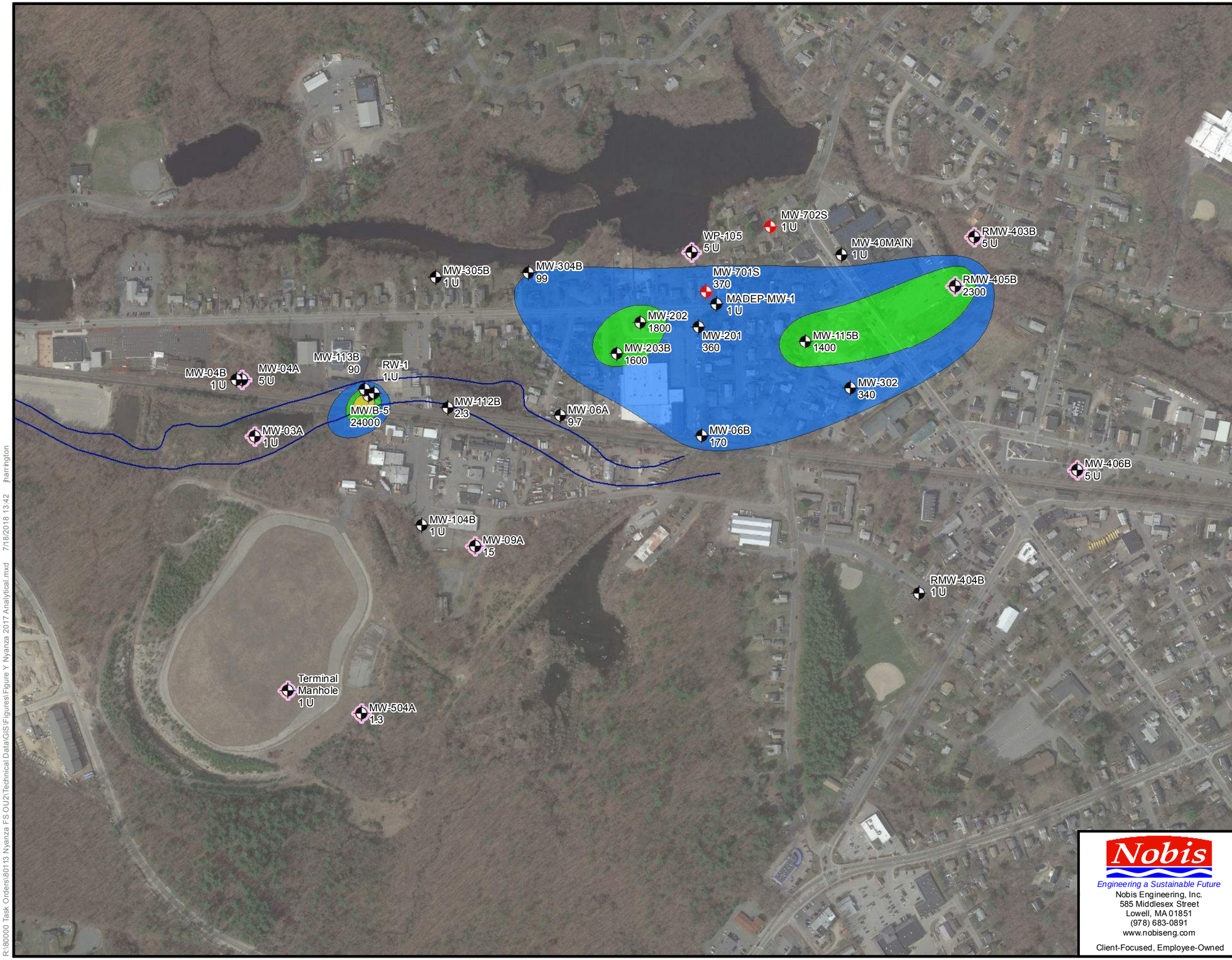

NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater Chlorobenzene is 100 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Monitoring Well with Chlorobenzene Concentration (µg/L)
- May 2, 2018 Data
- Sample Collected Fall 2015

CB Concentration (µg/L)

- > 100 ≤ 1,000
- > 1,000 ≤ 10,000
- > 10,000
- Approximate Former Sudbury River Stream Channel

0 200 400 800
Feet
1 inch = 400 feet

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FIGURE 3-13

OVERBURDEN GROUNDWATER CHLOROBENZENE RESULTS - FALL 2017

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

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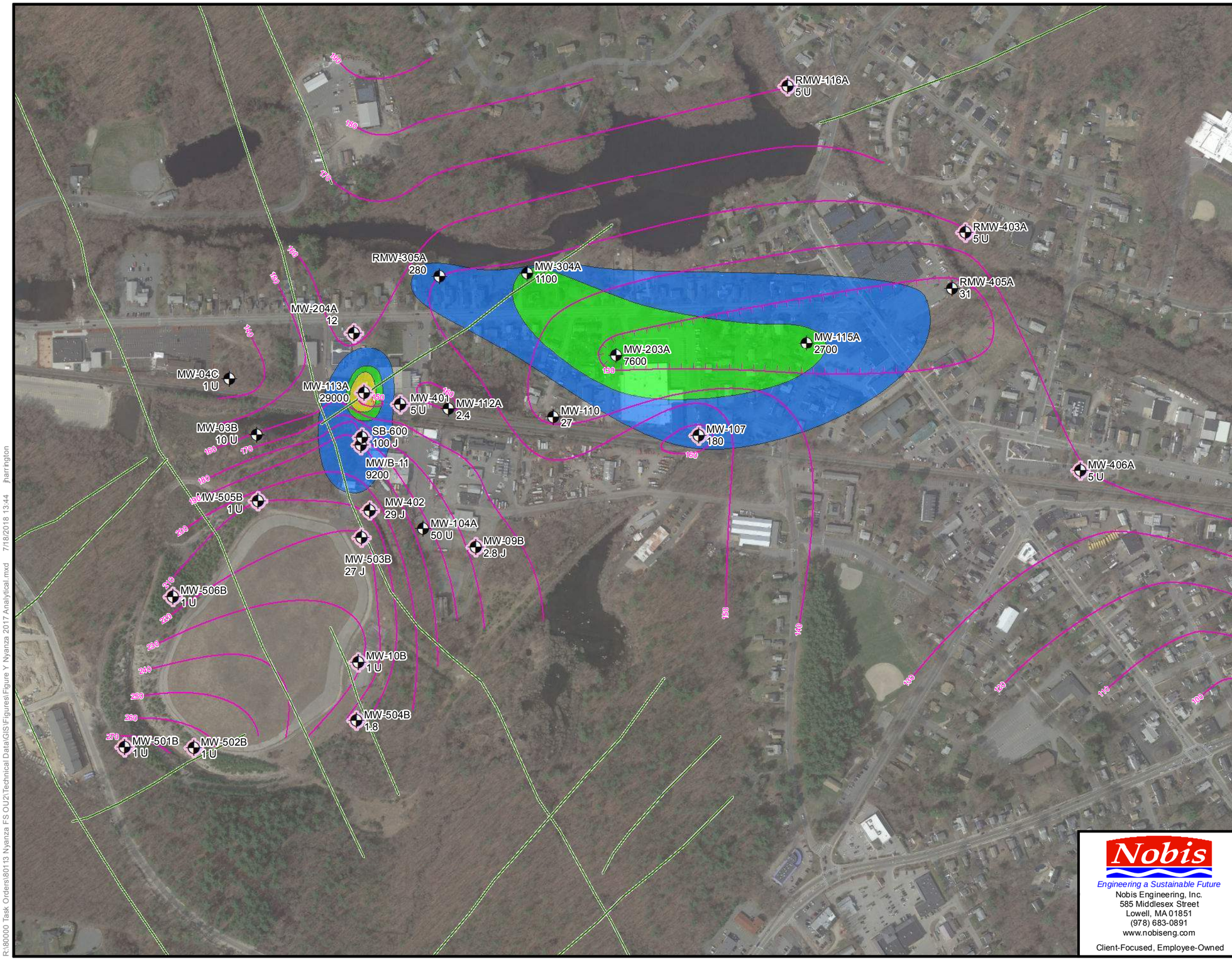

NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater Chlorobenzene is 100 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Bedrock Monitoring Well with Chlorobenzene Concentration (µg/L)
- Sample Collected Fall 2015

CB Concentration (µg/L)

- > 100 ≤ 1,000
- > 1,000 ≤ 10,000
- > 10,000
- Photolineaments
- Top of Bedrock Elevation Contour (ft NAVD88)
- Depression Bedrock Contour

0 200 400 800
Feet
1 inch = 400 feet

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FIGURE 3-14

BEDROCK GROUNDWATER CHLOROBENZENE RESULTS - FALL 2017

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

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NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater Vinyl Chloride is 2 micrograms per liter (µg/L). U = not detected.

3. Vinyl Chloride was not detected in overburden groundwater; therefore, isoconcentration contours are not depicted.

4. Aerial photograph from MassGIS/Google web map service, 2017.

5. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Monitoring Well with Vinyl Chloride Concentration (µg/L)
- Sample Collected Fall 2015
- May 2, 2018 Data
- Approximate Former Sudbury River Stream Channel

0 200 400 800
Feet
1 inch = 400 feet

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FIGURE 3-15

OVERBURDEN GROUNDWATER
VINYL CHLORIDE RESULTS - FALL 2017

NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

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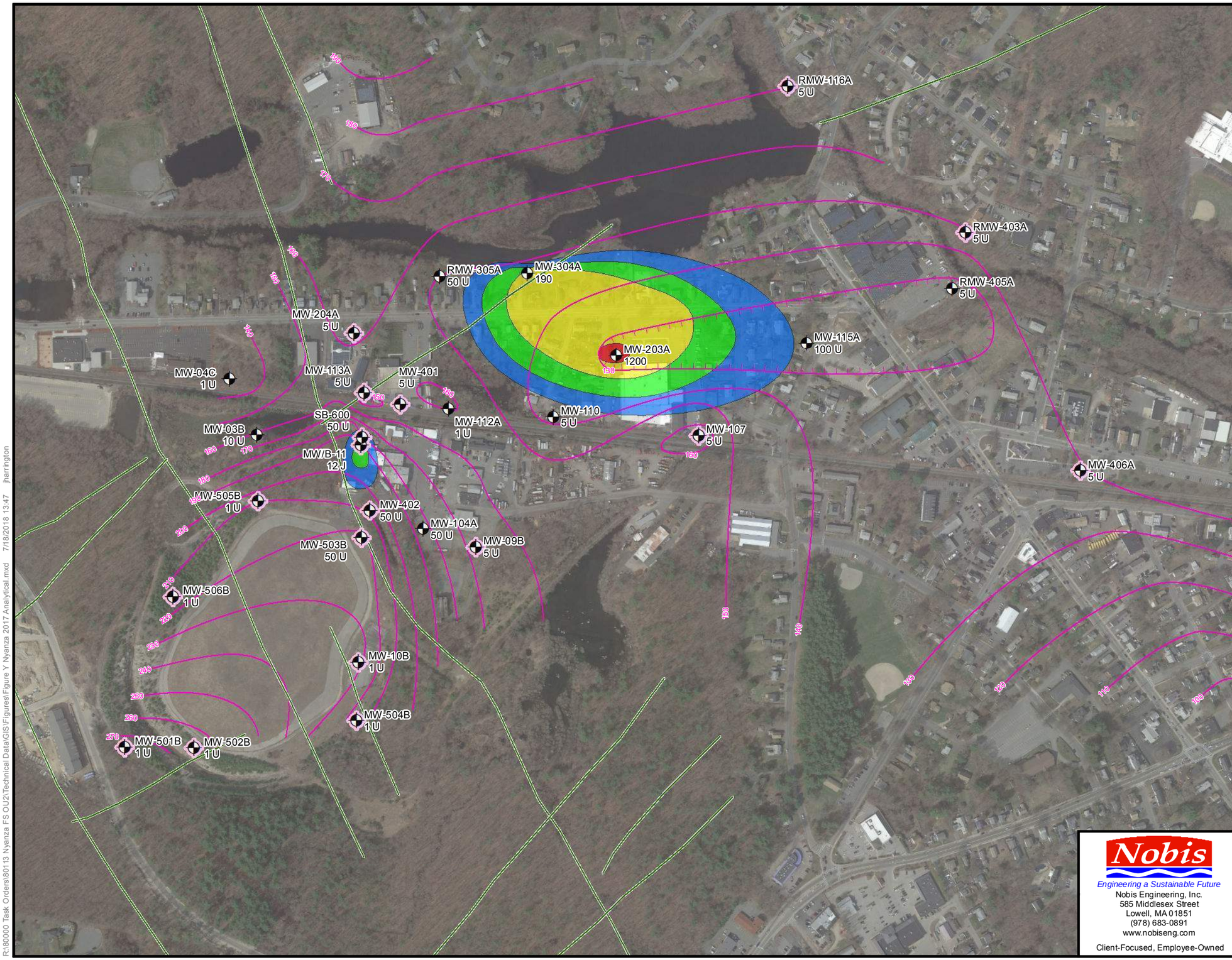

NOTES:

1. Samples collected by Nobis, November 13-16, 2017, unless otherwise noted.

2. Massachusetts MCP GW-1 standard for groundwater Vinyl Chloride is 2 micrograms per liter (µg/L). U = not detected.

3. Aerial photograph from MassGIS/Google web map service, 2017.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

Bedrock Monitoring Well with Vinyl Chloride Concentration (µg/L)

Sample Collected Fall 2015

VC Concentration (µg/L)

- > 2 ≤ 10
- > 10 ≤ 100
- > 100 ≤ 1,000
- > 1,000
- Photolineaments
- Top of Bedrock Elevation Contour (ft NAVD88)
- Depression Bedrock Contour

0 200 400 800
Feet

1 inch = 400 feet

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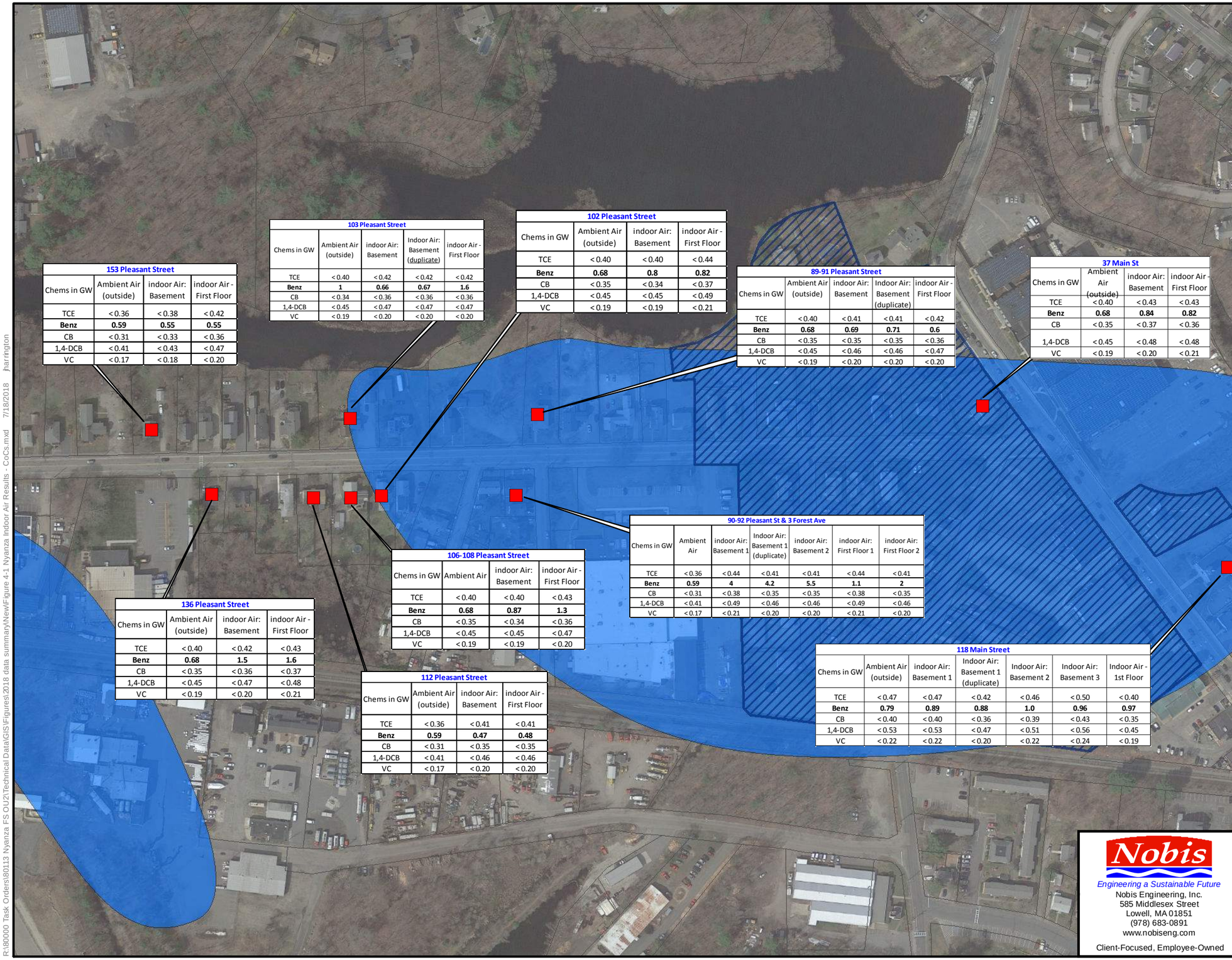
FIGURE 3-16

BEDROCK GROUNDWATER
VINYL CHLORIDE RESULTS - FALL 2017

NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: JH	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

R:\80000 Task Orders\80113 Nyanza FS OU2\Technical Data\GIS\Figures\Figure Y Nyanza 2017 Analytical.mxd 7/18/2018 13:47 jharrington



153 Pleasant Street

Chems in GW	Ambient Air (outside)	indoor Air: Basement	indoor Air - First Floor
TCE	< 0.36	< 0.38	< 0.42
Benz	**0.59**	**0.55**	**0.55**
CB	< 0.31	< 0.33	< 0.36
1,4-DCB	< 0.41	< 0.43	< 0.47
VC	< 0.17	< 0.18	< 0.20

103 Pleasant Street

Chems in GW	Ambient Air (outside)	indoor Air: Basement	Indoor Air: Basement (duplicate)	indoor Air - First Floor
TCE	< 0.40	< 0.42	< 0.42	< 0.42
Benz	**1**	**0.66**	**0.67**	**1.6**
CB	< 0.34	< 0.36	< 0.36	< 0.36
1,4-DCB	< 0.45	< 0.47	< 0.47	< 0.47
VC	< 0.19	< 0.20	< 0.20	< 0.20

102 Pleasant Street

Chems in GW	Ambient Air (outside)	indoor Air: Basement	indoor Air - First Floor
TCE	< 0.40	< 0.40	< 0.44
Benz	**0.68**	**0.8**	**0.82**
CB	< 0.35	< 0.34	< 0.37
1,4-DCB	< 0.45	< 0.45	< 0.49
VC	< 0.19	< 0.19	< 0.21

89-91 Pleasant Street

Chems in GW	Ambient Air (outside)	indoor Air: Basement	Indoor Air: Basement (duplicate)	indoor Air - First Floor
TCE	< 0.40	< 0.41	< 0.41	< 0.42
Benz	**0.68**	**0.69**	**0.71**	**0.6**
CB	< 0.35	< 0.35	< 0.35	< 0.36
1,4-DCB	< 0.45	< 0.46	< 0.46	< 0.47
VC	< 0.19	< 0.20	< 0.20	< 0.20

37 Main St

Chems in GW	Ambient Air (outside)	indoor Air: Basement	indoor Air - First Floor
TCE	< 0.40	< 0.43	< 0.43
Benz	**0.68**	**0.84**	**0.82**
CB	< 0.35	< 0.37	< 0.36
1,4-DCB	< 0.45	< 0.48	< 0.48
VC	< 0.19	< 0.20	< 0.21

90-92 Pleasant St & 3 Forest Ave

Chems in GW	Ambient Air	indoor Air: Basement 1	Indoor Air: Basement 1 (duplicate)	indoor Air: Basement 2	indoor Air: First Floor 1	indoor Air: First Floor 2
TCE	< 0.36	< 0.44	< 0.41	< 0.41	< 0.44	< 0.41
Benz	**0.59**	**4**	**4.2**	**5.5**	**1.1**	**2**
CB	< 0.31	< 0.38	< 0.35	< 0.35	< 0.38	< 0.35
1,4-DCB	< 0.41	< 0.49	< 0.46	< 0.46	< 0.49	< 0.46
VC	< 0.17	< 0.21	< 0.20	< 0.20	< 0.21	< 0.20

106-108 Pleasant Street

Chems in GW	Ambient Air	indoor Air: Basement	indoor Air - First Floor
TCE	< 0.40	< 0.40	< 0.43
Benz	**0.68**	**0.87**	**1.3**
CB	< 0.35	< 0.34	< 0.36
1,4-DCB	< 0.45	< 0.45	< 0.47
VC	< 0.19	< 0.19	< 0.20

136 Pleasant Street

Chems in GW	Ambient Air (outside)	indoor Air: Basement	indoor Air - First Floor
TCE	< 0.40	< 0.42	< 0.43
Benz	**0.68**	**1.5**	**1.6**
CB	< 0.35	< 0.36	< 0.37
1,4-DCB	< 0.45	< 0.47	< 0.48
VC	< 0.19	< 0.20	< 0.21

112 Pleasant Street

Chems in GW	Ambient Air (outside)	indoor Air: Basement	indoor Air - First Floor
TCE	< 0.36	< 0.41	< 0.41
Benz	**0.59**	**0.47**	**0.48**
CB	< 0.31	< 0.35	< 0.35
1,4-DCB	< 0.41	< 0.46	< 0.46
VC	< 0.17	< 0.20	< 0.20

118 Main Street

Chems in GW	Ambient Air (outside)	indoor Air: Basement 1	Indoor Air: Basement 1 (duplicate)	Indoor Air: Basement 2	Indoor Air: Basement 3	Indoor Air - 1st Floor
TCE	< 0.47	< 0.47	< 0.42	< 0.46	< 0.50	< 0.40
Benz	**0.79**	**0.89**	**0.88**	**1.0**	**0.96**	**0.97**
CB	< 0.40	< 0.40	< 0.36	< 0.39	< 0.43	< 0.35
1,4-DCB	< 0.53	< 0.53	< 0.47	< 0.51	< 0.56	< 0.45
VC	< 0.22	< 0.22	< 0.20	< 0.22	< 0.24	< 0.19

Notes:

1. This site plan was created from a site plan titled "Base Mapping and Well Survey" by A-Plus Construction, Dated September 25, 2012.

2. All exceedances are based on Mass DEP MCP-GW2, June 2016 except where noted. All results are in micrograms per liter (µg/L).

3. Vapor Mitigation Area is from Community Update, EPA Plans Modifications to Groundwater Cleanup, EPA, August 2006.

4. Aerial photograph from MassGIS/Google web map service, 2017.

5. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

6. Samples results presented in ug/m3.

7. Chemical abbreviations: TCE - Trichloroethyene; Benz - Benzene; CB - Chlorobenzene; 1,4-DCB - 1,4-Dichlorobenzene; VC - Vinyl Chloride.

8. Bolded results indicate a positive detection.

9. Ambient air results shown are based on the representative ambient air results for the day indoor air samples were collected at each target property.

Legend

- Air Sample Location
- Vapor Mitigation Area
- Overburden plume extent based on TCE concentrations above GW-2 (5 ug/L)

0 100 200 400

Feet

1 inch = 200 feet

N

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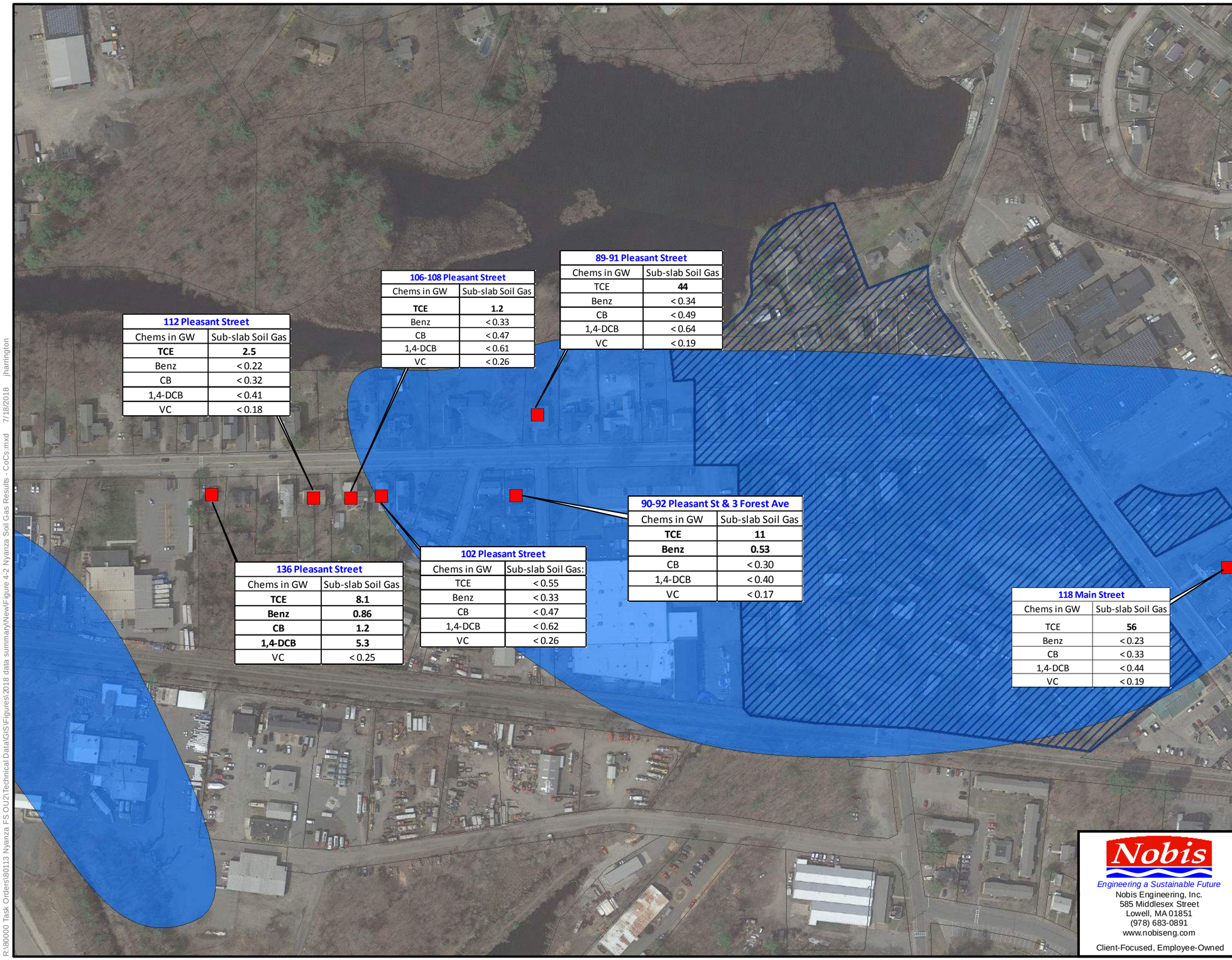
FIGURE 4-1

INDOOR & AMBIENT AIR RESULTS - CoCs
NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: DFM	CHECKED BY: JL
PROJECT NO. 80113	DATE: JULY 2018

R:\80000 Task Orders\80113 Nyanza FS OU2\Technical Data\GIS\Figures\2018 data summary\New\Figure 4-1 Nyanza Indoor Air Results - CoCs.mxd 7/18/2018 jharrington



Notes:

1. This site plan was created from a site plan titled "Base Mapping and Well Survey" by A-Plus Construction, Dated September 25, 2012.

2. All exceedances are based on Mass DEP MCP-GW2, June 2016 except where noted. All results are in micrograms per liter (µg/L).

3. Vapor Mitigation Area is from Community Update, EPA Plans Modifications to Groundwater Cleanup, EPA, August 2006.

4. Aerial photograph from MassGIS/Google web map service, 2017.

5. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

6. Samples results presented in ug/m3.

7. Chemical abbreviations: TCE - Trichloroethyene; Benz - Benzene; CB - Chlorobenzene; 1,4-DCB - 1,4-Dichlorobenzene; VC - Vinyl Chloride.

8. Bolded results indicate a positive detection.

Legend

- Sub-Slab Sample Location
- Vapor Mitigation Area
- Overburden plume extent based on TCE concentrations above GW-2 (5 ug/L)

N

0 100 200 400

Feet

1 inch = 200 feet

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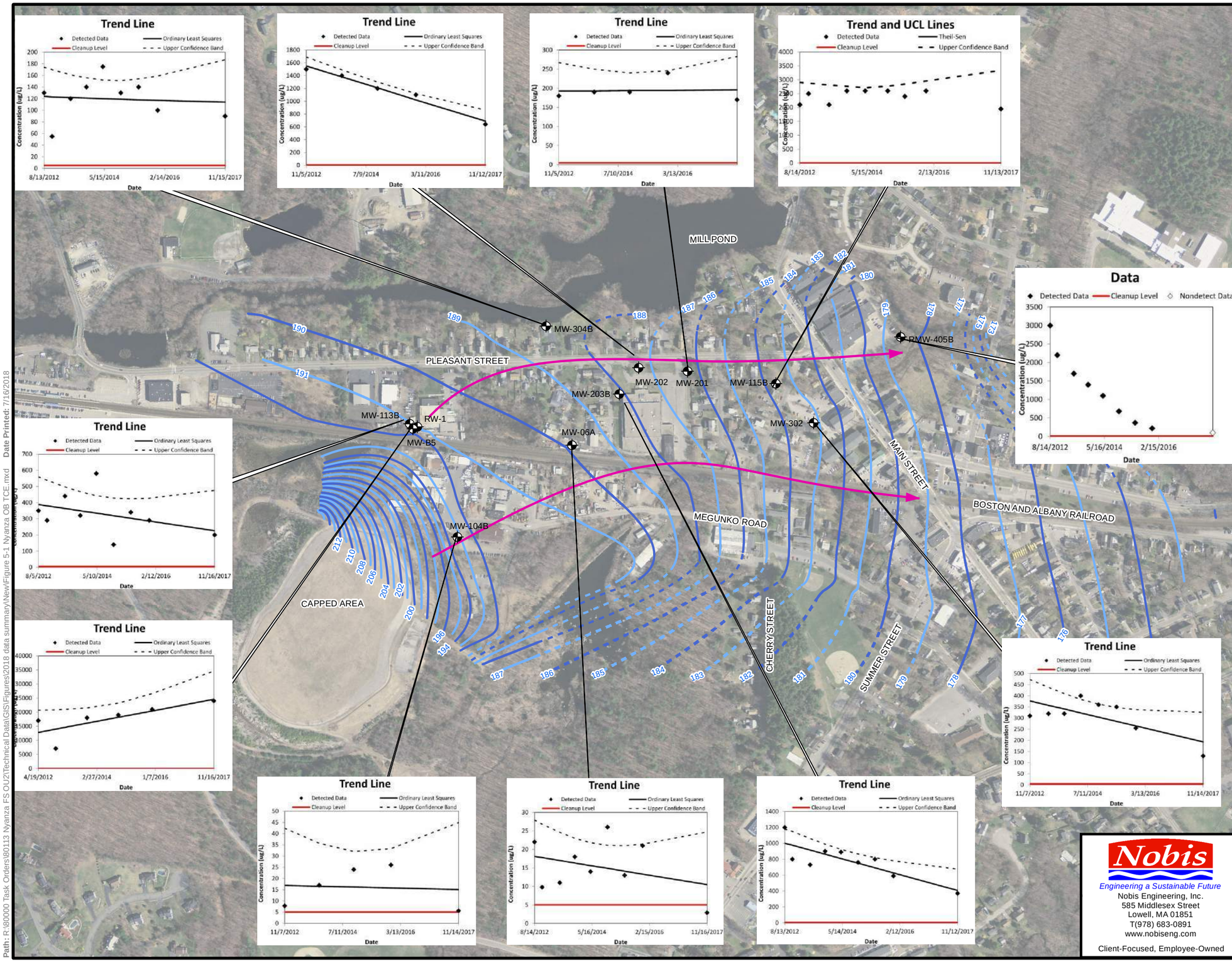
FIGURE 4-2

SOIL GAS SAMPLE RESULTS - CoCs
NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: DFM	CHECKED BY: JL
PROJECT NO. 80113	DATE: JULY 2018

R:\80000 Task Orders\80113 Nyanza FS OU2\Technical Data\GIS\Figures\2018 data summary\New\Figure 4-2 Nyanza Soil Gas Results - CoCs.mxd 7/18/2018 jharrington



NOTES:

1. See Appendix E for explanation.
2. Aerial photograph from MassGIS, 2013.
3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Potentiometric Surface with Groundwater Elevation (ft msl)
- Inferred Overburden Groundwater Contour
- Generalized Groundwater Flow

N

0 200 400 800

Feet

1 inch = 481 feet

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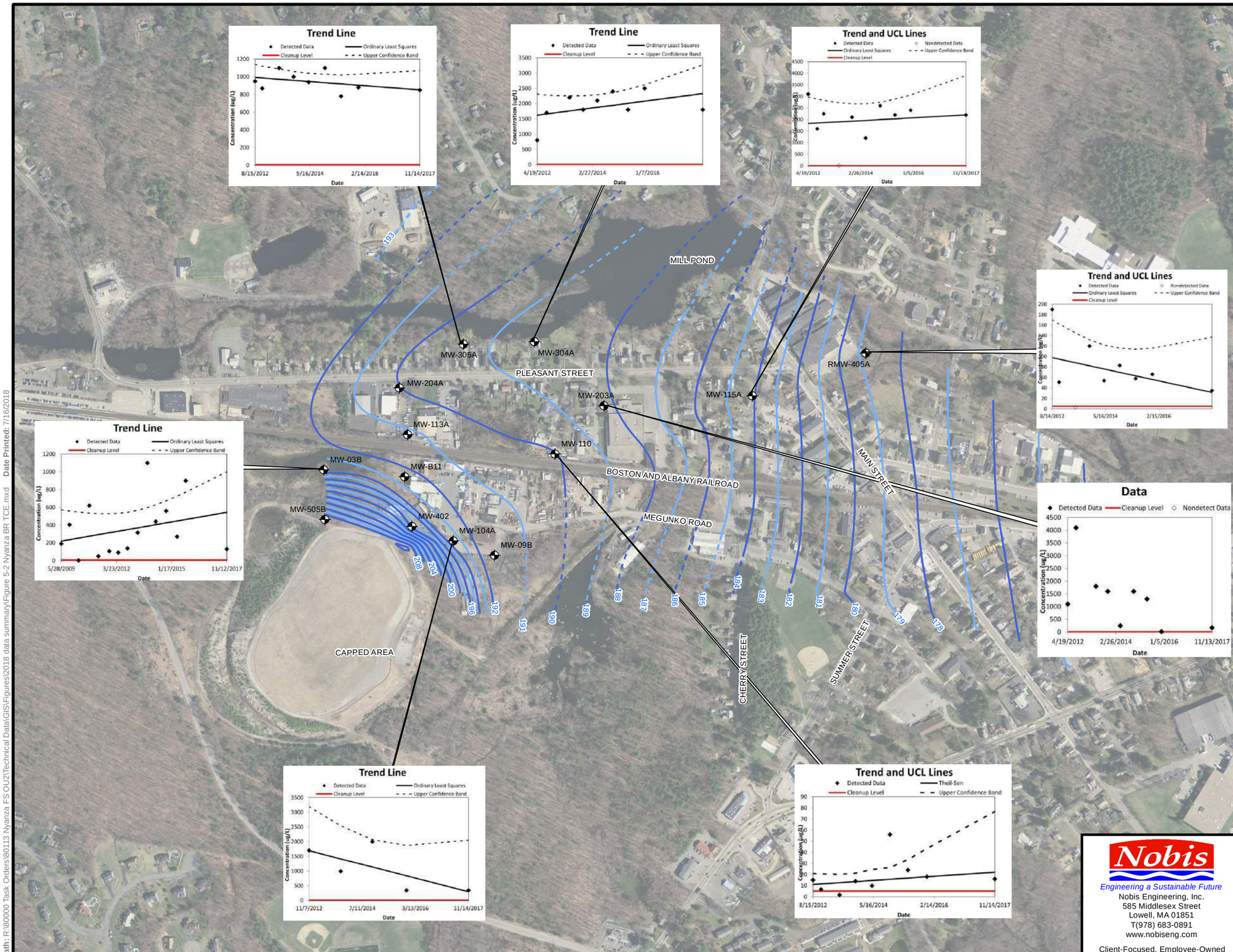
FIGURE 5-1

OVERBURDEN GROUNDWATER MONITORING TOOL RESULTS - TRICHLOROETHENE

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II ASHLAND, MASSACHUSETTS

PREPARED BY: CF	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

Path: R:\80000 Task Orders\80113 Nyanza FS OU2\Technical Data\GIS\Figures\2018 data summary\New\Figure 5-1 Nyanza OB TCE.mxd Date Printed: 7/16/2018



NOTES:

1. See Appendix E for explanation.
2. Aerial photograph from MassGIS, 2013.
3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Bedrock Potentiometric Surface with Groundwater Elevation (ft msl)
- Inferred Bedrock Groundwater Contour

N

0 200 400 800

Feet

1 inch = 514 feet

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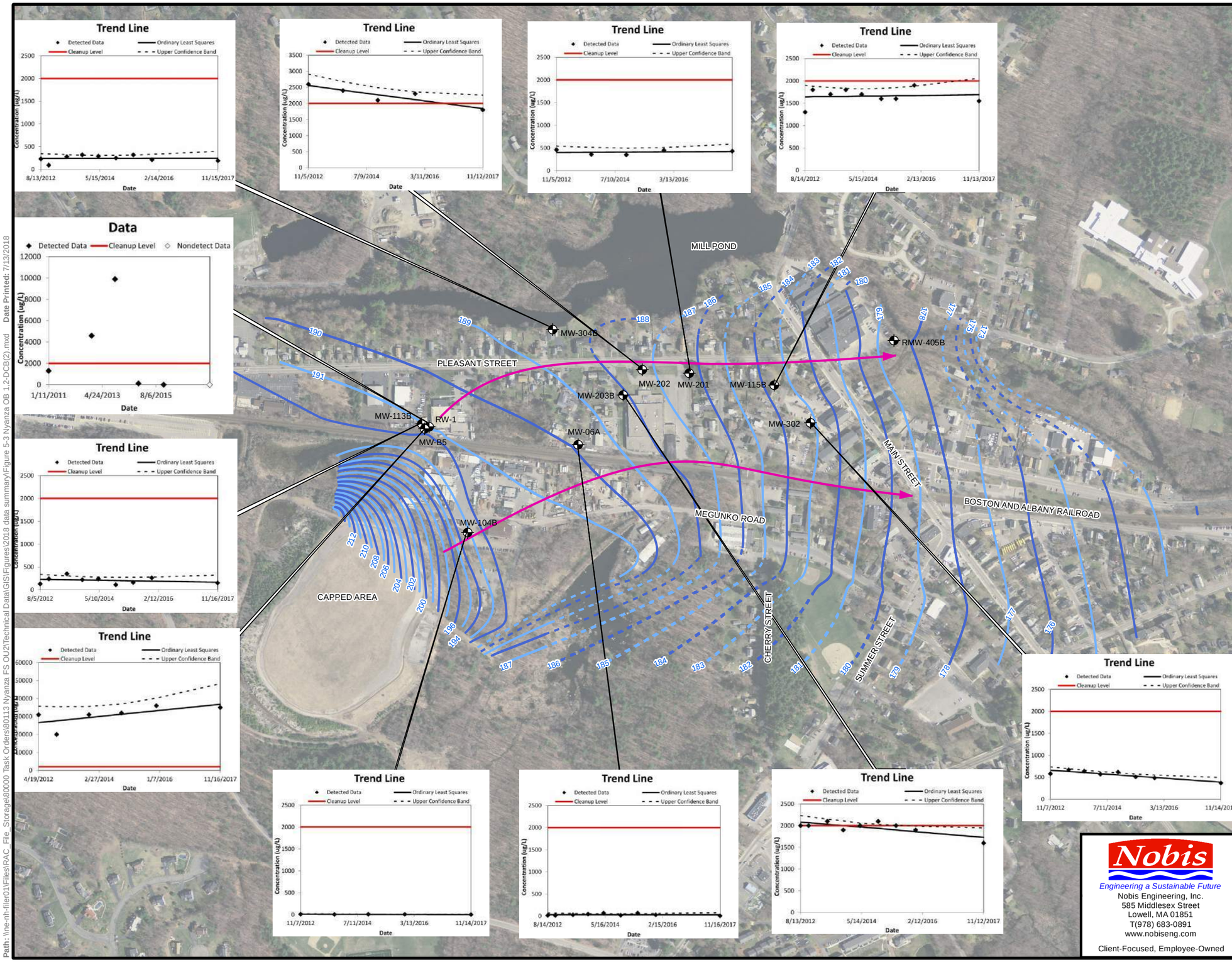
FIGURE 5-2

BEDROCK GROUNDWATER MONITORING TOOL RESULTS - TRICHLOROETHENE

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: CF	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

Path: R:\80000 Task Orders\80113 Nyanza FS OU2\Technical Data\GIS\Figures\2018 data summary\Figure 5-2 Nyanza BR TCE.mxd Date Printed: 7/16/2018



NOTES:

1. See Appendix E for explanation.
2. Aerial photograph from MassGIS, 2013.
3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Potentiometric Surface with Groundwater Elevation (ft msl)
- Inferred Overburden Groundwater Contour
- Generalized Groundwater Flow

N

0 200 400 800

Feet

1 inch = 500 feet

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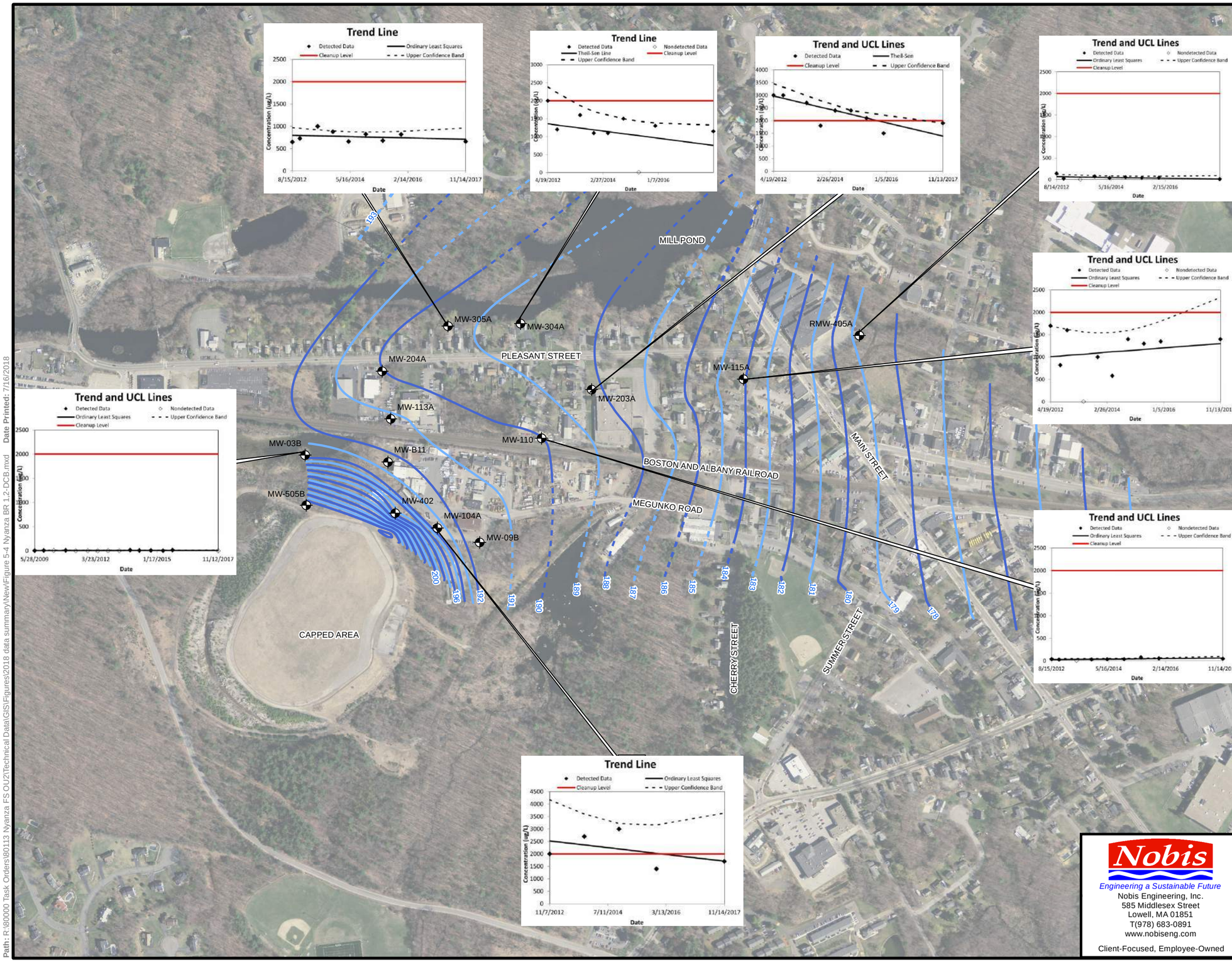
FIGURE 5-3

OVERBURDEN GROUNDWATER MONITORING TOOL RESULTS - 1,2-DICHLOROBENZENE

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: CF	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

Path: \\ne-nh-filer01\Files\RAC_File_Storage\80000 Task Orders\80113 Nyanza FS OU2\Technical Data\GIS\Figures\2018 data summary\Figure 5-3 Nyanza OB 1,2-DCB(2).mxd Date Printed: 7/13/2018



NOTES:

1. See Appendix E for explanation.
2. Aerial photograph from MassGIS, 2013.
3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Bedrock Potentiometric Surface with Groundwater Elevation (ft msl)
- Inferred Bedrock Groundwater Contour

N

0 200 400 800

Feet

1 inch = 502 feet

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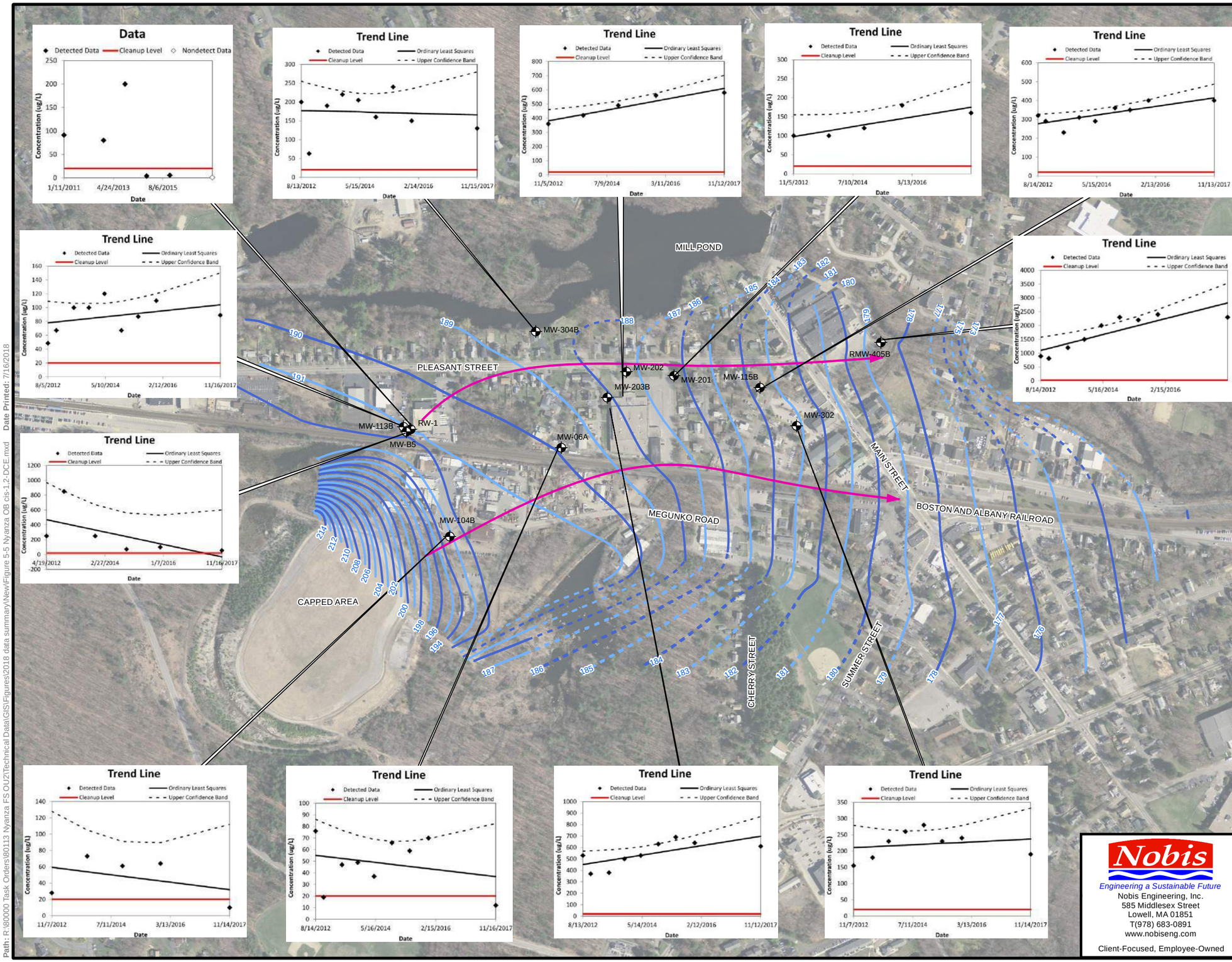
FIGURE 5-4

BEDROCK GROUNDWATER MONITORING TOOL RESULTS - 1,2-DICHLOROBENZENE

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: CF	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

Path: R:\80000 Task Orders\80113 Nyanza FS OU2\Technical Data\GIS\Figures\2018 data summary\New\Figure 5-4 Nyanza BR 1,2-DCB.mxd Date Printed: 7/16/2018



NOTES:

1. See Appendix E for explanation.
2. Aerial photograph from MassGIS, 2013.
3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Potentiometric Surface with Groundwater Elevation (ft msl)
- Inferred Overburden Groundwater Contour
- Generalized Groundwater Flow

N

0 200 400 800

Feet

1 inch = 494 feet

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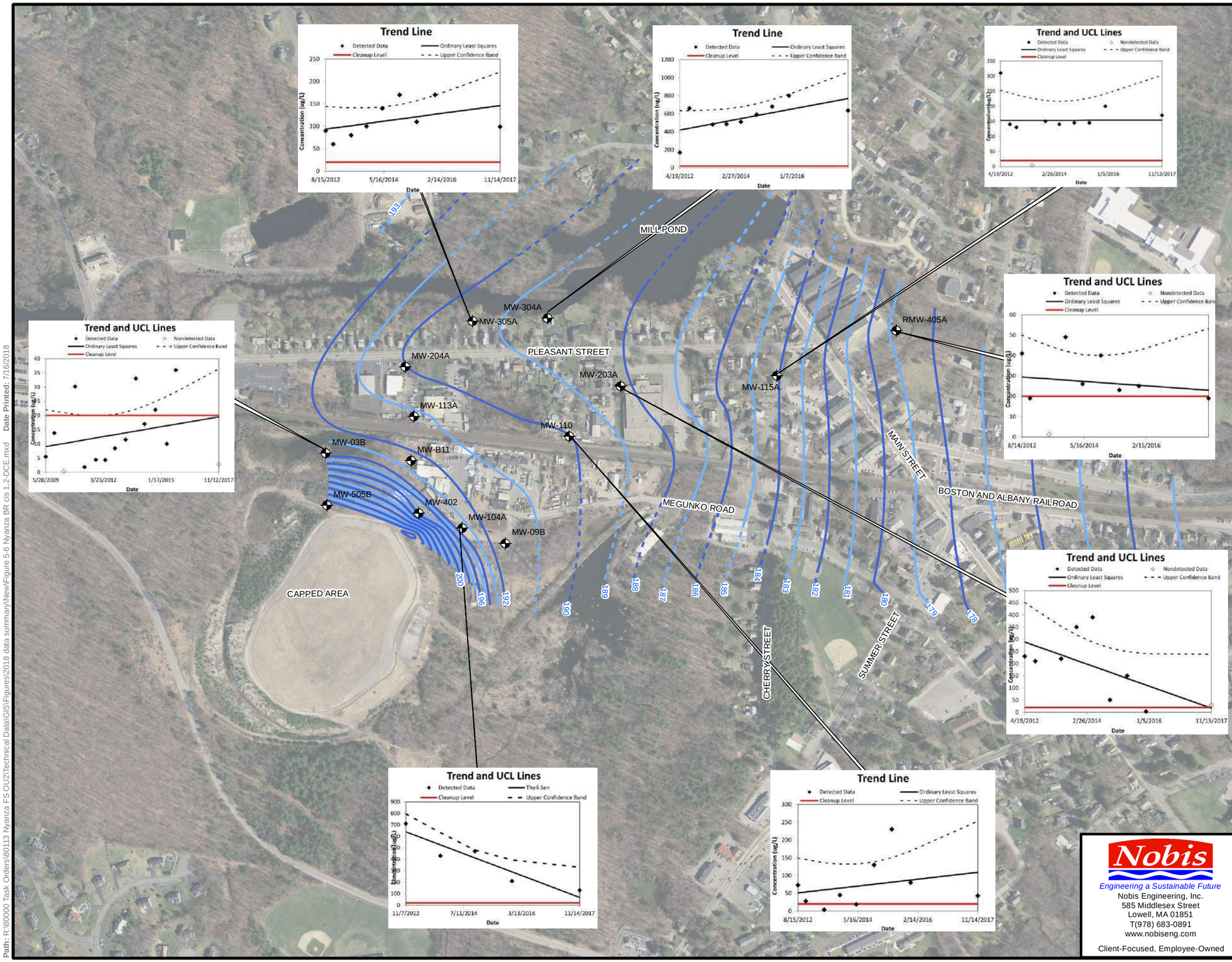
FIGURE 5-5

OVERBURDEN GROUNDWATER MONITORING TOOL RESULTS - cis-1,2-DICHLOROETHENE

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: CF	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

Path: R:\80000 Task Orders\80113 Nyanza FS OU2\Technical Data\GIS\Figures\2018 data summary\New\Figure 5-5 Nyanza OB cis-1,2-DCE.mxd Date Printed: 7/16/2018



NOTES:

1. See Appendix E for explanation.
2. Aerial photograph from MassGIS, 2013.
3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Bedrock Potentiometric Surface with Groundwater Elevation (ft msl)
- Inferred Bedrock Groundwater Contour

N

0 200 400 800

Feet

1 inch = 488 feet

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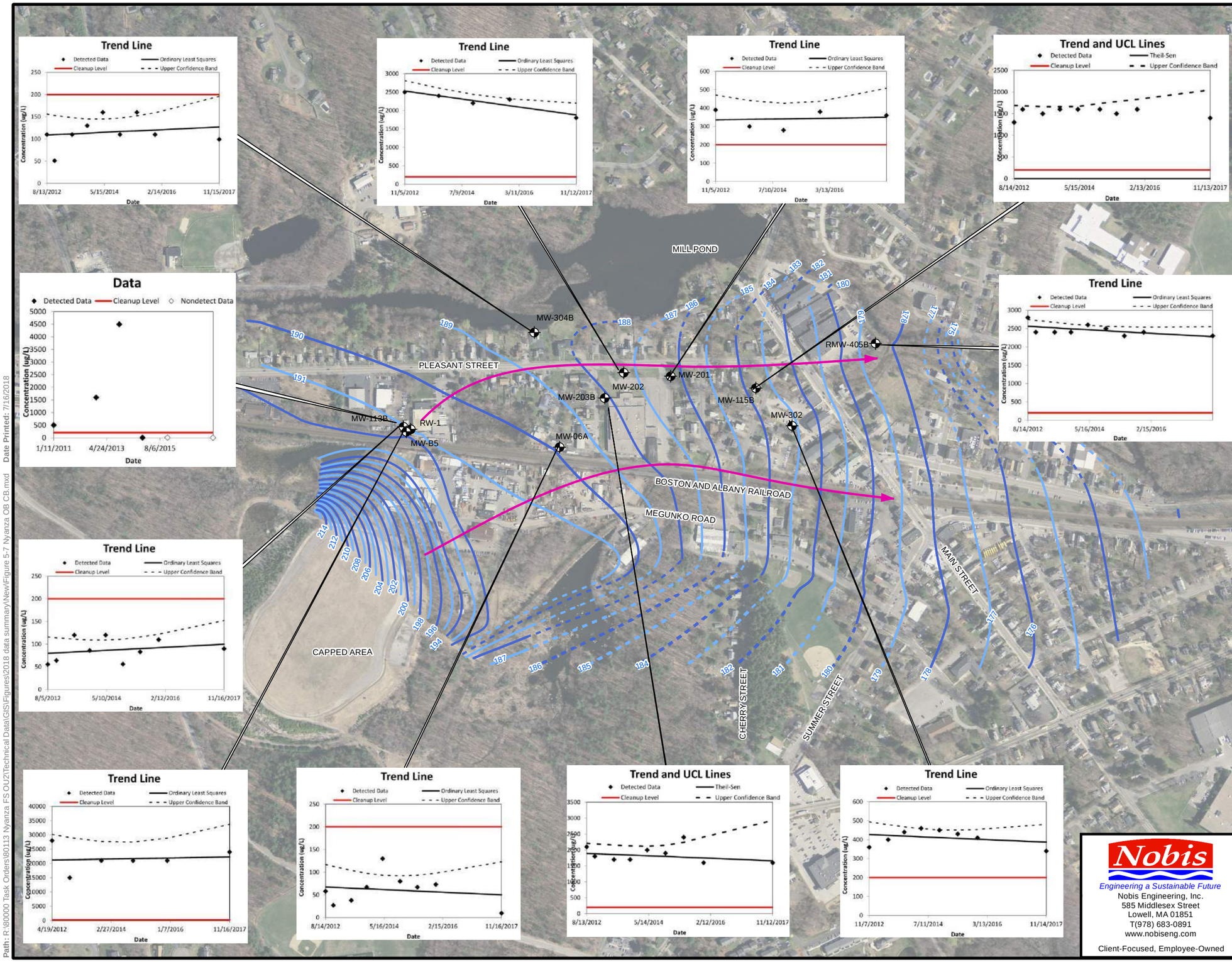
FIGURE 5-6

BEDROCK GROUNDWATER MONITORING TOOL RESULTS - Cis 1,2-DICHLOROETHENE

NYANZA CHEMICAL WASTE DUMP
SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: CF	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

Path: R:\80000 Task Orders\80113 Nyanza FS OU2\Technical Data\GIS\Figures\2018 data summary\New\Figure 5-6 Nyanza BR cis 1,2-DCE.mxd Date Printed: 7/16/2018



NOTES:

1. See Appendix E for explanation.
2. Aerial photograph from MassGIS, 2013.
3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Potentiometric Surface with Groundwater Elevation (ft msl)
- Inferred Overburden Groundwater Contour
- Generalized Groundwater Flow

N

0 200 400 800

Feet

1 inch = 500 feet

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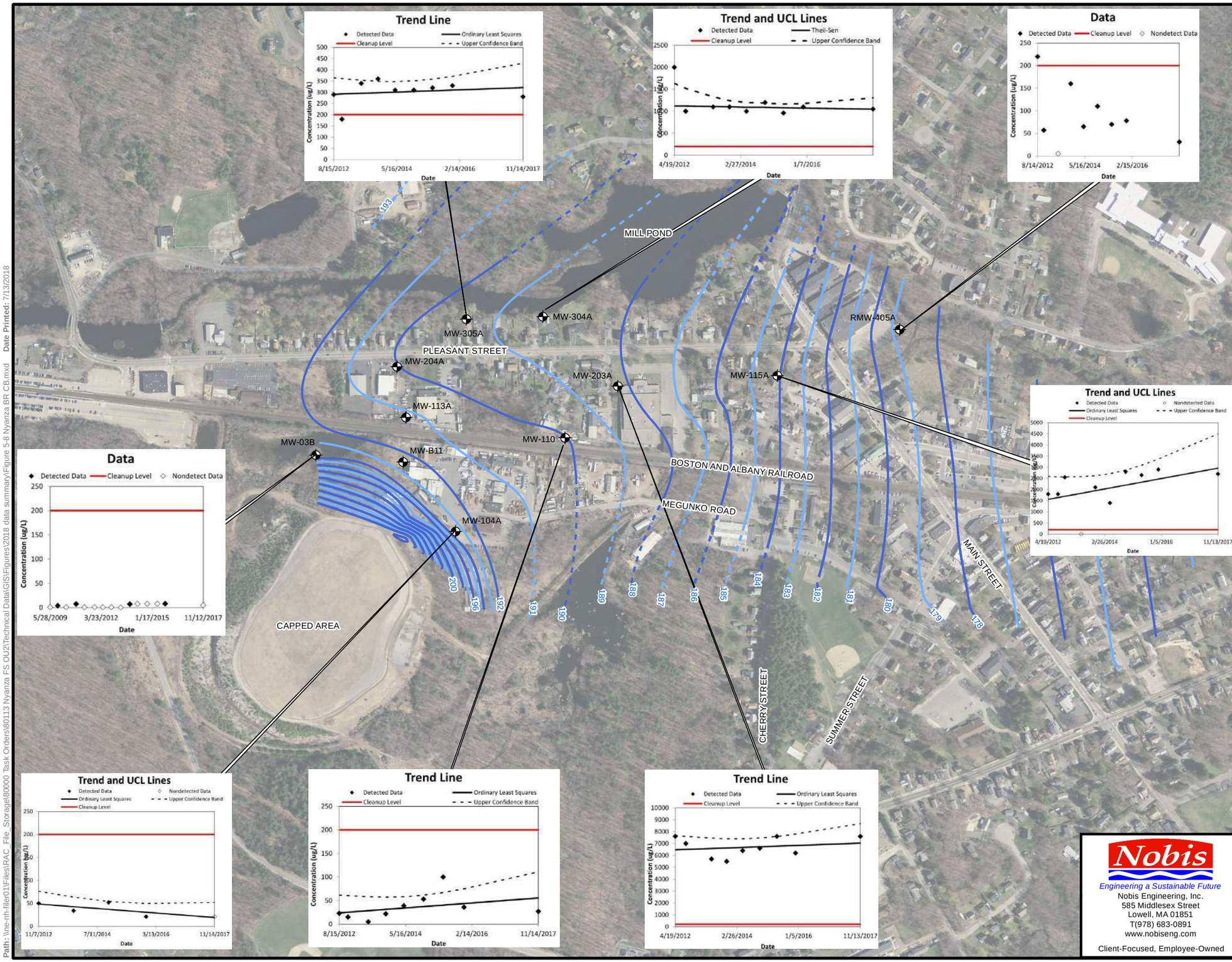
FIGURE 5-7

OVERBURDEN GROUNDWATER MONITORING TOOL RESULTS - CHLOROBENZENE

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II ASHLAND, MASSACHUSETTS

PREPARED BY: CF	CHECKED BY: JV
PROJECT NO. 80113	DATE: JULY 2018

Path: R:\80000 Task Orders\80113 Nyanza FS OU2\Technical Data\GIS\Figures\2018 data summary\New\Figure 5-7 Nyanza OB CB.mxd Date Printed: 7/16/2018



NOTES:

1. See Appendix E for explanation.
2. Aerial photograph from MassGIS, 2013.
3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Bedrock Potentiometric Surface with Groundwater Elevation (ft msl)
- Inferred Bedrock Groundwater Contour

N

0 200 400 800

Feet

1 inch = 477 feet

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FIGURE 5-8

BEDROCK GROUNDWATER MONITORING TOOL RESULTS - CHLOROBENZENE

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE - OPERABLE UNIT II
ASHLAND, MASSACHUSETTS

PREPARED BY: CF	CHECKED BY: JV
PROJECT NO. 80022	DATE: JULY 2018

Path: \\ne-nh-filer01\Files\RAC_File_Storage\80000 Task Orders\80113 Nyanza FS OU2\Technical Data\GIS\Figures\2018 data summary\Figure 5-8 Nyanza BR CB.mxd Date Printed: 7/13/2018

APPENDIX A

Low-Flow Test Report:

Test Date / Time: 11/13/2017 9:55:32 AM
Project: Nyanza
Operator Name: E. Johnson

Location Name: Nyanza MW-3B **Well Diameter: 2 in** **Casing Type: PVC** **Initial Depth to Water: 4.07 m**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 6 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 150 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358296**

Test Notes:

Weather Conditions:
Cloudy 40 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10	+/- 10	+/- 5	
11/13/2017 9:55 AM	00:00	6.49 pH	13.50 °C	672.93 µS/cm	6.56 mg/L		221.0 mV	4.08 ft	130.00 ml/min
11/13/2017 10:00 AM	05:00	6.53 pH	12.06 °C	638.60 µS/cm	2.20 mg/L	2.71 NTU	151.2 mV	4.08 ft	130.00 ml/min
11/13/2017 10:05 AM	10:00	6.65 pH	11.81 °C	647.14 µS/cm	1.93 mg/L	0.71 NTU	100.4 mV	4.09 ft	150.00 ml/min
11/13/2017 10:10 AM	15:00	6.71 pH	11.72 °C	656.23 µS/cm	1.81 mg/L	0.88 NTU	80.6 mV	4.09 ft	150.00 ml/min
11/13/2017 10:15 AM	20:00	6.71 pH	11.65 °C	793.05 µS/cm	1.01 mg/L	0.52 NTU	70.9 mV	4.09 ft	150.00 ml/min
11/13/2017 10:20 AM	25:00	6.74 pH	11.53 °C	910.50 µS/cm	0.24 mg/L	0.49 NTU	60.8 mV	4.09 ft	150.00 ml/min
11/13/2017 10:25 AM	30:00	6.78 pH	11.49 °C	878.35 µS/cm	0.57 mg/L	0.57 NTU	51.2 mV	4.10 ft	150.00 ml/min
11/13/2017 10:30 AM	35:00	6.80 pH	11.44 °C	803.76 µS/cm	1.12 mg/L	0.46 NTU	51.3 mV	4.10 ft	150.00 ml/min
11/13/2017 10:35 AM	40:00	6.78 pH	11.48 °C	737.60 µS/cm	1.70 mg/L	0.37 NTU	53.6 mV	4.10 ft	150.00 ml/min
11/13/2017 10:40 AM	45:00	6.75 pH	11.43 °C	666.90 µS/cm	2.19 mg/L	0.29 NTU	55.1 mV	4.10 ft	150.00 ml/min
11/13/2017 10:45 AM	50:00	6.72 pH	11.42 °C	607.76 µS/cm	2.63 mg/L	0.40 NTU	56.9 mV	4.10 ft	150.00 ml/min
11/13/2017 10:50 AM	55:00	6.67 pH	11.38 °C	562.77 µS/cm	2.99 mg/L	0.32 NTU	58.1 mV	4.10 ft	150.00 ml/min
11/13/2017 10:55 AM	01:00:00	6.65 pH	11.38 °C	520.64 µS/cm	3.27 mg/L	0.32 NTU	58.6 mV	4.10 ft	150.00 ml/min
11/13/2017 11:00 AM	01:05:00	6.62 pH	11.37 °C	480.58 µS/cm	3.53 mg/L	0.35 NTU	59.7 mV	4.10 ft	150.00 ml/min

11/13/2017 11:05 AM	01:10:00	6.58 pH	11.39 °C	473.43 µS/cm	3.66 mg/L	0.31 NTU	60.0 mV	4.10 ft	150.00 ml/min
11/13/2017 11:10 AM	01:15:00	6.57 pH	11.35 °C	429.23 µS/cm	3.91 mg/L	0.28 NTU	60.8 mV	4.10 ft	150.00 ml/min
11/13/2017 11:15 AM	01:20:00	6.53 pH	11.35 °C	398.78 µS/cm	4.08 mg/L	0.30 NTU	61.4 mV	4.10 ft	150.00 ml/min
11/13/2017 11:20 AM	01:25:00	6.48 pH	11.30 °C	436.10 µS/cm	4.04 mg/L	0.42 NTU	60.4 mV	4.10 ft	150.00 ml/min
11/13/2017 11:25 AM	01:30:00	6.46 pH	11.34 °C	413.68 µS/cm	4.25 mg/L	0.34 NTU	61.7 mV	4.10 ft	150.00 ml/min
11/13/2017 11:30 AM	01:35:00	6.46 pH	11.38 °C	388.30 µS/cm	4.29 mg/L	0.36 NTU	61.8 mV	4.10 ft	150.00 ml/min
11/13/2017 11:35 AM	01:40:00	6.45 pH	11.31 °C	365.53 µS/cm	4.41 mg/L	0.31 NTU	62.0 mV	4.10 ft	150.00 ml/min
11/13/2017 11:40 AM	01:45:00	6.42 pH	11.30 °C	364.13 µS/cm	4.43 mg/L	0.25 NTU	62.2 mV	4.10 ft	150.00 ml/min
11/13/2017 11:45 AM	01:50:00	6.39 pH	11.31 °C	346.23 µS/cm	4.58 mg/L	0.32 NTU	63.2 mV	4.10 ft	150.00 ml/min
11/13/2017 11:50 AM	01:55:00	6.38 pH	11.29 °C	343.22 µS/cm	4.61 mg/L	0.33 NTU	63.3 mV	4.10 ft	150.00 ml/min
11/13/2017 11:55 AM	02:00:00	6.36 pH	11.28 °C	331.80 µS/cm	4.65 mg/L		62.8 mV	4.10 ft	150.00 ml/min
11/13/2017 11:56 AM	02:00:56	6.37 pH	11.25 °C	320.55 µS/cm	4.71 mg/L		69.2 mV	4.10 ft	150.00 ml/min
11/13/2017 11:56 AM	02:01:26	6.36 pH	11.25 °C	319.08 µS/cm	4.74 mg/L		68.6 mV	4.10 ft	150.00 ml/min

Samples

Sample ID:	Description:

Low-Flow Test Report:

Test Date / Time: 11/15/2017 2:08:10 PM
Project: Nyanza 202 (2) (2) (2) (2) (2) (2)
Operator Name: C. Falco

Location Name: MW04B **Well Diameter: 2 in** **Casing Type: Pvc** **Initial Depth to Water: 6.17 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 1 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 130 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 388346**

Test Notes:
Purge start 1408
Purge end 1443

Weather Conditions:
Cloudy 30s

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/15/2017 2:08 PM	00:00	6.38 pH	11.15 °C	625.52 µS/cm	0.45 mg/L	10.20 NTU	391.3 mV	6.19 ft	130.00 ml/min
11/15/2017 2:13 PM	05:00	6.27 pH	12.30 °C	623.25 µS/cm	0.72 mg/L	6.21 NTU	227.8 mV	6.19 ft	130.00 ml/min
11/15/2017 2:15 PM	07:08	6.26 pH	12.26 °C	619.63 µS/cm	0.64 mg/L	2.82 NTU	274.6 mV	6.19 ft	130.00 ml/min
11/15/2017 2:20 PM	12:08	6.25 pH	12.23 °C	622.26 µS/cm	0.50 mg/L	1.48 NTU	204.2 mV	6.19 ft	130.00 ml/min
11/15/2017 2:25 PM	17:08	6.24 pH	12.30 °C	623.74 µS/cm	0.45 mg/L	1.51 NTU	196.5 mV	6.19 ft	130.00 ml/min
11/15/2017 2:30 PM	22:08	6.24 pH	12.40 °C	624.39 µS/cm	0.43 mg/L	0.64 NTU	193.0 mV	6.19 ft	130.00 ml/min
11/15/2017 2:35 PM	27:08	6.24 pH	12.18 °C	626.74 µS/cm	0.41 mg/L	0.93 NTU	190.3 mV	6.19 ft	130.00 ml/min

Samples

Sample ID:	Description:
04B	At 1440

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 11/15/2017 11:48:00 AM
Project: Nyanza 202 (2) (2) (2) (2) (2)
Operator Name: C. Falco

Location Name: MW04C **Well Diameter: 2 in** **Casing Type: Pvc** **Initial Depth to Water: 5.47 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 2.5 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 90 ml/min** **Final Draw Down: 4.17 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 388346**

Test Notes:
Purge start 1145
Purge end 1356

Weather Conditions:
Sunny 40s

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/15/2017 11:48 AM	00:00	5.62 pH	10.39 °C	233.56 µS/cm	6.75 mg/L	6.13 NTU	464.6 mV	6.05 ft	110.00 ml/min
11/15/2017 11:50 AM	02:23	5.67 pH	10.94 °C	382.58 µS/cm	3.13 mg/L	3.78 NTU	323.7 mV	6.27 ft	110.00 ml/min
11/15/2017 11:55 AM	07:23	5.96 pH	11.76 °C	258.39 µS/cm	0.59 mg/L	8.86 NTU	263.3 mV	6.68 ft	110.00 ml/min
11/15/2017 12:00 PM	12:23	6.19 pH	11.75 °C	566.28 µS/cm	0.46 mg/L	4.08 NTU	231.5 mV	7.39 ft	100.00 ml/min
11/15/2017 12:05 PM	17:23	6.33 pH	11.86 °C	560.74 µS/cm	0.30 mg/L	1.02 NTU	223.7 mV	7.76 ft	100.00 ml/min
11/15/2017 12:10 PM	22:23	6.33 pH	11.86 °C	472.49 µS/cm	0.29 mg/L	2.95 NTU	226.2 mV	8.07 ft	90.00 ml/min
11/15/2017 12:15 PM	27:23	6.26 pH	11.94 °C	429.95 µS/cm	0.29 mg/L	22.10 NTU	225.8 mV	8.34 ft	90.00 ml/min
11/15/2017 12:20 PM	32:23	6.22 pH	11.87 °C	419.59 µS/cm	0.25 mg/L	22.60 NTU	217.3 mV	8.59 ft	90.00 ml/min
11/15/2017 12:25 PM	37:23	6.23 pH	11.70 °C	443.14 µS/cm	0.24 mg/L	3.91 NTU	205.6 mV	8.83 ft	90.00 ml/min
11/15/2017 12:30 PM	42:23	6.27 pH	11.68 °C	475.49 µS/cm	0.24 mg/L	1.94 NTU	197.2 mV	8.96 ft	90.00 ml/min
11/15/2017 12:35 PM	47:23	6.30 pH	11.75 °C	496.50 µS/cm	0.26 mg/L	18.40 NTU	196.1 mV	9.06 ft	90.00 ml/min
11/15/2017 12:40 PM	52:23	6.33 pH	11.76 °C	514.37 µS/cm	0.24 mg/L	1.68 NTU	198.9 mV	9.20 ft	90.00 ml/min
11/15/2017 12:45 PM	57:23	6.35 pH	11.77 °C	527.56 µS/cm	0.27 mg/L	4.90 NTU	199.5 mV	9.31 ft	90.00 ml/min

11/15/2017 12:50 PM	01:02:23	6.37 pH	11.68 °C	529.00 µS/cm	0.25 mg/L	1.73 NTU	193.0 mV	9.41 ft	90.00 ml/min
11/15/2017 12:55 PM	01:07:23	6.38 pH	11.61 °C	538.93 µS/cm	0.23 mg/L	3.85 NTU	182.7 mV	9.50 ft	90.00 ml/min
11/15/2017 1:00 PM	01:12:23	6.40 pH	11.52 °C	545.40 µS/cm	0.24 mg/L	0.66 NTU	177.6 mV	9.54 ft	90.00 ml/min
11/15/2017 1:05 PM	01:17:23	6.39 pH	11.48 °C	551.39 µS/cm	0.23 mg/L	1.57 NTU	176.8 mV	9.63 ft	90.00 ml/min
11/15/2017 1:10 PM	01:22:23	6.40 pH	11.50 °C	560.12 µS/cm	0.27 mg/L	3.65 NTU	178.0 mV	9.64 ft	90.00 ml/min
11/15/2017 1:15 PM	01:27:23	6.41 pH	11.52 °C	566.28 µS/cm	0.31 mg/L	0.68 NTU	179.2 mV	9.62 ft	90.00 ml/min
11/15/2017 1:20 PM	01:32:23	6.42 pH	11.49 °C	582.06 µS/cm	0.32 mg/L	4.10 NTU	177.5 mV	9.59 ft	90.00 ml/min
11/15/2017 1:25 PM	01:37:23	6.44 pH	11.43 °C	593.20 µS/cm	0.32 mg/L	0.81 NTU	174.2 mV	9.59 ft	90.00 ml/min
11/15/2017 1:30 PM	01:42:23	6.45 pH	11.48 °C	600.60 µS/cm	0.29 mg/L	1.51 NTU	178.4 mV	9.59 ft	90.00 ml/min
11/15/2017 1:35 PM	01:47:23	6.46 pH	11.40 °C	610.69 µS/cm	0.23 mg/L	0.64 NTU	169.1 mV	9.61 ft	90.00 ml/min
11/15/2017 1:40 PM	01:52:23	6.46 pH	11.38 °C	608.83 µS/cm	0.22 mg/L	0.93 NTU	164.4 mV	9.64 ft	90.00 ml/min
11/15/2017 1:45 PM	01:57:23	6.47 pH	11.39 °C	606.47 µS/cm	0.22 mg/L	6.62 NTU	165.5 mV	9.64 ft	90.00 ml/min

Samples

Sample ID:	Description:
04C	MS/MSD At 1345

Low-Flow Test Report:

Test Date / Time: 11/16/2017 11:38:12 AM
Project: Nyanza B/MW-5
Operator Name: A. Goldberg

Location Name: B/MW-5 **Well Diameter: 2 in** **Casing Type: Steel** **Initial Depth to Water: 3.61 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 6750 ml** **Flow Cell Volume: 90 ml** **Final Flow Rate: 150 ml/min** **Final Draw Down: 3.14 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358284**

Test Notes:
Purge start @11:35
Slight odor observed

Weather Conditions:
Rain, 40s

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/16/2017 11:38 AM	00:00	4.61 pH	12.68 °C	7,098.7 µS/cm	0.43 mg/L		72.6 mV	3.61 ft	150.00 ml/min
11/16/2017 11:43 AM	05:00	6.13 pH	12.65 °C	3,523.3 µS/cm	0.23 mg/L	69.80 NTU	-33.0 mV	6.72 ft	150.00 ml/min
11/16/2017 11:48 AM	10:00	6.34 pH	12.56 °C	1,593.5 µS/cm	0.16 mg/L	45.90 NTU	-4.7 mV	6.73 ft	150.00 ml/min
11/16/2017 11:53 AM	15:00	6.34 pH	12.56 °C	1,407.3 µS/cm	0.17 mg/L	28.40 NTU	20.7 mV	6.73 ft	150.00 ml/min
11/16/2017 11:58 AM	20:00	6.33 pH	12.47 °C	1,370.8 µS/cm	0.19 mg/L	20.80 NTU	30.4 mV	6.74 ft	150.00 ml/min
11/16/2017 12:03 PM	25:00	6.31 pH	12.42 °C	1,358.4 µS/cm	0.21 mg/L	20.80 NTU	35.6 mV	6.74 ft	150.00 ml/min
11/16/2017 12:08 PM	30:00	6.29 pH	12.40 °C	1,349.9 µS/cm	0.21 mg/L	16.70 NTU	38.6 mV	6.74 ft	150.00 ml/min
11/16/2017 12:13 PM	35:00	6.28 pH	12.37 °C	1,342.9 µS/cm	0.23 mg/L	4.80 NTU	40.1 mV	6.75 ft	150.00 ml/min
11/16/2017 12:18 PM	40:00	6.27 pH	12.36 °C	1,343.1 µS/cm	0.23 mg/L	3.93 NTU	41.2 mV	6.75 ft	150.00 ml/min
11/16/2017 12:23 PM	45:00	6.27 pH	12.37 °C	1,335.4 µS/cm	0.23 mg/L	4.80 NTU	41.4 mV	6.75 ft	150.00 ml/min

Samples

Sample ID:	Description:

B/MW5	Sample time 12:25 VOCS

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 11/16/2017 9:44:56 AM
Project: Nyanza 202 (2) (2) (2) (2) (2) (2) (2)
Operator Name: C. Falco

Location Name: MW06A **Well Diameter: 2 in** **Casing Type: Pvc** **Initial Depth to Water: 3.25 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 4.1 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 150 ml/min** **Final Draw Down: 0.01 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 388346**

Test Notes:
Purge start 0942
Purge end 1149
Dtb 12.07

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/16/2017 9:44 AM	00:00	6.18 pH	13.17 °C	933.42 µS/cm	1.91 mg/L	50.80 NTU	150.0 mV	3.26 ft	125.00 ml/min
11/16/2017 9:49 AM	05:00	5.70 pH	13.57 °C	923.91 µS/cm	0.19 mg/L	64.40 NTU	136.5 mV	3.26 ft	150.00 ml/min
11/16/2017 9:54 AM	10:00	5.70 pH	13.77 °C	908.82 µS/cm	0.15 mg/L	51.30 NTU	124.5 mV	3.26 ft	150.00 ml/min
11/16/2017 9:59 AM	15:00	5.70 pH	13.99 °C	884.72 µS/cm	0.13 mg/L	42.60 NTU	112.5 mV	3.26 ft	150.00 ml/min
11/16/2017 10:04 AM	20:00	5.71 pH	14.13 °C	847.70 µS/cm	0.12 mg/L	36.00 NTU	98.6 mV	3.26 ft	150.00 ml/min
11/16/2017 10:07 AM	22:46	5.71 pH	14.17 °C	825.12 µS/cm	0.12 mg/L	27.10 NTU	92.8 mV	3.26 ft	150.00 ml/min
11/16/2017 10:12 AM	27:46	5.72 pH	14.16 °C	791.75 µS/cm	0.12 mg/L	22.60 NTU	81.1 mV	3.26 ft	150.00 ml/min
11/16/2017 10:17 AM	32:46	5.73 pH	14.14 °C	769.31 µS/cm	0.12 mg/L	22.20 NTU	73.2 mV	3.26 ft	150.00 ml/min
11/16/2017 10:22 AM	37:46	5.74 pH	14.22 °C	740.62 µS/cm	0.11 mg/L	20.30 NTU	64.4 mV	3.26 ft	150.00 ml/min
11/16/2017 10:27 AM	42:46	5.75 pH	14.26 °C	700.95 µS/cm	0.11 mg/L	14.50 NTU	56.9 mV	3.26 ft	150.00 ml/min
11/16/2017 10:32 AM	47:46	5.75 pH	14.25 °C	701.28 µS/cm	0.11 mg/L	10.80 NTU	56.5 mV	3.26 ft	150.00 ml/min
11/16/2017 10:37 AM	52:46	5.75 pH	14.21 °C	694.17 µS/cm	0.12 mg/L	13.20 NTU	55.5 mV	3.26 ft	150.00 ml/min
11/16/2017 10:42 AM	57:46	5.75 pH	14.26 °C	699.74 µS/cm	0.11 mg/L	13.50 NTU	55.0 mV	3.26 ft	150.00 ml/min
11/16/2017 10:47 AM	01:02:46	5.76 pH	14.37 °C	675.40 µS/cm	0.10 mg/L	10.80 NTU	52.7 mV	3.26 ft	150.00 ml/min

11/16/2017 10:52 AM	01:07:46	5.77 pH	14.42 °C	633.93 µS/cm	0.10 mg/L	10.90 NTU	49.7 mV	3.26 ft	150.00 ml/min
11/16/2017 10:55 AM	01:10:19	5.77 pH	14.47 °C	626.38 µS/cm	0.10 mg/L	9.26 NTU	47.7 mV	3.26 ft	150.00 ml/min
11/16/2017 11:00 AM	01:15:19	5.77 pH	14.47 °C	638.88 µS/cm	0.11 mg/L	8.87 NTU	53.1 mV	3.26 ft	150.00 ml/min
11/16/2017 11:05 AM	01:20:19	5.77 pH	14.45 °C	664.92 µS/cm	0.11 mg/L	9.73 NTU	56.4 mV	3.26 ft	150.00 ml/min
11/16/2017 11:10 AM	01:25:19	5.77 pH	14.43 °C	658.08 µS/cm	0.10 mg/L	10.50 NTU	56.8 mV	3.26 ft	150.00 ml/min
11/16/2017 11:15 AM	01:30:19	5.77 pH	14.38 °C	645.28 µS/cm	0.11 mg/L	10.10 NTU	56.6 mV	3.26 ft	150.00 ml/min
11/16/2017 11:20 AM	01:35:19	5.77 pH	14.26 °C	648.88 µS/cm	0.12 mg/L	8.66 NTU	58.6 mV	3.26 ft	150.00 ml/min
11/16/2017 11:25 AM	01:40:19	5.77 pH	14.31 °C	651.37 µS/cm	0.11 mg/L	6.64 NTU	57.9 mV	3.26 ft	150.00 ml/min
11/16/2017 11:30 AM	01:45:19	5.78 pH	14.40 °C	641.93 µS/cm	0.10 mg/L	4.78 NTU	57.5 mV	3.26 ft	150.00 ml/min
11/16/2017 11:35 AM	01:50:19	5.78 pH	14.28 °C	629.98 µS/cm	0.11 mg/L	6.95 NTU	56.5 mV	3.26 ft	150.00 ml/min
11/16/2017 11:40 AM	01:55:19	5.78 pH	14.26 °C	638.56 µS/cm	0.11 mg/L	6.92 NTU	58.1 mV	3.26 ft	150.00 ml/min
11/16/2017 11:45 AM	02:00:19	5.78 pH	14.17 °C	631.65 µS/cm	0.11 mg/L	6.89 NTU	57.5 mV	3.26 ft	150.00 ml/min

Samples

Sample ID:	Description:
06A	At 1143

Low-Flow Test Report:

Test Date / Time: 11/14/2017 2:08:38 PM
Project: Nyanza 6B
Operator Name: A. Goldberg

Location Name: MW-6B **Well Diameter: 3 in** **Casing Type: PVC** **Initial Depth to Water: 3.45 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 1 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 90 ml/min** **Final Draw Down: 1.58 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358284**

Test Notes:
Purge start 14:02
Purge complete 14:47
Total depth 16.30 ft

Weather Conditions:
40s, overcast

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/14/2017 2:08 PM	00:00	5.89 pH	11.68 °C	2,537.4 µS/cm	0.41 mg/L		46.1 mV	3.45 ft	90.00 ml/min
11/14/2017 2:13 PM	05:00	5.90 pH	12.24 °C	2,515.6 µS/cm	1.50 mg/L	14.90 NTU	38.4 mV	4.25 ft	90.00 ml/min
11/14/2017 2:18 PM	10:00	5.90 pH	12.47 °C	2,495.3 µS/cm	0.19 mg/L	8.51 NTU	35.0 mV	4.40 ft	90.00 ml/min
11/14/2017 2:23 PM	15:00	5.90 pH	12.66 °C	2,496.5 µS/cm	0.14 mg/L	8.79 NTU	27.6 mV	4.59 ft	90.00 ml/min
11/14/2017 2:28 PM	20:00	5.90 pH	12.69 °C	2,505.3 µS/cm	0.13 mg/L	10.40 NTU	31.0 mV	4.78 ft	90.00 ml/min
11/14/2017 2:33 PM	25:00	5.90 pH	12.83 °C	2,499.2 µS/cm	0.14 mg/L	9.95 NTU	29.3 mV	4.78 ft	90.00 ml/min
11/14/2017 2:38 PM	30:00	5.91 pH	12.86 °C	2,483.3 µS/cm	0.13 mg/L	9.93 NTU	23.8 mV	5.03 ft	90.00 ml/min

Samples

Sample ID:	Description:
MW-06B	Sample time 14:45 VOCS

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 11/14/2017 10:09:05 AM
Project: Nyanza MW-104A
Operator Name: E. Johnson

Location Name: Nyanza MW-104B **Well Diameter: 2 in** **Casing Type: Steel** **Initial Depth to Water: 9.89 m**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 1.5 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 125 ml/min** **Final Draw Down: 0.37 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358296**

Test Notes:
Purge start 10:05; Sample time 10:40

Weather Conditions:
Cloudy 40 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/14/2017 10:09 AM	00:00	6.46 pH	12.50 °C	1,449.0 µS/cm	0.83 mg/L		-8.7 mV	9.89 ft	150.00 ml/min
11/14/2017 10:14 AM	05:00	6.87 pH	12.76 °C	1,375.7 µS/cm	0.34 mg/L	1.52 NTU	-15.2 mV	10.09 ft	150.00 ml/min
11/14/2017 10:19 AM	10:00	7.11 pH	12.64 °C	1,374.6 µS/cm	0.26 mg/L	0.63 NTU	-18.9 mV	10.16 ft	150.00 ml/min
11/14/2017 10:24 AM	15:00	7.20 pH	12.39 °C	1,351.0 µS/cm	0.24 mg/L	0.54 NTU	-12.4 mV	10.19 ft	125.00 ml/min
11/14/2017 10:29 AM	20:00	7.21 pH	11.99 °C	1,343.6 µS/cm	0.25 mg/L	0.66 NTU	-14.3 mV	10.21 ft	125.00 ml/min
11/14/2017 10:34 AM	25:00	7.18 pH	12.36 °C	1,358.1 µS/cm	0.22 mg/L	0.58 NTU	-19.5 mV	10.24 ft	125.00 ml/min
11/14/2017 10:39 AM	30:00	7.18 pH	12.32 °C	1,352.0 µS/cm	0.22 mg/L	0.41 NTU	-19.7 mV	10.26 ft	125.00 ml/min
11/14/2017 10:44 AM	35:00	7.18 pH	12.04 °C	1,348.3 µS/cm	10.23 mg/L		-7.7 mV	10.26 ft	125.00 ml/min

Samples

Sample ID:	Description:

Low-Flow Test Report:

Test Date / Time: 11/13/2017 1:36:23 PM
Project: Nyanza MW-104B
Operator Name: E. Johnson

Location Name: Nyanza MW-104B **Well Diameter: 2 in** **Casing Type: Steel** **Initial Depth to Water: 10.76 m**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 5 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 150 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358296**

Test Notes:
Purge start: 1335, slight pink hue to purge water. Sample time 1535.

Weather Conditions:
Rain, 40 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/13/2017 1:36 PM	00:00	6.29 pH	9.12 °C	975.05 µS/cm	1.31 mg/L		11.0 mV	10.77 ft	125.00 ml/min
11/13/2017 1:39 PM	03:02	6.28 pH	11.26 °C	932.29 µS/cm	0.31 mg/L		-7.3 mV	10.77 ft	125.00 ml/min
11/13/2017 1:44 PM	08:02	6.29 pH	11.76 °C	908.16 µS/cm	0.25 mg/L	82.70 NTU	-9.5 mV	10.78 ft	125.00 ml/min
11/13/2017 1:49 PM	13:02	6.29 pH	11.72 °C	906.60 µS/cm	0.21 mg/L	60.60 NTU	-11.8 mV	10.78 ft	125.00 ml/min
11/13/2017 1:53 PM	17:18	6.29 pH	11.81 °C	897.46 µS/cm	0.21 mg/L	85.80 NTU	-12.6 mV	10.78 ft	125.00 ml/min
11/13/2017 1:58 PM	22:18	6.30 pH	11.43 °C	882.91 µS/cm	0.24 mg/L	92.90 NTU	-9.1 mV	10.78 ft	125.00 ml/min
11/13/2017 2:03 PM	27:18	6.28 pH	12.27 °C	888.98 µS/cm	0.18 mg/L	59.90 NTU	-20.4 mV	10.78 ft	125.00 ml/min
11/13/2017 2:08 PM	32:18	6.29 pH	12.81 °C	866.92 µS/cm	0.15 mg/L	48.30 NTU	-36.4 mV	10.78 ft	125.00 ml/min
11/13/2017 2:13 PM	37:18	6.29 pH	12.68 °C	866.62 µS/cm	0.16 mg/L	45.80 NTU	-36.1 mV	10.78 ft	125.00 ml/min
11/13/2017 2:18 PM	42:18	6.29 pH	12.36 °C	864.88 µS/cm	0.16 mg/L	41.50 NTU	-37.3 mV	10.78 ft	125.00 ml/min
11/13/2017 2:23 PM	47:18	6.29 pH	12.00 °C	862.79 µS/cm	0.15 mg/L	29.90 NTU	-39.5 mV	10.78 ft	125.00 ml/min
11/13/2017 2:28 PM	52:18	6.29 pH	11.72 °C	861.66 µS/cm	0.15 mg/L	32.40 NTU	-38.5 mV	10.78 ft	125.00 ml/min

11/13/2017 2:33 PM	57:18	6.29 pH	11.70 °C	859.43 µS/cm	0.15 mg/L	25.50 NTU	-38.8 mV	10.78 ft	125.00 ml/min
11/13/2017 2:38 PM	01:02:18	6.30 pH	11.35 °C	857.46 µS/cm	0.15 mg/L	23.90 NTU	-37.7 mV	10.78 ft	125.00 ml/min
11/13/2017 2:43 PM	01:07:18	6.29 pH	11.53 °C	859.58 µS/cm	0.15 mg/L	28.30 NTU	-35.3 mV	10.78 ft	125.00 ml/min
11/13/2017 2:48 PM	01:12:18	6.30 pH	10.98 °C	864.95 µS/cm	0.17 mg/L	24.10 NTU	-33.0 mV	10.78 ft	125.00 ml/min
11/13/2017 2:53 PM	01:17:18	6.28 pH	11.31 °C	881.90 µS/cm	0.21 mg/L	21.10 NTU	-37.5 mV	10.78 ft	150.00 ml/min
11/13/2017 2:58 PM	01:22:18	6.28 pH	12.73 °C	856.22 µS/cm	0.15 mg/L	17.90 NTU	-47.4 mV	10.78 ft	150.00 ml/min
11/13/2017 3:03 PM	01:27:18	6.29 pH	12.96 °C	842.15 µS/cm	0.11 mg/L	14.40 NTU	-52.2 mV	10.78 ft	150.00 ml/min
11/13/2017 3:08 PM	01:32:18	6.29 pH	13.17 °C	847.78 µS/cm	0.09 mg/L	11.80 NTU	-55.6 mV	10.78 ft	150.00 ml/min
11/13/2017 3:13 PM	01:37:18	6.29 pH	12.99 °C	842.61 µS/cm	0.08 mg/L	13.20 NTU	-55.8 mV	10.78 ft	150.00 ml/min
11/13/2017 3:18 PM	01:42:18	6.29 pH	12.91 °C	845.17 µS/cm	0.08 mg/L	7.62 NTU	-57.1 mV	10.78 ft	150.00 ml/min
11/13/2017 3:23 PM	01:47:18	6.29 pH	13.06 °C	842.67 µS/cm	0.07 mg/L	7.34 NTU	-61.2 mV	10.78 ft	150.00 ml/min
11/13/2017 3:28 PM	01:52:18	6.29 pH	12.91 °C	839.93 µS/cm	0.07 mg/L	7.03 NTU	-63.4 mV	10.78 ft	150.00 ml/min

Samples

Sample ID:	Description:

Low-Flow Test Report:

Test Date / Time: 11/15/2017 12:42:16 PM
Project: Nyanza
Operator Name: E. Johnson

Location Name: Nyanza MW-110 **Well Diameter: 2 in** **Casing Type: Steel** **Initial Depth to Water: 2.74 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 1 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 130 ml/min** **Final Draw Down: 1.03 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358296**

Test Notes:
Purge start time 12:35. Slight purple hue to purge water. Sample collected 13:10, VOCS only.

Weather Conditions:
Clear, 40 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/15/2017 12:42 PM	00:00	7.06 pH	11.62 °C	323.03 µS/cm	0.44 mg/L		-39.0 mV	2.74 ft	130.00 ml/min
11/15/2017 12:47 PM	05:00	6.75 pH	12.13 °C	316.30 µS/cm	0.23 mg/L		-31.2 mV	3.47 ft	130.00 ml/min
11/15/2017 12:52 PM	10:00	6.61 pH	12.18 °C	314.95 µS/cm	0.21 mg/L	6.06 NTU	-31.5 mV	3.45 ft	130.00 ml/min
11/15/2017 12:57 PM	15:00	6.52 pH	12.13 °C	315.39 µS/cm	0.18 mg/L	3.78 NTU	-33.4 mV	3.48 ft	130.00 ml/min
11/15/2017 1:02 PM	20:00	6.46 pH	12.27 °C	316.38 µS/cm	0.14 mg/L	3.21 NTU	-34.4 mV	3.72 ft	130.00 ml/min
11/15/2017 1:07 PM	25:00	6.43 pH	12.36 °C	314.43 µS/cm	0.13 mg/L	2.86 NTU	-34.1 mV	3.77 ft	130.00 ml/min

Samples

Sample ID:	Description:

Low-Flow Test Report:

Test Date / Time: 11/14/2017 10:04:43 AM
Project: Nyanza 112A
Operator Name: A. Goldberg

Location Name: MW-112A **Well Diameter: 2 in** **Casing Type: Steel** **Initial Depth to Water: 6.73 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 1 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 90 ml/min** **Final Draw Down: 4.57 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358284**

Test Notes:
Purge start 9:58
Purge complete= 11:23
Total depth 47.0

Weather Conditions:
40sF , overcast

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/14/2017 10:04 AM	00:00	6.31 pH	13.15 °C	1,754.6 µS/cm	0.86 mg/L		-0.5 mV	6.73 ft	90.00 ml/min
11/14/2017 10:09 AM	05:00	6.61 pH	12.96 °C	1,310.1 µS/cm	0.52 mg/L	8.54 NTU	-6.3 mV	8.31 ft	90.00 ml/min
11/14/2017 10:14 AM	10:00	6.83 pH	12.76 °C	1,140.1 µS/cm	0.41 mg/L	6.39 NTU	-10.3 mV	8.83 ft	90.00 ml/min
11/14/2017 10:19 AM	15:00	6.94 pH	12.60 °C	1,095.7 µS/cm	0.37 mg/L	5.25 NTU	-10.4 mV	9.27 ft	90.00 ml/min
11/14/2017 10:24 AM	20:00	6.94 pH	12.47 °C	1,098.1 µS/cm	0.34 mg/L	5.07 NTU	-10.4 mV	9.72 ft	90.00 ml/min
11/14/2017 10:29 AM	25:00	6.87 pH	12.47 °C	1,086.8 µS/cm	0.31 mg/L	6.20 NTU	-15.4 mV	10.27 ft	90.00 ml/min
11/14/2017 10:34 AM	30:00	6.85 pH	12.56 °C	1,081.0 µS/cm	0.26 mg/L	6.55 NTU	-16.4 mV	10.79 ft	90.00 ml/min
11/14/2017 10:39 AM	35:00	6.85 pH	12.46 °C	1,089.8 µS/cm	0.25 mg/L	6.14 NTU	-16.4 mV	11.30 ft	90.00 ml/min

Samples

Sample ID:	Description:
MW-112A	Sample time= 10:45 MNA parameters

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Low-Flow Test Report:

Test Date / Time: 11/14/2017 11:34:35 AM
Project: Nyanza 112B
Operator Name: A. Goldberg

Location Name: MW-112B **Well Diameter: 2 in** **Casing Type: Steel** **Initial Depth to Water: 6.68 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 1.5 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 80 ml/min** **Final Draw Down: 2.55 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358284**

Test Notes:
Purge start 11:30
Purge complete 14:22
Total depth 31.61 ft

Weather Conditions:
40s, overcast

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/14/2017 11:34 AM	00:00	6.35 pH	9.77 °C	908.54 µS/cm	4.29 mg/L		11.8 mV	6.68 ft	80.00 ml/min
11/14/2017 11:39 AM	05:00	6.31 pH	11.79 °C	861.21 µS/cm	0.42 mg/L	223.00 NTU	6.5 mV	7.80 ft	80.00 ml/min
11/14/2017 11:44 AM	10:00	6.31 pH	12.10 °C	852.71 µS/cm	0.33 mg/L	123.00 NTU	2.7 mV	8.28 ft	80.00 ml/min
11/14/2017 11:49 AM	15:00	6.31 pH	12.15 °C	845.03 µS/cm	0.30 mg/L	106.00 NTU	0.3 mV	8.39 ft	80.00 ml/min
11/14/2017 11:54 AM	20:00	6.32 pH	12.28 °C	835.70 µS/cm	0.28 mg/L	91.40 NTU	-1.6 mV	8.61 ft	80.00 ml/min
11/14/2017 11:59 AM	25:00	6.32 pH	12.10 °C	833.14 µS/cm	0.26 mg/L	75.90 NTU	-2.8 mV	8.76 ft	80.00 ml/min
11/14/2017 12:04 PM	30:00	6.32 pH	12.24 °C	829.15 µS/cm	0.30 mg/L	74.80 NTU	-2.4 mV	8.85 ft	80.00 ml/min
11/14/2017 12:09 PM	35:00	6.32 pH	12.28 °C	829.61 µS/cm	0.26 mg/L	65.70 NTU	-2.6 mV	8.94 ft	80.00 ml/min
11/14/2017 12:14 PM	40:00	6.33 pH	12.33 °C	825.76 µS/cm	0.27 mg/L	73.60 NTU	-2.3 mV	9.00 ft	80.00 ml/min
11/14/2017 12:19 PM	45:00	6.33 pH	12.27 °C	823.66 µS/cm	0.26 mg/L	51.50 NTU	-3.6 mV	9.06 ft	80.00 ml/min
11/14/2017 12:24 PM	50:00	6.33 pH	12.28 °C	823.39 µS/cm	0.25 mg/L	64.60 NTU	-2.0 mV	9.10 ft	80.00 ml/min
11/14/2017 12:29 PM	55:00	6.33 pH	12.28 °C	822.77 µS/cm	0.24 mg/L	54.00 NTU	-2.2 mV	9.15 ft	80.00 ml/min
11/14/2017 12:34 PM	01:00:00	6.33 pH	12.31 °C	819.42 µS/cm	0.27 mg/L	51.80 NTU	-1.9 mV	9.21 ft	80.00 ml/min

11/14/2017 12:39 PM	01:05:00	6.33 pH	12.23 °C	825.78 µS/cm	0.26 mg/L	51.10 NTU	-1.8 mV	9.23 ft	80.00 ml/min

Samples

Sample ID:	Description:
MW-112B	Sample time 12:45 MNA PARAMETERS

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 11/16/2017 9:51:01 AM
Project: Nyanza 113B
Operator Name: A. Goldberg

Location Name: MW-113B **Well Diameter: 2 in** **Casing Type: Steel** **Initial Depth to Water: 3.13 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 3.5 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 100 ml/min** **Final Draw Down: 0.6 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358284**

Test Notes:
Purge start 9:45
Purging at lowest setting before pump turns off
Purge complete 10:18
Total depth 28.71ft

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/16/2017 9:51 AM	00:00	6.08 pH	13.96 °C	245.17 µS/cm	1.11 mg/L		114.5 mV	3.13 ft	100.00 ml/min
11/16/2017 9:56 AM	05:00	5.87 pH	12.61 °C	251.77 µS/cm	0.37 mg/L	23.70 NTU	94.5 mV	3.61 ft	100.00 ml/min
11/16/2017 10:01 AM	10:00	5.86 pH	12.47 °C	294.18 µS/cm	0.26 mg/L	19.30 NTU	67.8 mV	3.61 ft	100.00 ml/min
11/16/2017 10:06 AM	15:00	5.86 pH	12.39 °C	336.29 µS/cm	0.21 mg/L	18.40 NTU	59.1 mV	3.64 ft	100.00 ml/min
11/16/2017 10:11 AM	20:00	5.87 pH	12.37 °C	371.33 µS/cm	0.18 mg/L	10.90 NTU	54.9 mV	3.64 ft	100.00 ml/min
11/16/2017 10:16 AM	25:00	5.89 pH	12.28 °C	391.68 µS/cm	0.16 mg/L	9.38 NTU	52.4 mV	3.66 ft	100.00 ml/min
11/16/2017 10:21 AM	30:00	5.90 pH	12.29 °C	413.63 µS/cm	0.15 mg/L	7.60 NTU	50.5 mV	3.66 ft	100.00 ml/min
11/16/2017 10:26 AM	35:00	5.91 pH	12.33 °C	423.67 µS/cm	0.15 mg/L	6.89 NTU	49.6 mV	3.66 ft	100.00 ml/min
11/16/2017 10:31 AM	40:00	5.90 pH	12.37 °C	441.15 µS/cm	0.13 mg/L	6.46 NTU	48.2 mV	3.68 ft	100.00 ml/min
11/16/2017 10:36 AM	45:00	5.91 pH	12.49 °C	455.44 µS/cm	0.13 mg/L	6.82 NTU	47.0 mV	3.69 ft	100.00 ml/min
11/16/2017 10:41 AM	50:00	5.90 pH	12.47 °C	483.26 µS/cm	0.12 mg/L	5.18 NTU	45.9 mV	3.70 ft	100.00 ml/min
11/16/2017 10:46 AM	55:00	5.91 pH	12.35 °C	492.48 µS/cm	0.12 mg/L	4.31 NTU	45.0 mV	3.70 ft	100.00 ml/min
11/16/2017 10:51 AM	01:00:00	5.91 pH	12.60 °C	499.04 µS/cm	0.11 mg/L	4.06 NTU	45.2 mV	3.71 ft	100.00 ml/min
11/16/2017 10:56 AM	01:05:00	5.90 pH	12.51 °C	520.43 µS/cm	0.11 mg/L	4.37 NTU	44.7 mV	3.71 ft	100.00 ml/min

11/16/2017 11:01 AM	01:10:00	5.89 pH	12.38 °C	550.79 µS/cm	0.11 mg/L	2.43 NTU	43.8 mV	3.72 ft	100.00 ml/min
11/16/2017 11:06 AM	01:15:00	5.88 pH	12.33 °C	563.00 µS/cm	0.11 mg/L	1.87 NTU	43.5 mV	3.72 ft	100.00 ml/min
11/16/2017 11:11 AM	01:20:00	5.88 pH	12.28 °C	565.48 µS/cm	0.11 mg/L	2.66 NTU	43.4 mV	3.73 ft	100.00 ml/min

Samples

Sample ID:	Description:
MW-113B	Sample time @ 11:15 VOCS

Low-Flow Test Report:

Test Date / Time: 11/13/2017 10:03:28 AM
Project: Nyanza
Operator Name: C.Falco

Location Name: MW-115A **Well Diameter: 2 in** **Casing Type: Pvc** **Total Depth: 91.9 ft** **Initial Depth to Water: 8.47 ft**	**Pump Type: Geopump** **Estimated Total Volume Pumped: 1.6 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 100 ml/min** **Final Draw Down: 1.78 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358284**

Test Notes:
Purge start 09:57
Sample 11:00
Purge end 11:39

Weather Conditions:
Cloudy 30s

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/13/2017 10:03 AM	00:00	6.03 pH	10.94 °C	12,017 µS/cm	7.61 mg/L		247.7 mV	8.99 ft	175.00 ml/min
11/13/2017 10:08 AM	05:00	6.90 pH	12.14 °C	13,706 µS/cm	0.37 mg/L	72.60 NTU	192.1 mV	9.62 ft	100.00 ml/min
11/13/2017 10:11 AM	08:05	6.88 pH	12.05 °C	13,933 µS/cm	0.35 mg/L	33.10 NTU	204.4 mV	9.85 ft	100.00 ml/min
11/13/2017 10:16 AM	13:05	6.86 pH	11.96 °C	14,080 µS/cm	0.31 mg/L	24.10 NTU	203.5 mV	10.00 ft	100.00 ml/min
11/13/2017 10:21 AM	18:05	6.80 pH	12.03 °C	13,861 µS/cm	0.28 mg/L	20.90 NTU	212.9 mV	10.05 ft	100.00 ml/min
11/13/2017 10:26 AM	23:05	6.71 pH	12.12 °C	13,484 µS/cm	0.28 mg/L	18.60 NTU	212.3 mV	10.10 ft	100.00 ml/min
11/13/2017 10:31 AM	28:05	6.48 pH	12.15 °C	12,718 µS/cm	0.28 mg/L	12.50 NTU	208.6 mV	10.15 ft	100.00 ml/min
11/13/2017 10:36 AM	33:05	6.39 pH	12.21 °C	11,866 µS/cm	0.22 mg/L	10.30 NTU	207.3 mV	10.15 ft	100.00 ml/min
11/13/2017 10:41 AM	38:05	6.41 pH	12.28 °C	11,936 µS/cm	0.18 mg/L	5.45 NTU	205.2 mV	10.20 ft	100.00 ml/min
11/13/2017 10:46 AM	43:05	6.44 pH	12.27 °C	12,076 µS/cm	0.16 mg/L	6.21 NTU	204.3 mV	10.25 ft	100.00 ml/min
11/13/2017 10:51 AM	48:05	6.46 pH	12.24 °C	12,143 µS/cm	0.17 mg/L	6.70 NTU	203.3 mV	10.25 ft	100.00 ml/min
11/13/2017 10:56 AM	53:05	6.48 pH	12.14 °C	12,253 µS/cm	0.16 mg/L	6.13 NTU	202.4 mV	10.25 ft	100.00 ml/min

Samples

Sample ID:	Description:
MW-115A	11:00

Low-Flow Test Report:

Test Date / Time: 11/13/2017 10:19:03 AM
Project: Nyanza 115B
Operator Name: A Goldberg

Location Name: MW-115B **Well Diameter: 2 in** **Casing Type: PVC** **Initial Depth to Water: 8.35 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 1 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 90 ml/min** **Final Draw Down: 0.7 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 388346**

Test Notes:
Purge start 10:07
Turbidity meter SN 11030C007945
Total depth 47.55ft
Purge end 12:15

Weather Conditions:
40s, overcast

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/13/2017 10:19 AM	00:00	5.89 pH	12.12 °C	7,659.2 µS/cm	0.59 mg/L		79.0 mV	8.35 ft	90.00 ml/min
11/13/2017 10:24 AM	05:00	5.91 pH	12.21 °C	7,667.4 µS/cm	0.46 mg/L	15.40 NTU	78.1 mV	8.87 ft	90.00 ml/min
11/13/2017 10:29 AM	10:00	5.92 pH	12.21 °C	7,699.4 µS/cm	0.30 mg/L	14.00 NTU	76.6 mV	8.91 ft	90.00 ml/min
11/13/2017 10:34 AM	15:00	5.93 pH	12.30 °C	7,651.9 µS/cm	0.24 mg/L	12.00 NTU	74.7 mV	8.90 ft	90.00 ml/min
11/13/2017 10:39 AM	20:00	5.93 pH	12.35 °C	7,579.7 µS/cm	0.17 mg/L	10.30 NTU	74.4 mV	8.90 ft	90.00 ml/min
11/13/2017 10:44 AM	25:00	5.94 pH	12.30 °C	7,557.0 µS/cm	0.16 mg/L	7.44 NTU	73.4 mV	8.91 ft	90.00 ml/min
11/13/2017 10:47 AM	27:59	5.94 pH	12.34 °C	7,507.0 µS/cm	0.15 mg/L	6.41 NTU	75.3 mV	9.03 ft	90.00 ml/min
11/13/2017 10:52 AM	32:59	5.94 pH	12.31 °C	7,435.5 µS/cm	0.21 mg/L	6.84 NTU	71.3 mV	9.05 ft	90.00 ml/min
11/13/2017 10:57 AM	37:59	5.94 pH	12.23 °C	7,478.4 µS/cm	0.22 mg/L	6.91 NTU	70.2 mV	9.05 ft	90.00 ml/min

Samples

Sample ID:	Description:

MW115B	Sample time 11:05 MNA Parameters FD01 collected sample time 15:40

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 11/14/2017 2:01:45 PM
Project: Nyanza 202 (2) (2) (2)
Operator Name: C. Falco

Location Name: MW201 **Well Diameter: 2 cm** **Casing Type: Pvc** **Initial Depth to Water: 10.61 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 1.3 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 95 ml/min** **Final Draw Down: 0.04 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 388346**

Test Notes:
Purge start 1400
Initial dtw 10.61 final dtw 10.65
Purge end 1450
Dtb 18.29

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/14/2017 2:01 PM	00:00	5.80 pH	12.03 °C	1,936.3 µS/cm	2.19 mg/L	73.70 NTU	455.7 mV	10.65 ft	95.50 ml/min
11/14/2017 2:05 PM	03:55	5.79 pH	12.72 °C	1,915.7 µS/cm	0.80 mg/L	29.10 NTU	286.2 mV	10.65 ft	95.00 ml/min
11/14/2017 2:10 PM	08:55	5.75 pH	12.89 °C	1,840.6 µS/cm	0.33 mg/L	15.60 NTU	234.5 mV	10.65 ft	95.00 ml/min
11/14/2017 2:15 PM	13:55	5.72 pH	13.36 °C	1,733.5 µS/cm	0.28 mg/L	8.95 NTU	224.5 mV	10.65 ft	95.00 ml/min
11/14/2017 2:20 PM	18:55	5.71 pH	13.67 °C	1,685.4 µS/cm	0.25 mg/L	6.71 NTU	223.1 mV	10.65 ft	95.00 ml/min
11/14/2017 2:25 PM	23:55	5.69 pH	13.81 °C	1,666.4 µS/cm	0.22 mg/L	5.09 NTU	218.9 mV	10.65 ft	95.00 ml/min
11/14/2017 2:30 PM	28:55	5.68 pH	13.94 °C	1,637.3 µS/cm	0.19 mg/L	4.93 NTU	217.3 mV	10.65 ft	95.00 ml/min
11/14/2017 2:35 PM	33:55	5.67 pH	14.08 °C	1,619.0 µS/cm	0.19 mg/L	5.39 NTU	215.5 mV	10.65 ft	95.00 ml/min
11/14/2017 2:40 PM	38:55	5.66 pH	13.95 °C	1,612.2 µS/cm	0.21 mg/L	4.99 NTU	214.0 mV	10.65 ft	95.00 ml/min

Samples

Sample ID:	Description:
201	At 14:45

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 11/13/2017 2:19:28 PM
Project: Nyanza 202
Operator Name: A Goldberg

Location Name: MW-202 **Well Diameter: 2 in** **Casing Type: PVC** **Initial Depth to Water: 7.86 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 1 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 90 ml/min** **Final Draw Down: 0.9 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 388346**

Test Notes:
Purge start 14:09
Purge complete 14:57
Total depth =24.82

Weather Conditions:
40, rain

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/13/2017 2:19 PM	00:00	5.77 pH	11.07 °C	2,318.6 µS/cm	0.44 mg/L		298.2 mV	7.86 ft	90.00 ml/min
11/13/2017 2:24 PM	05:00	5.74 pH	12.02 °C	2,286.4 µS/cm	0.30 mg/L	9.62 NTU	198.6 mV	8.76 ft	90.00 ml/min
11/13/2017 2:29 PM	10:00	5.73 pH	12.71 °C	2,260.1 µS/cm	0.25 mg/L	9.48 NTU	183.8 mV	8.85 ft	90.00 ml/min
11/13/2017 2:34 PM	15:00	5.73 pH	12.29 °C	2,246.5 µS/cm	0.26 mg/L	5.05 NTU	184.1 mV	8.79 ft	90.00 ml/min
11/13/2017 2:39 PM	20:00	5.73 pH	12.14 °C	2,266.1 µS/cm	0.24 mg/L	4.07 NTU	180.7 mV	8.75 ft	90.00 ml/min
11/13/2017 2:44 PM	25:00	5.72 pH	12.33 °C	2,242.0 µS/cm	0.24 mg/L	4.12 NTU	184.2 mV	8.75 ft	90.00 ml/min
11/13/2017 2:49 PM	30:00	5.71 pH	12.17 °C	2,253.5 µS/cm	0.22 mg/L	4.33 NTU	181.5 mV	8.76 ft	90.00 ml/min

Samples

Sample ID:	Description:
MW202	Sample time= 14:50 VOCs

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 11/13/2017 12:34:02 PM
Project: Nyanza (2)
Operator Name: C.Falco

Location Name: MW-203A **Well Diameter: 2 cm** **Casing Type: Steel** **Initial Depth to Water: 5.69 ft**	**Pump Type: Geopump** **Estimated Total Volume Pumped: 2.5 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 444475 ml/min** **Final Draw Down: 5.72 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358284**

Test Notes:
Purge start 12:18
Sample 13:50
Purge end 1440
Final dtw 12.7
Dtb 78.4

Weather Conditions:
Cloudy rain 30s

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/13/2017 12:34 PM	00:00	8.74 pH	12.22 °C	22,740 µS/cm	-0.01 mg/L	46.10 NTU	-122.8 mV	7.80 ft	50.00 ml/min
11/13/2017 12:39 PM	05:00	8.75 pH	12.01 °C	22,626 µS/cm	-0.02 mg/L	42.30 NTU	-83.4 mV	8.80 ft	50.00 ml/min
11/13/2017 12:44 PM	10:00	8.74 pH	12.24 °C	22,590 µS/cm	-0.02 mg/L	35.30 NTU	-100.9 mV	8.47 ft	50.00 ml/min
11/13/2017 12:49 PM	15:00	8.74 pH	12.08 °C	22,666 µS/cm	-0.01 mg/L	28.80 NTU	-111.1 mV	8.66 ft	50.00 ml/min
11/13/2017 12:52 PM	18:19	8.74 pH	12.18 °C	22,513 µS/cm	-0.02 mg/L	27.90 NTU	-145.8 mV	8.82 ft	50.00 ml/min
11/13/2017 12:57 PM	23:19	8.73 pH	12.01 °C	22,537 µS/cm	-0.01 mg/L	23.50 NTU	-117.4 mV	9.19 ft	50.00 ml/min
11/13/2017 1:02 PM	28:19	8.69 pH	11.82 °C	22,408 µS/cm	1.22 mg/L	24.30 NTU	-92.9 mV	9.30 ft	50.00 ml/min
11/13/2017 1:07 PM	33:19	8.64 pH	11.91 °C	22,330 µS/cm	-0.01 mg/L	27.70 NTU	-129.5 mV	9.54 ft	50.00 ml/min
11/13/2017 1:12 PM	38:19	8.55 pH	12.10 °C	22,207 µS/cm	-0.02 mg/L	22.30 NTU	-152.3 mV	9.86 ft	50.00 ml/min
11/13/2017 1:14 PM	40:34	8.54 pH	12.01 °C	22,219 µS/cm	-0.02 mg/L	25.00 NTU	-150.0 mV	10.02 ft	50.00 ml/min
11/13/2017 1:19 PM	45:34	8.52 pH	11.91 °C	22,296 µS/cm	-0.02 mg/L	23.40 NTU	-179.1 mV	10.26 ft	50.00 ml/min
11/13/2017 1:24 PM	50:34	8.48 pH	12.05 °C	22,084 µS/cm	-0.02 mg/L	20.50 NTU	-189.8 mV	10.56 ft	50.00 ml/min

11/13/2017 1:29 PM	55:34	8.50 pH	12.01 °C	22,065 µS/cm	-0.02 mg/L	23.70 NTU	-193.9 mV	10.88 ft	50.00 ml/min
11/13/2017 1:34 PM	01:00:34	8.50 pH	11.77 °C	22,044 µS/cm	-0.02 mg/L	26.20 NTU	-191.2 mV	10.98 ft	50.00 ml/min
11/13/2017 1:39 PM	01:05:34	8.46 pH	12.02 °C	22,112 µS/cm	-0.01 mg/L	26.60 NTU	-199.0 mV	11.20 ft	50.00 ml/min
11/13/2017 1:44 PM	01:10:34	8.42 pH	11.95 °C	21,937 µS/cm	-0.02 mg/L	28.10 NTU	-196.5 mV	11.41 ft	50.00 ml/min

Samples

Sample ID:	Description:
203A	1350
203A	Taken at 1350

Low-Flow Test Report:

Test Date / Time: 11/13/2017 12:43:13 PM
Project: Nyanza 203B
Operator Name: A Goldberg

Location Name: MW-203B **Well Diameter: 2 in** **Casing Type: PVC** **Initial Depth to Water: 5.52 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 0.8 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 100 ml/min** **Final Draw Down: 0.35 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 388346**

Test Notes:
Purge start= 12:37
Purge stop = 13:10
Total depth= 31.65 ft bgs

Weather Conditions:
40s, rain

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/13/2017 12:43 PM	00:00	6.34 pH	9.14 °C	2,322.8 µS/cm	2.51 mg/L		141.8 mV	5.52 ft	100.00 ml/min
11/13/2017 12:48 PM	05:00	6.39 pH	11.84 °C	1,902.8 µS/cm	0.24 mg/L	3.68 NTU	61.4 mV	5.81 ft	100.00 ml/min
11/13/2017 12:50 PM	07:11	6.39 pH	12.36 °C	1,866.3 µS/cm	0.25 mg/L		54.4 mV	5.81 ft	100.00 ml/min
11/13/2017 12:55 PM	12:11	6.40 pH	12.32 °C	1,864.4 µS/cm	0.18 mg/L	4.62 NTU	48.0 mV	5.85 ft	100.00 ml/min
11/13/2017 1:00 PM	17:11	6.39 pH	12.33 °C	1,861.3 µS/cm	0.14 mg/L	2.79 NTU	44.6 mV	5.87 ft	100.00 ml/min
11/13/2017 1:05 PM	22:19	6.39 pH	12.26 °C	1,851.2 µS/cm	0.13 mg/L	3.20 NTU	43.9 mV	5.87 ft	100.00 ml/min

Samples

Sample ID:	Description:
MW-203B	Sample time= 13:10 MNA parameters

Low-Flow Test Report:

Test Date / Time: 11/15/2017 10:13:06 AM
Project: Nyanza 202 (2) (2) (2) (2)
Operator Name: C. Falco

Location Name: MW302 **Well Diameter: 2 in** **Casing Type: Pvc** **Initial Depth to Water: 10.6 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 1 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 70 ml/min** **Final Draw Down: 1.83 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 388346**

Test Notes:
Purge start 1010
Purge end 1100
DTB 25.14

Weather Conditions:
Sunny 30s

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/15/2017 10:13 AM	00:00	4.76 pH	13.16 °C	3,075.6 µS/cm	3.47 mg/L	16.20 NTU	267.9 mV	10.60 ft	90.00 ml/min
11/15/2017 10:18 AM	05:00	4.63 pH	12.62 °C	3,030.3 µS/cm	0.74 mg/L	13.70 NTU	233.7 mV	11.36 ft	70.00 ml/min
11/15/2017 10:23 AM	10:00	4.62 pH	12.54 °C	3,031.5 µS/cm	0.49 mg/L	8.67 NTU	222.8 mV	11.58 ft	70.00 ml/min
11/15/2017 10:28 AM	15:00	4.62 pH	12.42 °C	3,017.4 µS/cm	0.36 mg/L	5.10 NTU	217.4 mV	11.79 ft	70.00 ml/min
11/15/2017 10:33 AM	20:00	4.62 pH	12.72 °C	2,968.6 µS/cm	0.25 mg/L	2.85 NTU	211.6 mV	12.01 ft	70.00 ml/min
11/15/2017 10:38 AM	25:00	4.63 pH	12.65 °C	2,910.4 µS/cm	0.22 mg/L	2.19 NTU	208.8 mV	12.18 ft	70.00 ml/min
11/15/2017 10:43 AM	30:00	4.64 pH	12.67 °C	2,875.2 µS/cm	0.20 mg/L	2.28 NTU	207.5 mV	12.32 ft	70.00 ml/min
11/15/2017 10:48 AM	35:00	4.64 pH	12.60 °C	2,892.8 µS/cm	0.20 mg/L	2.37 NTU	207.3 mV	12.43 ft	70.00 ml/min

Samples

Sample ID:	Description:
302	Taken at 1050

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 11/15/2017 10:21:34 AM
Project: Nyanza
Operator Name: E. Johnson

Location Name: Nyanza MW-304A **Well Diameter: 2 in** **Casing Type: PVC** **Initial Depth to Water: 3.72 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 1.5 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 130 ml/min** **Final Draw Down: 0.31 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358296**

Test Notes:
Purge start 10:20. Clear purge water. Sample collected 11:05, FD-02 collected 1600, only VOCs.

Weather Conditions:
Clear, 40 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/15/2017 10:21 AM	00:00	5.84 pH	11.95 °C	8,484.8 µS/cm	8.27 mg/L		109.2 mV	3.72 ft	130.00 ml/min
11/15/2017 10:26 AM	05:00	6.27 pH	11.90 °C	8,841.2 µS/cm	0.03 mg/L	33.30 NTU	-132.4 mV	4.00 ft	130.00 ml/min
11/15/2017 10:31 AM	10:00	6.40 pH	11.87 °C	8,857.4 µS/cm	0.01 mg/L	13.40 NTU	-179.8 mV	4.01 ft	130.00 ml/min
11/15/2017 10:36 AM	15:00	6.46 pH	11.86 °C	8,827.1 µS/cm	0.01 mg/L	12.10 NTU	-200.1 mV	4.02 ft	130.00 ml/min
11/15/2017 10:41 AM	20:00	6.48 pH	11.86 °C	8,817.5 µS/cm	0.00 mg/L	8.05 NTU	-208.2 mV	4.04 ft	130.00 ml/min
11/15/2017 10:46 AM	25:00	6.50 pH	11.83 °C	8,804.2 µS/cm	0.00 mg/L	7.52 NTU	-216.0 mV	4.03 ft	130.00 ml/min
11/15/2017 10:51 AM	30:00	6.51 pH	11.80 °C	8,768.6 µS/cm	0.00 mg/L	5.38 NTU	-220.8 mV	4.03 ft	130.00 ml/min
11/15/2017 10:56 AM	35:00	6.51 pH	11.70 °C	8,719.6 µS/cm	0.00 mg/L	4.61 NTU	-224.9 mV	4.03 ft	130.00 ml/min
11/15/2017 11:01 AM	40:00	6.51 pH	11.58 °C	8,737.4 µS/cm	0.05 mg/L		-149.8 mV	4.03 ft	130.00 ml/min

Samples

Sample ID:	Description:

Low-Flow Test Report:

Test Date / Time: 11/15/2017 11:22:52 AM
Project: Nyanza
Operator Name: E. Johnson

Location Name: Nyanza MW-304B **Well Diameter: 2 in** **Casing Type: PVC** **Initial Depth to Water: 3.85 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 1.5 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 120 ml/min** **Final Draw Down: 0.4 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358296**

Test Notes:
Purge start time 11:22. Tablet freezes following 2nd reading, resumed quickly thereafter. Sample collected 12:05, VOCS only.

Weather Conditions:
Clear, 40 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/15/2017 11:22 AM	00:00	6.77 pH	10.32 °C	4,451.4 µS/cm	6.09 mg/L		-30.7 mV	3.85 ft	120.00 ml/min
11/15/2017 11:27 AM	05:00	6.58 pH	11.72 °C	4,392.0 µS/cm	0.27 mg/L	4.86 NTU	-45.6 mV	4.01 ft	120.00 ml/min
11/15/2017 11:45 AM	22:09	6.50 pH	11.91 °C	4,144.1 µS/cm	0.12 mg/L	3.52 NTU	-65.0 mV	4.31 ft	120.00 ml/min
11/15/2017 11:50 AM	27:09	6.48 pH	11.90 °C	4,096.7 µS/cm	0.13 mg/L	1.44 NTU	-23.2 mV	4.24 ft	120.00 ml/min
11/15/2017 11:55 AM	32:09	6.47 pH	11.99 °C	4,049.2 µS/cm	0.12 mg/L	1.27 NTU	-19.0 mV	4.26 ft	120.00 ml/min
11/15/2017 12:00 PM	37:09	6.46 pH	12.02 °C	4,013.6 µS/cm	0.12 mg/L	1.33 NTU	-18.5 mV	4.25 ft	120.00 ml/min

Samples

Sample ID:	Description:

Low-Flow Test Report:

Test Date / Time: 11/14/2017 11:20:09 AM
Project: Nyanza 202 (2) (2)
Operator Name: C. Falco

Location Name: MW305A **Well Diameter: 2 in** **Casing Type: Steel** **Initial Depth to Water: 6.9 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 2.65 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 100 ml/min** **Final Draw Down: 0.34 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 388346**

Test Notes:
Purge start 1118
Sample 1320
Purge end 1323

Weather Conditions:
Cloudy 30s

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/14/2017 11:20 AM	00:00	5.38 pH	10.27 °C	922.20 µS/cm	7.09 mg/L	173.00 NTU	345.8 mV	7.15 ft	100.00 ml/min
11/14/2017 11:25 AM	05:00	5.98 pH	11.29 °C	1,181.9 µS/cm	0.92 mg/L	57.90 NTU	201.5 mV	7.19 ft	100.00 ml/min
11/14/2017 11:30 AM	10:00	5.96 pH	11.66 °C	1,143.2 µS/cm	0.50 mg/L	33.30 NTU	221.2 mV	7.19 ft	100.00 ml/min
11/14/2017 11:35 AM	15:00	5.88 pH	11.89 °C	1,097.0 µS/cm	1.52 mg/L	102.00 NTU	246.3 mV	7.21 ft	100.00 ml/min
11/14/2017 11:40 AM	20:00	5.94 pH	12.07 °C	1,090.4 µS/cm	0.35 mg/L	43.20 NTU	214.0 mV	7.23 ft	100.00 ml/min
11/14/2017 11:45 AM	25:00	5.96 pH	12.16 °C	1,086.7 µS/cm	0.29 mg/L	23.10 NTU	204.3 mV	7.23 ft	100.00 ml/min
11/14/2017 11:50 AM	30:00	5.97 pH	12.12 °C	1,081.0 µS/cm	0.27 mg/L	20.90 NTU	201.6 mV	7.24 ft	100.00 ml/min
11/14/2017 11:55 AM	35:00	5.98 pH	12.21 °C	1,075.3 µS/cm	0.24 mg/L	14.30 NTU	195.9 mV	7.25 ft	100.00 ml/min
11/14/2017 12:00 PM	40:00	5.98 pH	12.24 °C	1,079.6 µS/cm	0.23 mg/L	10.10 NTU	195.1 mV	7.24 ft	100.00 ml/min
11/14/2017 12:05 PM	45:00	6.01 pH	12.40 °C	1,062.2 µS/cm	0.22 mg/L	7.40 NTU	187.1 mV	7.24 ft	100.00 ml/min
11/14/2017 12:10 PM	50:00	5.96 pH	12.12 °C	1,070.0 µS/cm	0.23 mg/L	5.99 NTU	198.6 mV	7.23 ft	100.00 ml/min
11/14/2017 12:15 PM	55:00	5.98 pH	12.12 °C	1,052.2 µS/cm	0.22 mg/L	377.00 NTU	187.5 mV	7.22 ft	100.00 ml/min

11/14/2017 12:20 PM	01:00:00	5.99 pH	12.23 °C	1,037.4 µS/cm	0.23 mg/L	101.00 NTU	181.3 mV	7.23 ft	100.00 ml/min
11/14/2017 12:25 PM	01:05:00	5.97 pH	12.22 °C	1,028.4 µS/cm	0.20 mg/L	28.30 NTU	178.6 mV	7.24 ft	100.00 ml/min
11/14/2017 12:30 PM	01:10:00	5.94 pH	12.31 °C	1,027.1 µS/cm	0.18 mg/L	16.40 NTU	181.3 mV	7.27 ft	100.00 ml/min
11/14/2017 12:35 PM	01:15:00	5.90 pH	12.36 °C	1,014.6 µS/cm	0.18 mg/L	14.90 NTU	189.5 mV	7.26 ft	100.00 ml/min
11/14/2017 12:40 PM	01:20:00	5.88 pH	12.12 °C	1,009.2 µS/cm	0.20 mg/L	7.04 NTU	194.0 mV	7.25 ft	100.00 ml/min
11/14/2017 12:45 PM	01:25:00	5.83 pH	12.14 °C	999.35 µS/cm	0.19 mg/L	4.21 NTU	199.9 mV	7.26 ft	100.00 ml/min
11/14/2017 12:50 PM	01:30:00	5.79 pH	12.36 °C	980.65 µS/cm	0.16 mg/L	6.44 NTU	204.4 mV	7.26 ft	100.00 ml/min
11/14/2017 12:55 PM	01:35:00	5.75 pH	12.41 °C	975.43 µS/cm	0.15 mg/L	3.69 NTU	207.6 mV	7.25 ft	100.00 ml/min
11/14/2017 1:00 PM	01:40:00	5.72 pH	12.12 °C	978.78 µS/cm	1.26 mg/L	4.05 NTU	210.0 mV	7.25 ft	100.00 ml/min
11/14/2017 1:05 PM	01:45:00	5.70 pH	12.30 °C	970.60 µS/cm	0.20 mg/L	3.57 NTU	214.3 mV	7.25 ft	100.00 ml/min
11/14/2017 1:10 PM	01:50:00	5.68 pH	12.39 °C	964.78 µS/cm	0.16 mg/L	2.30 NTU	217.2 mV	7.25 ft	100.00 ml/min
11/14/2017 1:11 PM	01:51:41	5.67 pH	12.40 °C	962.94 µS/cm	0.16 mg/L	1.50 NTU	213.6 mV	7.25 ft	100.00 ml/min
11/14/2017 1:16 PM	01:56:41	5.65 pH	12.33 °C	965.23 µS/cm	0.17 mg/L	1.81 NTU	219.1 mV	7.24 ft	100.00 ml/min

Samples

Sample ID:	Description:
305A	4 voas at 13:20

Low-Flow Test Report:

Test Date / Time: 11/14/2017 10:02:16 AM
Project: Nyanza 202 (2)
Operator Name: C. Falco

Location Name: MW305B **Well Diameter: 2 in** **Casing Type: Pvc**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 0.6 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 100 ml/min** **Final Draw Down: 0 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 388346**

Test Notes:
Purge start 1000
Sample time 1035
Purge end time 1111
Dtb 17.18
Initial dtw 7.2
Final dtw 7.2

Weather Conditions:
Cloudy 30s

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/14/2017 10:02 AM	00:00	6.42 pH	11.16 °C	406.36 µS/cm	2.83 mg/L	4.01 NTU	295.4 mV	7.22 ft	100.00 ml/min
11/14/2017 10:07 AM	05:00	4.96 pH	12.06 °C	341.37 µS/cm	0.48 mg/L	0.96 NTU	309.3 mV	7.20 ft	100.00 ml/min
11/14/2017 10:12 AM	10:00	4.79 pH	12.61 °C	336.53 µS/cm	0.72 mg/L	0.81 NTU	308.4 mV	7.20 ft	100.00 ml/min
11/14/2017 10:17 AM	15:00	4.75 pH	12.76 °C	334.74 µS/cm	0.35 mg/L	0.78 NTU	308.3 mV	7.20 ft	100.00 ml/min
11/14/2017 10:22 AM	20:00	4.74 pH	12.72 °C	334.54 µS/cm	0.32 mg/L	0.70 NTU	306.0 mV	7.20 ft	100.00 ml/min
11/14/2017 10:27 AM	25:00	4.74 pH	12.60 °C	335.85 µS/cm	0.31 mg/L	0.78 NTU	303.3 mV	7.20 ft	100.00 ml/min
11/14/2017 10:32 AM	30:00	4.74 pH	12.62 °C	335.65 µS/cm	0.30 mg/L	0.92 NTU	302.8 mV	7.20 ft	100.00 ml/min

Samples

Sample ID:	Description:
305a	At 10:35 MNA

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 11/14/2017 11:51:46 AM
Project: Nyanza
Operator Name: E. Johnson

Location Name: Nyanza MW-404B **Well Diameter: 2 in** **Casing Type: PVC** **Total Depth: 39.55 ft** **Initial Depth to Water: 10.59 m**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Pump Intake From TOC: 36.5 ft** **Estimated Total Volume Pumped: 1.5 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 170 ml/min** **Final Draw Down: 0.02 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358296**

Test Notes:
New LDPE tubing installed. Purge start 11:48. Sample time 12:30.

Weather Conditions:
Cloudy, 40 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/14/2017 11:51 AM	00:00	7.80 pH	10.88 °C	815.57 µS/cm	7.80 mg/L		111.8 mV	10.70 ft	170.00 ml/min
11/14/2017 11:56 AM	05:00	6.93 pH	12.83 °C	789.69 µS/cm	6.69 mg/L	7.27 NTU	123.9 mV	10.70 ft	170.00 ml/min
11/14/2017 12:01 PM	10:00	6.42 pH	12.93 °C	800.79 µS/cm	6.53 mg/L	6.45 NTU	114.1 mV	10.71 ft	170.00 ml/min
11/14/2017 12:06 PM	15:00	6.13 pH	13.02 °C	811.07 µS/cm	6.43 mg/L	8.31 NTU	106.4 mV	10.71 ft	170.00 ml/min
11/14/2017 12:11 PM	20:00	5.98 pH	12.96 °C	813.23 µS/cm	6.35 mg/L	4.42 NTU	103.1 mV	10.71 ft	170.00 ml/min
11/14/2017 12:16 PM	25:00	5.89 pH	13.00 °C	811.85 µS/cm	6.24 mg/L	2.69 NTU	98.7 mV	10.71 ft	170.00 ml/min
11/14/2017 12:21 PM	30:00	5.84 pH	12.96 °C	814.54 µS/cm	6.25 mg/L	3.65 NTU	96.3 mV	10.71 ft	170.00 ml/min
11/14/2017 12:26 PM	35:00	5.81 pH	13.00 °C	817.28 µS/cm	6.22 mg/L	2.44 NTU	92.7 mV	10.71 ft	170.00 ml/min

Samples

Sample ID:	Description:

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 11/15/2017 10:14:54 AM
Project: Nyanza 405A
Operator Name: A. Goldberg

Location Name: MW-405A **Well Diameter: 2 in** **Casing Type: Steel** **Initial Depth to Water: 1.51 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 1 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 80 ml/min** **Final Draw Down: 4.58 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358284**

Test Notes:
Purge start 10:10
Purge complete 10:57
Total depth 73.05ft

Weather Conditions:
40s, sun

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/15/2017 10:14 AM	00:00	7.22 pH	13.23 °C	1,652.3 µS/cm	1.04 mg/L		-79.8 mV	1.51 ft	80.00 ml/min
11/15/2017 10:19 AM	05:00	7.51 pH	13.22 °C	1,582.7 µS/cm	0.29 mg/L	7.97 NTU	-68.3 mV	2.79 ft	80.00 ml/min
11/15/2017 10:24 AM	10:00	7.61 pH	13.47 °C	1,504.0 µS/cm	0.24 mg/L	7.69 NTU	-61.3 mV	3.30 ft	80.00 ml/min
11/15/2017 10:29 AM	15:00	7.65 pH	13.56 °C	1,490.0 µS/cm	0.22 mg/L	5.28 NTU	-60.2 mV	3.88 ft	80.00 ml/min
11/15/2017 10:34 AM	20:00	7.68 pH	13.71 °C	1,471.2 µS/cm	0.20 mg/L	5.41 NTU	-62.2 mV	4.39 ft	80.00 ml/min
11/15/2017 10:39 AM	25:00	7.69 pH	13.68 °C	1,473.6 µS/cm	0.20 mg/L	3.73 NTU	-64.3 mV	4.95 ft	80.00 ml/min
11/15/2017 10:44 AM	30:00	7.69 pH	13.74 °C	1,483.2 µS/cm	0.19 mg/L	2.03 NTU	-67.7 mV	5.55 ft	80.00 ml/min
11/15/2017 10:49 AM	35:00	7.69 pH	13.65 °C	1,491.0 µS/cm	0.19 mg/L	3.70 NTU	-66.4 mV	6.09 ft	80.00 ml/min

Samples

Sample ID:	Description:

MW-405A	Sample time @ 10:55 VOCs

Low-Flow Test Report:

Test Date / Time: 11/15/2017 11:15:09 AM
Project: Nyanza 405B
Operator Name: A. Goldberg

Location Name: MW-405B **Well Diameter: 2 in** **Casing Type: Steel** **Initial Depth to Water: 2.11 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 2.25 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 100 ml/min** **Final Draw Down: 0.17 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358284**

Test Notes:
Purge start 11:10
Purge end 12:33
Total depth 45.10ft

Weather Conditions:
40s, sun

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/15/2017 11:15 AM	00:00	6.10 pH	11.84 °C	11,030 µS/cm	6.71 mg/L		-30.4 mV	2.11 ft	100.00 ml/min
11/15/2017 11:20 AM	05:00	6.05 pH	13.61 °C	11,002 µS/cm	0.22 mg/L	26.80 NTU	-38.2 mV	2.25 ft	100.00 ml/min
11/15/2017 11:25 AM	10:00	6.05 pH	13.83 °C	10,951 µS/cm	0.15 mg/L	15.10 NTU	-42.8 mV	2.25 ft	100.00 ml/min
11/15/2017 11:30 AM	15:00	6.06 pH	14.02 °C	10,882 µS/cm	0.13 mg/L	19.70 NTU	-41.8 mV	2.26 ft	100.00 ml/min
11/15/2017 11:35 AM	20:00	6.05 pH	14.02 °C	10,894 µS/cm	0.12 mg/L	17.70 NTU	-48.8 mV	2.26 ft	100.00 ml/min
11/15/2017 11:40 AM	25:00	6.06 pH	13.97 °C	10,849 µS/cm	0.11 mg/L	25.50 NTU	-53.9 mV	2.27 ft	100.00 ml/min
11/15/2017 11:45 AM	30:00	6.06 pH	13.97 °C	10,831 µS/cm	0.10 mg/L	20.70 NTU	-55.8 mV	2.27 ft	100.00 ml/min
11/15/2017 11:50 AM	35:00	6.06 pH	13.99 °C	10,803 µS/cm	0.09 mg/L	16.20 NTU	-60.1 mV	2.27 ft	100.00 ml/min
11/15/2017 11:55 AM	40:00	6.06 pH	14.03 °C	10,799 µS/cm	0.09 mg/L	15.10 NTU	-64.4 mV	2.27 ft	100.00 ml/min
11/15/2017 12:00 PM	45:00	6.06 pH	13.93 °C	10,798 µS/cm	0.08 mg/L	12.20 NTU	-64.3 mV	2.27 ft	100.00 ml/min
11/15/2017 12:05 PM	50:00	6.06 pH	13.93 °C	10,760 µS/cm	0.08 mg/L	10.40 NTU	-65.9 mV	2.27 ft	100.00 ml/min
11/15/2017 12:10 PM	55:00	6.06 pH	13.89 °C	10,779 µS/cm	0.08 mg/L	11.10 NTU	-65.5 mV	2.28 ft	100.00 ml/min

11/15/2017 12:15 PM	01:00:00	6.06 pH	13.86 °C	10,769 µS/cm	0.08 mg/L	6.81 NTU	-66.5 mV	2.28 ft	100.00 ml/min
11/15/2017 12:20 PM	01:05:00	6.06 pH	14.05 °C	10,745 µS/cm	0.08 mg/L	6.69 NTU	-66.2 mV	2.28 ft	100.00 ml/min
11/15/2017 12:25 PM	01:10:00	6.06 pH	14.11 °C	10,682 µS/cm	0.07 mg/L	6.48 NTU	-69.0 mV	2.28 ft	100.00 ml/min

Samples

Sample ID:	Description:
MW-405B	Sample time@12:30 VOCS

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 11/15/2017 1:25:47 PM
Project: Nyanza 40MAIN
Operator Name: A. Goldberg

Location Name: MW-40MAIN **Well Diameter: 1 in** **Casing Type: PVC** **Initial Depth to Water: 18.42 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Pump Intake From TOC: 24.6 ft** **Estimated Total Volume Pumped: 4 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 125 ml/min** **Final Draw Down: 0.21 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358284**

Test Notes:
Purge start 13:16
Purge complete 15:12
Total depth 23.73 ft

Weather Conditions:
40s, partly cloudy

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/15/2017 1:25 PM	00:00	5.24 pH	12.49 °C	1,463.7 µS/cm	5.57 mg/L		113.4 mV	18.42 ft	125.00 ml/min
11/15/2017 1:30 PM	05:00	5.15 pH	14.38 °C	1,237.4 µS/cm	3.46 mg/L	77.00 NTU	108.0 mV	18.61 ft	125.00 ml/min
11/15/2017 1:35 PM	10:00	5.20 pH	14.78 °C	1,182.9 µS/cm	3.23 mg/L	49.90 NTU	99.9 mV	18.63 ft	125.00 ml/min
11/15/2017 1:40 PM	15:00	5.24 pH	14.82 °C	1,162.9 µS/cm	3.16 mg/L	46.10 NTU	94.7 mV	18.63 ft	125.00 ml/min
11/15/2017 1:45 PM	20:00	5.28 pH	14.99 °C	1,142.9 µS/cm	3.16 mg/L	29.90 NTU	90.1 mV	18.63 ft	125.00 ml/min
11/15/2017 1:50 PM	25:00	5.30 pH	14.95 °C	1,123.4 µS/cm	3.16 mg/L	27.50 NTU	87.0 mV	18.63 ft	125.00 ml/min
11/15/2017 1:55 PM	30:00	5.31 pH	14.92 °C	1,121.0 µS/cm	3.11 mg/L	19.30 NTU	85.0 mV	18.63 ft	125.00 ml/min
11/15/2017 2:00 PM	35:00	5.33 pH	14.82 °C	1,116.3 µS/cm	3.04 mg/L	16.30 NTU	83.0 mV	18.63 ft	125.00 ml/min
11/15/2017 2:05 PM	40:00	5.34 pH	15.08 °C	1,104.5 µS/cm	3.14 mg/L	13.80 NTU	81.6 mV	18.63 ft	125.00 ml/min
11/15/2017 2:10 PM	45:00	5.36 pH	15.65 °C	1,091.3 µS/cm	3.09 mg/L	12.40 NTU	80.4 mV	18.63 ft	125.00 ml/min
11/15/2017 2:15 PM	50:00	5.37 pH	15.71 °C	1,083.3 µS/cm	3.08 mg/L	10.20 NTU	78.5 mV	18.63 ft	125.00 ml/min

11/15/2017 2:20 PM	55:00	5.37 pH	15.82 °C	1,084.1 µS/cm	3.17 mg/L	7.67 NTU	77.4 mV	18.63 ft	125.00 ml/min
11/15/2017 2:25 PM	01:00:00	5.38 pH	16.20 °C	1,076.0 µS/cm	3.13 mg/L	7.35 NTU	77.1 mV	18.63 ft	125.00 ml/min
11/15/2017 2:30 PM	01:05:00	5.39 pH	16.31 °C	1,072.4 µS/cm	3.16 mg/L	7.63 NTU	76.5 mV	18.63 ft	125.00 ml/min
11/15/2017 2:35 PM	01:10:00	5.39 pH	16.46 °C	1,075.5 µS/cm	3.17 mg/L	6.89 NTU	75.5 mV	18.63 ft	125.00 ml/min
11/15/2017 2:40 PM	01:15:00	5.41 pH	16.29 °C	1,067.4 µS/cm	3.23 mg/L	6.76 NTU	74.3 mV	18.63 ft	125.00 ml/min
11/15/2017 2:45 PM	01:20:00	5.41 pH	15.91 °C	1,057.5 µS/cm	3.25 mg/L	8.51 NTU	73.9 mV	18.63 ft	125.00 ml/min
11/15/2017 2:50 PM	01:25:00	5.41 pH	16.03 °C	1,072.4 µS/cm	3.23 mg/L	7.72 NTU	74.0 mV	18.63 ft	125.00 ml/min
11/15/2017 2:55 PM	01:30:00	5.42 pH	15.77 °C	1,067.7 µS/cm	3.24 mg/L	8.77 NTU	72.5 mV	18.63 ft	125.00 ml/min
11/15/2017 3:00 PM	01:35:00	5.42 pH	15.56 °C	1,073.8 µS/cm	3.29 mg/L	8.68 NTU	72.0 mV	18.63 ft	125.00 ml/min
11/15/2017 3:05 PM	01:40:00	5.42 pH	15.55 °C	1,074.1 µS/cm	3.30 mg/L	8.72 NTU	71.1 mV	18.63 ft	125.00 ml/min

Samples

Sample ID:	Description:
MW-40MAIN	Sample time 15:10 VOCs

Low-Flow Test Report:

Test Date / Time: 11/16/2017 12:18:18 PM
Project: Nyanza 202 (2) (2) (2) (2) (2) (2) (2) (2)
Operator Name: C. Falco

Location Name: RW-1 **Well Diameter: 8 cm** **Casing Type: Steel** **Initial Depth to Water: 4.16 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Estimated Total Volume Pumped: 0.75 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 120 ml/min** **Final Draw Down: 0.18 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 388346**

Test Notes:
Purge start 1217
Purge end 1250
Dtb 43.10

Weather Conditions:
Rainy 40s

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/16/2017 12:18 PM	00:00	4.37 pH	12.40 °C	162.02 µS/cm	3.04 mg/L	7.09 NTU	193.3 mV	4.23 ft	150.00 ml/min
11/16/2017 12:23 PM	05:00	5.81 pH	12.67 °C	115.58 µS/cm	4.64 mg/L	5.87 NTU	143.0 mV	4.26 ft	125.00 ml/min
11/16/2017 12:28 PM	10:01	5.90 pH	12.71 °C	115.03 µS/cm	4.72 mg/L	4.92 NTU	149.5 mV	4.30 ft	125.00 ml/min
11/16/2017 12:33 PM	15:01	5.92 pH	12.63 °C	113.77 µS/cm	4.69 mg/L	4.06 NTU	162.6 mV	4.32 ft	100.00 ml/min
11/16/2017 12:38 PM	20:01	5.93 pH	12.45 °C	113.22 µS/cm	4.70 mg/L	4.77 NTU	160.7 mV	4.32 ft	120.00 ml/min
11/16/2017 12:43 PM	25:01	5.94 pH	12.58 °C	114.09 µS/cm	4.73 mg/L	3.73 NTU	164.8 mV	4.34 ft	120.00 ml/min

Samples

Sample ID:	Description:
RW1	At 1246

Created using VuSitu from In-Situ, Inc.

Low-Flow Test Report:

Test Date / Time: 11/14/2017 1:06:28 PM
Project: Nyanza WP-105
Operator Name: E. Johnson

Location Name: Nyanza WP-105 **Well Diameter: 1.5 in** **Casing Type: Steel** **Total Depth: 9.32 ft** **Initial Depth to Water: 4.94 ft**	**Pump Type: Peristaltic** **Tubing Type: LDPE** **Pump Intake From TOC: 8 ft** **Estimated Total Volume Pumped: 0.2 gal** **Flow Cell Volume: 90 ml** **Final Flow Rate: 90 ml/min** **Final Draw Down: 4.39 ft**	**Instrument Used: SmarTROLL MP** **Serial Number: 358296**

Test Notes:
New dedicated tubing installed. Purge start 13:03. Considerable drawdown occurring. Well purged completely dry prior to collecting a sample. EVEN to return tomorrow to collect sample.

Weather Conditions:
Cloudy 40 F

Low-Flow Readings:

Date Time	Elapsed Time	pH	Temperature	Specific Conductivity	RDO Concentration	Turbidity	ORP	Depth To Water	Flow
		+/- 0.1	+/- 3 %	+/- 3 %	+/- 10 %	+/- 10 %	+/- 10	+/- 0.3	
11/14/2017 1:06 PM	00:00	5.88 pH	10.93 °C	315.64 µS/cm	0.82 mg/L		-33.4 mV	4.94 ft	90.00 ml/min
11/14/2017 1:11 PM	05:00	5.89 pH	11.65 °C	309.39 µS/cm	0.34 mg/L	32.80 NTU	-31.9 mV	7.15 ft	90.00 ml/min
11/14/2017 1:16 PM	10:00	5.91 pH	11.56 °C	307.67 µS/cm	0.46 mg/L		-27.4 mV	7.15 ft	90.00 ml/min
11/14/2017 1:21 PM	15:00	5.92 pH	11.33 °C	306.20 µS/cm	11.01 mg/L		-22.4 mV	7.15 ft	90.00 ml/min
11/14/2017 1:21 PM	15:22	5.92 pH	11.34 °C	305.63 µS/cm	11.03 mg/L		-23.2 mV	7.15 ft	90.00 ml/min

Samples

Sample ID:	Description:

Created using VuSitu from In-Situ, Inc.

Low-Flow Field Log

Nobis — Engineering a Sustainable Future

Site Name: Nyanza
Job Number: 80113.03/0340
Sampler: ANE

Date: 5/2/2018

Well ID: **MW-701**
Sample ID: MW-701-050218A
Reviewed By:

Measurement Reference Point (MP): pvc (PVC, Casing, Ground, etc.)
Depth to GW: 8.62 (ft from MP)
Depth to Bottom: 14.7 (ft from MP)
Pump Intake Depth: 13 (ft from MP)
Well depth as installed: 15 (ft bgs)
Screen interval (range): 5/15/2018 (ft bgs)

Purging start time: 1015
Parameter stabalization (Y/N): Y
Two hour time limit reached (Y/N): N
Sample time: 1205
Total volume purged (gals): 2.5
Time at purge completion: 1230

Equipment Vendor: US ENVIRONMENTAL
Pump Type: peristaltic pump

Turbidity Meter: Hach2100Q
Serial #: 11090C12226

Multimeter: YSI
Serial #: 15D101636

Notes (Initial PID reading, SOP deviations, etc.):

Lab Analyses: Vocs
QC Info (Duplicate, MS/MSD): MSMSD

Clock Time	Bladder Pump Discharge/ Refill	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp ±3%	Spec. Cond. ±3%	pH ±0.1	ORP ±10	DO ±10% if >0.5 mg/L	Turbidity ±10% if >5 NTU	Comments/Gas Pressure/Observations	Stability Calculator (auto)
HHMM	sec./sec. or setting	ml/min	ft. below MP	ft.	ft.	oC	µS/cmc		mV	mg/L	NTU		
1020		180	8.70	0.08	0.08								
1025		180	8.70	0.00	0.08	14.76	2427	4.99	3	0.51	13.5		
1030		180	8.70	0.00	0.08	13.47	2409	5.00	0.3	0.39	18.6		
1035		200	8.70	0.00	0.08	14.06	2400	5.02	-3.8	0.29	12.6		Not Stable
1040		200	8.70	0.00	0.08	14.53	2373	5.03	-6.1	0.29	16.2		Not Stable
1045		200	8.70	0.00	0.08	14.19	2347	5.04	-10.5	0.29	13.7		Not Stable
1050		180	8.70	0.00	0.08	14.20	2326	5.06	-6.9	0.25	14.5		Not Stable
1055		180	8.70	0.00	0.08	14.20	2276	5.06	-14.7	0.28	11.7		Not Stable
1100		180	8.70	0.00	0.08	14.20	2246	5.07	-16.2	0.30	9.38		Not Stable
1105		180	8.70	0.00	0.08	14.20	2186	5.09	-10.5	0.30	6.9		Not Stable
1110		180	8.70	0.00	0.08	14.21	2139	5.11	-24.7	0.32	9.6		Not Stable
1115		180	8.70	0.00	0.08	14.21	2105	5.12	-26	0.33	10.2		Not Stable
1120		180	8.70	0.00	0.08	14.22	2071	5.14	-27.3	0.35	7.82		Not Stable
1125		180	8.70	0.00	0.08	14.22	2029	5.14	-30.1	0.68	8.65		Not Stable
1130		180	8.70	0.00	0.08	14.22	2019	5.15	-32.6	0.68	9.04		Not Stable
1135		160	8.70	0.00	0.08	14.23	1950	5.16	-36.9	0.68	7.8		Not Stable
1140		160	8.70	0.00	0.08	14.23	1910	5.16	-43.2	0.70	6.41		Not Stable

Low-Flow Field Log

Nobis — Engineering a Sustainable Future

Site Name: Nyanza
Job Number: 80113.03/0340
Sampler: ANE

Date: 5/2/2018

Well ID: **MW-701**
Sample ID: MW-701-050218A
Reviewed By: 0

Measurement Reference Point (MP): pvc (PVC, Casing, Ground, etc.)
Depth to GW: 8.62 (ft from MP)
Depth to Bottom: 14.7 (ft from MP)
Pump Intake Depth: 13 (ft from MP)
Well depth as installed: 15 (ft bgs)
Screen interval (range): 43235 (ft bgs)

Purging start time: 1015
Parameter stabalization (Y/N): Y
Two hour time limit reached (Y/N): N
Sample time: 1205
Total volume purged (gals): 2.5
Time at purge completion: 1230

Equipment Vendor: US ENVIRONMENTAL
Pump Type: peristaltic pump

Turbidity Meter: Hach2100Q
Serial #: 11090C12226

Multimeter: YSI
Serial #: 15D101636

Notes (Initial PID reading, SOP deviations, etc.): 0

Lab Analyses: Vocs
QC Info (Duplicate, MS/MSD): MSMSD

Clock Time	Bladder Pump Discharge/ Refill	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp ±3%	Spec. Cond. ±3%	pH ±0.1	ORP ±10	DO ±10% if >0.5 mg/L	Turbidity ±10% if >5 NTU	Comments/Gas Pressure/Observations	Stability Calculator (auto)
HHMM	sec./sec. or setting	ml/min	ft. below MP	ft.	ft.	oC	µS/cm		mV	mg/L	NTU		
1145		160	8.70	0.00	0.08	14.23	1846	5.18	-36.6	0.67	3.9		Not Stable
1150		160	8.70	0.00	0.08	14.23	1751	5.21	-32	0.69	8.82		Not Stable
1155		160	8.70	0.00	0.08	14.25	1721	5.21	-30.3	0.68	4.34		Not Stable
1200		160	8.70	0.00	0.08	14.25	1684	5.21	-29.6	0.70	4.56		Not Stable
1205		160	8.70	0.00	0.08	14.25	1696	5.23	-26.2	0.69	3.23		Stable

Low-Flow Field Log

Nobis — Engineering a Sustainable Future

Site Name: Nyanza
Job Number: 80113.03/0340
Sampler: AE

Date: 5/2/2018

Page: 1 of

Well ID: **MW-702**
Sample ID: MW-702-050218A
Reviewed By:

Measurement Reference Point (MP): pvc (PVC, Casing, Ground, etc.)
Depth to GW: 8.21 (ft from MP)
Depth to Bottom: 14.86 (ft from MP)
Pump Intake Depth: 13 (ft from MP)
Well depth as installed: 15 (ft bgs)
Screen interval (range): 5-15 (ft bgs)

Purging start time: 0820
Parameter stabalization (Y/N): Y
Two hour time limit reached (Y/N): N
Sample time: 925
Total volume purged (gals): 2
Time at purge completion: 945

Equipment Vendor: US ENVIRONMENTAL
Pump Type: peristaltic pump

Turbidity Meter: Hach2100Q
Serial #: 11090C12226

Multimeter: YSI
Serial #: 15D101636

Notes (Initial PID reading, SOP deviations, etc.):

Lab Analyses: VOCs
QC Info (Duplicate, MS/MSD): Field Duplicate MW-702-050218D @ 1600

Clock Time	Bladder Pump Discharge/ Refill	Purge Rate	Depth to Water	Draw down	Cum. Draw down	Temp ±3%	Spec. Cond. ±3%	pH ±0.1	ORP ±10	DO ±10% if >0.5 mg/L	Turbidity ±10% if >5 NTU	Comments/Gas Pressure/Observations	Stability Calculator (auto)
HHMM	sec./sec. or setting	ml/min	ft. below MP	ft.	ft.	oC	µS/cmc		mV	mg/L	NTU		
840		180	8.42	0.21	0.21								
845		180	8.42	0.00	0.21	9.89	172	6.08	18.4	7.33	79		
850		180	8.43	0.01	0.22	9.85	181	6.10	17	6.95	57.6		
855		188	8.43	0.00	0.22	9.78	187	6.13	15.3	6.68	52.1		Not Stable
900		188	8.43	0.00	0.22	9.72	196	6.16	14.1	6.31	28.3		Not Stable
905		180	8.43	0.00	0.22	9.72	205	6.20	12.7	5.93	31.7		Not Stable
910		180	8.43	0.00	0.22	9.73	214	6.21	11.4	5.75	8.81		Not Stable
915		180	8.43	0.00	0.22	9.73	210	6..22	10.3	5.79	6..85		Not Stable
920		180	8.43	0.00	0.22	9.72	211	6.21	9.5	5.73	5.15		Not Stable
925		180	8.43	0.00	0.22	9.72	210	6.21	9.7	5.80	5.15		Stable

BORING LOG

Nobis — Engineering a Sustainable Future

Project: Nyanza Superfund Site

Location: Ashland, Massachusetts

Nobis Project No.: 80113.03

Boring No.: **MW-701S**

Boring Location: Eastern side of 47-49 Pleasant Street property (Along Water Street)

Checked by: J. Brunelle

Date Start: April 6, 2018

Date Finish: April 6, 2018

Contractor: Drilex Environmental, Inc.

Driller: J. Jalutkewicz

Nobis Rep.: A. Epstein

Rig Type / Model: ATV Track Rig / CME 55 LC

Hammer Type: Automatic Hammer

Hammer Hoist: Automatic

Ground Surface Elev.:

Datum: NGVD 29

	Drilling Method	Sampler
Type	Hollow Stem Auger	N/A
Size ID (in.)	2	N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
▼ 04/09/18	11:07	10.2		15	72 Hours
▽ 04/09/18	11:25	13.6		15	18 Minutes

Depth (ft.)	Sample Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	Graphic	Stratum Elev. / Depth (ft.)	Sample Description and Remarks (Classification System: Modified Burmister)	Well Detail	Notes
1							/ 1.0	Black, TOPSOIL, with organics (roots and leaves).	Roadbox and Concrete Collar	
2								Brown, fine to medium SAND, some fine to coarse Gravel, little Silt.	Bentonite Seal	
3										
4									Riser	
5										
6										
7										
8										
9										
10					▼			Brown, fine to medium SAND, some fine to coarse Gravel, little Silt.	10 Slot Screen	
11										
12										
13										
14					▽					
15							/ 15.0	Brown, fine to medium SAND, some fine to coarse Gravel, little Silt. wet.		
16								Boring terminated at 15 feet.		
17										
18										
19										
20										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Well Location: 19' South of Nothern edge of fence located at the 47-49 Pleasant Street residence, 37' Southwest of utility pole found on Eastern side of Water Street.
2) Well developed on 4/9/2018, 11:02-11:25

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BOREHOLE LOG - NOBIS GINT DATA TEMPLATE OCT 7 2011.GDT - 4/16/18 15:58 - R:\80000 TASK ORDERS\80113 NYANZA FS OU2\TECHNICAL DATA\APRIL 2018 WELL CONSTRUCTION\2018 WELL INSTALLATION.GPJ

BORING LOG

Nobis — Engineering a Sustainable Future

Project:	Nyanza Superfund Site
Location:	Ashland, Massachusetts
Nobis Project No.:	80113.03
Boring No.:	MW-702S
Boring Location:	Historical Society (2 Myrtle Street)
Checked by:	J. Brunelle
Date Start:	April 6, 2018
Date Finish:	April 6, 2018
Contractor:	Drilex Environmental, Inc.
Driller:	J. Jalutkewicz
Nobis Rep.:	A. Epstein
Rig Type / Model:	ATV Track Rig / CME 55 LC
Hammer Type:	Automatic Hammer
Hammer Hoist:	Automatic
Ground Surface Elev.:	
Datum:	NGVD 29

	Drilling Method	Sampler
Type	Hollow Stem Auger	N/A
Size ID (in.)	2	N/A
Advancement	Augered	N/A

Groundwater Observations

Date	Time	Depth Below Ground (ft.)	Depth of Casing (ft.)	Depth to Bottom of Hole (ft.)	Stabilization Time
▼ 04/09/18	12:04	9.50		15	72 Hours
▽ 04/09/18	12:21	14.03		15	17 Minutes

Depth (ft.)	Sample Type & No.	Rec (in.)	Depth (ft.)	Blows/ 6 in.	Ground Water	Graphic	Stratum Elev. / Depth (ft.)	Sample Description and Remarks (Classification System: Modified Burmister)	Well Detail	Notes
							/ 0.5			
1								Black, TOPSOIL, with organics (roots and leaves).	Roadbox and Concrete Collar	
2									Bentonite Seal	
3										
4									Riser	
5								Brown, fine to medium SAND, some fine to coarse Gravel, little Silt.		
6										
7										
8										
9										
10					▼		/ 10.0			
								Brown, fine to medium SAND, some fine to coarse Gravel, little Silt.	10 Slot Screen	
11										
12										
13										
14					▽					
15							/ 15.0	Brown, fine to medium SAND, some fine to coarse Gravel, little Silt. Wet.		
								Boring terminated at 15 feet.		
16										
17										
18										
19										
20										

Soil	Percentage	Non-Soil
trace	5 - 10	very few
little	10 - 20	few
some	20 - 35	several
and	35 - 50	numerous

NOTES:

1) Well Location: 14' East of 3 Water Street property fence, 42' South of Southwestern corner of the Historical Society garage building (Western building) and about 6' North of Water Street.
2) Well developed on 4/9/2018, 11:57-12:30

Soil descriptions are based on visual classifications and should be considered approximate. Stratification lines are approximate boundaries between stratums; transitions may be gradual.

BOREHOLE LOG - NOBIS GINT DATA TEMPLATE OCT 7 2011.GDT - 4/16/18 15:58 - R:\80000 TASK ORDERS\80113 NYANZA FS OU2\TECHNICAL DATA\APRIL 2018 WELL CONSTRUCTION\2018 WELL INSTALLATION.GPJ

APPENDIX B

Revision 0
Date 4/10/18

INDOOR AIR SOIL VAPOR INTRUSION STUDY REPORT MARCH 2018

Ashland, MA Nyanza Site

U.S. ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND REGIONAL LABORATORY
OFFICE OF ENVIRONMENTAL MEASUREMENT & EVALUATION
11 TECHNOLOGY DRIVE
NORTH CHELMSFORD, MASSACHUSETTS 01863

Prepared for: Office of Site Remediation & Restoration, Removal Program
U.S. Environmental Protection Agency, New England

Prepared by: _____ Date: 4/10/18
Peter Kahn, ECA Air Monitoring Team, EPA Project Manager

Reviewed by: _____ Date: 4/10/18
Robert Judge, ECA Air Monitoring Team Leader

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1.0 Introduction

The Mass DEP and the EPA are concerned with the possibility of a threat to public health from volatile organic compounds (VOCs) off-gassing and migrating into buildings and impacting indoor air quality from a contaminated groundwater plume underlying buildings in the Ashland, MA area. These VOCs originated from the manufacturing and disposal activities that occurred at the former Nyanza Chemical Company facility located at the end of Megunko Road. The groundwater, soil, sediments, and surface water are contaminated with heavy metals and volatile chlorinated organics (VOCs). Chemical vapors originating from VOCs present in shallow groundwater have also been detected inside some area buildings. Health threats include direct contact with or accidental ingestion of contaminated groundwater or soil, and inhalation of vapors inside some area buildings.

2.0 Sampling Objective

EPA Remedial Project Manager (RPM), Lisa Thuot requested indoor air samples and where feasible sub-slab soil gas samples be collected inside pre-selected residential and commercial properties to form lines of evidence for completion of a vapor intrusion pathway risk evaluation related to contaminants associated with the Nyanza Site. Property access was granted by each property owner prior to sub-slab soil gas sampling probe installations and sampling activities. Sub-slab soil gas sampling probes were installed by Peter Kahn and Alysha Thompson using EPA Region I Standard Operating Procedure for Sub-Slab Soil Gas Sampling, October 7, 2014, Revision 3 on March 12, 14, and 20, 2018, at the following locations: 89 – 91 Pleasant Street, 136 Pleasant Street, 112 Pleasant Street, 106 – 108 Pleasant Street, 102 Pleasant Street, 90 – 92 Pleasant Street/3 Forest Avenue, and 118 Main Street. Indoor air and sub-slab soil gas samples were collected the week of March 26, 2018 at the following locations: 89 – 91 Pleasant Street, 136 Pleasant Street, 112 Pleasant Street, 106 – 108 Pleasant Street, 102 Pleasant Street, 90 – 92 Pleasant Street, and 118 Main Street. Indoor air samples were only collected at 37 Main Street because the building has a vapor mitigation system; the 153 Pleasant Street owner did not want holes drilled through the basement floor; and at 103 Pleasant Street sub-slab soil gas sampling probes could not be installed because the concrete slab was too thin, approximately 2 inches thick.

Indoor air samples were collected in the basement and on the first floor over a 24-hour period at all residential properties listed above and the dentist office located at 37 Main Street. At the commercial property located 118 Main Street 8-hour samples were collected from the first-floor church office space and rooms located in the basement the church uses for several activities. A pre-school also utilizes the basement area of the church, so an office and class room were sampled. Indoor air data will be compared to background outdoor air samples collected outside selected buildings each day indoor samples were collected. For quality control purposes, collocated canister indoor samples were collected from the basement of selected buildings each day samples were collected.

Soil gas samples were collected using EPA Region I Standard Operating Procedure for Sub-Slab Soil Gas Sampling, October 7, 2014, Revision 3. Scott Clifford collected the

soil gas samples and immediately analyze them on-site using EPA's Mobile Laboratory. Confirmation canister grab samples were collected at selected locations and then analyzed at the EPA Regional Laboratory using a GC/MS. In addition, grab air samples were collected by Scott Clifford using a glass syringe from areas where soil gases have the greatest potential to migrate into the building (i.e. openings in the concrete floor, drain pipes, etc.) if present. These samples were analyzed on-site in the mobile lab.

To obtain additional information about each building, an Indoor Air Assessment Survey was completed by EPA's contractor, Nobis.

2.1 Data Use and Reporting

The results of the study are presented in this report and will be provided to the EPA RPM for review and distribution to a EPA risk assessor, property owner and others as needed. This report describes where samples were collected and the sampling and analytical procedures used. In addition, all sampling and quality assurance/quality control (QA/QC) data are also contained in this report. The data were validated following the QC criteria described in Section 3.4. The data will be used to evaluate whether indoor air quality has been adversely impacted by contaminants associated with the Nyanza site and whether mitigation measures are warranted.

All canister samples were analyzed for the VOCs listed in Table 1, particularly the target compounds vinyl chloride (VC), benzene, chlorobenzene, 1, 4-dichlorobenzene, and trichloroethene (TCE) using a GC/MS.

3.0 Canister VOC Air Sampling and Analytical Methodologies

3.1 Description

EPA Region I Standard Operating Procedure (SOP) for Canister Sampling, ECASOP-Canister Sampling SOP, Revision 6, was used to collect the indoor and ambient air samples. Eight-hour and 24-hour time-weighted average (TWA) indoor air and ambient air samples were collected in evacuated 6-liter canisters using mechanical flow controllers, following the procedures described in the Region I SOP.

The TWA indoor air and ambient air samples were collected using a 6-liter canister with a mechanical flow controller calibrated to 10 ml/min to obtain 8-hour samples and 3 ml/min to obtain 24-hour samples. At the end of the sampling period, the final canister pressure should be below atmospheric pressure, indicated on a pressure gauge as a negative value, indicative of a vacuum for the sample duration. For this study, the final canister pressures at the end of the sample period were between -3 and -10 inches of mercury. As a result, the data collected are representative of 8-hour and 24-hour average concentrations.

The indoor air, ambient air, and sub-slab soil gas canister samples were brought back to the EPA laboratory, logged in on March 27, 28, 29, and 30, 2018, and analyzed on March 27, 28, 29, April 2, 3, 4, 2018, following the EPA Region I Standard Operating Procedure, EIASOP AIRCAN12. This analytical procedure was used to identify and

quantify VOCs listed in Table 1. Prior to analyzing the canisters, they were pressurized with nitrogen. Typically, where VOCs are present in groundwater, indoor air and soil gas concentrations can be higher than outside ambient air. Frequently dilutions are made to keep concentrations of contaminants within the calibration range. As a result, a dilution factor is calculated and applied to the data. When dilutions are made to samples, the compound reporting limits are increased.

3.2 Canister Cleaning and Leak Certification Procedures

3.2.1 Canister Cleaning Procedure

Prior to the sampling event, all the canisters were cleaned by placing them in an oven maintained at 100°C, evacuated to at least 10^{-2} Torr and then pressurized with humidified nitrogen to approximately 30 psig. This process was repeated three times. Detailed descriptions of these procedures are provided in the document entitled, TO-Clean Canister Cleaner and Leak Certification Standard Operating Procedures, 2/14/18, Revision 0.

3.2.2 Canister Leak Certification Procedure

After the canisters have been cleaned and they have been left overnight to equilibrate to room temperature, they are ready for the leak certification procedure. A MKS Baratron Pressure Gauge, model 122A is used to measure the pressure in the canister and a MKS PDR-C-1C Meter is used to display the pressure reading during the leak certification process. An initial pressure measurement is recorded and a final pressure measurement is made after a minimum of 24 hours and the difference between the initial and final measurement is calculated to determine if the canister is leaking. Leak certification ensures the valves and connections associated with the canister do not leak. This prevents cross contamination or loss of sample during transport to the field and back to the laboratory. Detailed descriptions of these procedures are provided in the document entitled, TO-Clean Canister Cleaner and Leak Certification Standard Operating Procedures, 2/14/18, Revision 0.

3.2.3 Canister Cleanliness Certification Procedure

After all the canisters were certified leak free, each canister was analyzed for contamination using the same GC/MS used to analyze the samples. Clean certified canisters were stored under pressure until the day before the canisters were used for sampling, when they were evacuated to less than 3.4×10^{-2} Torr. Detailed descriptions of these procedures are provided in the document entitled, Canister Evacuation Standard Operating Procedures, ECASOP-Canister Evacuation SOP4, September 19, 2011, Revision 4.

3.3 Canister Flow Controller Cleaning and Calibration Procedures

3.3.1 Flow Controller Calibration Procedure

Flow controllers to be used with the 6-liter canisters were calibrated at the EPA laboratory to 10 ml/min to obtain 8-hour samples and 3 ml/min to obtain 24-hour samples following the procedures provided in the EPA Region I SOP for Canister Sampling, ECASOP-Canister Sampling SOP, Revision 6, Section 14.1. Each flow controller was connected to a "dummy" evacuated canister and an Aalborg Electronic Mass Flow Meter, Model GFMs-010020, was attached to the flow controller's inlet port. As room air was drawn into the "dummy" canister, the flow controller needle valve was adjusted until the flow rate was maintained at the desired rate.

In the field, each canister pressure was checked prior to and after the sampling event with a dedicated pressure/vacuum gauge. For this study the final canister pressures were between -3 and -10 inches of mercury vacuum. These final pressure readings confirm that the data are representative of 8-hour and 24-hour average concentrations.

3.3.2 Flow Controller Cleaning Procedure

After the flow controllers were calibrated they were cleaned following the procedures provided in the EPA Region I SOP for Flow Controller Cleaning Standard Operating Procedures, ECASOP- Flow Controller Cleaning, SOP.Rev2. The flow controllers were placed in ovens maintained at 100°C and purged with humidified nitrogen for approximately one hour.

3.4 Canister Analysis Quality Control/Quality Assurance Results

3.4.1 Laboratory Blank

Humidified nitrogen was introduced into the analytical instrument inlet line prior to analyzing the canisters to serve as a laboratory blank. Laboratory blanks are analyzed to determine the background contamination present in the analytical system. Canister data were qualified as estimated and flagged with a "B", when the observed concentration in the sample was less than ten times the concentration in the laboratory blank. Blank values were not subtracted from the reported sample concentrations.

The laboratory blank results are presented in the five Laboratory Analytical Reports, provided in Appendix A. Six laboratory blanks were analyzed with the samples and no compounds were detected above their reporting limits, so data needed to be qualified.

3.4.2 Data Reproducibility/Precision Results

The following canisters were analyzed a second time for assessing analytical precision: Canister #22105 (Sample ID: AB74125), Canister #15059 (Sample ID: AB74135), Canister #15048 (Sample ID: AB74147), Canister #14891 (Sample ID: AB74210), and Canister #12567 (Sample ID: AB74214). More specifically, a second aliquot of the same volume was withdrawn from the canister and analyzed in a similar manner. A

table at the end of each Laboratory Analytical Report provided in Appendix A show the results of the laboratory duplicates. The relative percent differences (RPD) were calculated and all are less than QC limits/acceptance criterion. Therefore, the values reported are deemed acceptable and do not need to be qualified as estimated.

Each day indoor air samples were collected one duplicate canister sample pair were collected from the following buildings, 89 – 91 Pleasant Street (Canisters #22698 and #14898), 118 Main Street (Canisters #12563 and #14894), 103 Pleasant Street (Canisters #13498 and #22680), and 90 - 92 Pleasant Street (Canisters #12567 and #20846). Tables 2A, 2B, 2C, 2D show a comparison of compounds detected above their reporting limits in both samples along with calculated RPD. The sampling precision data were evaluated by comparing data pairs with both values greater than ten times the reporting limit and then determine if the RPD was within the 25% acceptance criteria. Based on these criteria, the acceptance criteria was satisfied for all compounds.

3.4.3 Data Accuracy Results

Five laboratory fortified blanks (LFB) canister samples containing selected VOCs at known concentrations were analyzed with the canister samples to determine analytical accuracy. The results of the observed concentrations were compared to the known acceptable range and are reported in a table at the end each Laboratory Analytical Report provided in Appendix A. All the LFB percent recovery results were within the QC limits, except acrylonitrile and bromoform were below the QC limits for analytical report 18030014; bromoform was below the QC limit for analytical report 18030015; the following compounds were above the QC limits: 1,2,4-trimethylbenzene, 1,2-dichloroethane, 4-ethyltoluene, allyl chloride, bromodichloromethane, cyclohexane, ethylbenzene, heptane, hexane, methyl ethyl ketone, methyl isobutyl ketone, methyl-t-butyl ketone, tetrachloroethylene, toluene, trichloroethylene, m/p-xylene, o-xylene, and t-1,2-dichloroethylene, bromoform was below the QC limit for analytical report 18030016; acrylonitrile, bromoform and dibromochloromethane were below the QC limits for analytical report 18030019; 1,2,4-trimethylbenzene, acrylonitrile, bromoform, and t-1,2-dichloroethylene were below the QC limit for analytical report 18040001.

3.4.4 Canister Surrogate Spike Results

Prior to analyzing each canister sample, surrogate compounds, 1,2-dichloroethane d4, bromofluorobenzene, and toluene d8 were added to the analytical system. The percent recovery data for the surrogate compounds are reported with each sample data sheet in Appendix A. The results show the recoveries for the three surrogate compounds were all determined to be acceptable.

3.4.5 Chain of Custody

Chain of custody documentation was completed by Peter Kahn. All canister samples were logged into the laboratory on March 27, 28, 29, and 30, 2018, transferring the sample custody to laboratory personnel. A completed chain of custody form is included with the Laboratory Analytical Report provided in Appendix A.

3.4.6 Data Validation and Usability

The analytical report provided by the EPA Regional Laboratory was further validated by Peter Kahn. The data reported by the laboratory were compared to the data quality performance criteria specified in Sections 3.4.1, 3.4.2, 3.4.3 and 3.4.4 to evaluate data usability. All data collected for this project are presented in this report and qualified as needed, no data were rejected. The data presented in this report are of acceptable quality to represent the levels of volatile organic compounds present at the indoor air, ambient air, and soil gas sampling locations. These levels may vary given differing site activities, environmental conditions and the time of year. Therefore, the data only represent the conditions prevailing at the time of sampling.

4.0 Air Grab Sampling and Analysis Methodology for VOCs

4.1 Air Grab Sampling Procedures

Air grab samples were collected by drawing 200 micro liters of air at the selected sampling locations using an air tight steel barrel glass syringe. The sample was immediately analyzed on-site using the EPA mobile lab.

4.2 Air Grab Field Analytical Procedures

Air grab samples were analyzed using Region 1's standard air screening method, Air Sample Analysis for Volatile Organic Compounds, EIASOP-FLDGRAB4. Air samples were collected in a 250 micro liter steel barreled glass syringe and analyzed onsite using a Shimadzu 2010 plus gas chromatograph (GC) equipped with a 30 meter, 0.53 mm DBPS 624 column, electron capture detector (ECD) and photo ionization detector (PID).

Concentrations of VOCs were calculated using the external standard technique. To tentatively identify compounds in a sample, professional judgment was used to compare the retention times of sample chromatogram peaks to the peak retention times of standard mixture of VOCs. When a compound was tentatively identified, quantitation was performed by a peak height comparison. The contaminants analyzed and their corresponding reporting limits are provided below. The Mobile Laboratory Analytical Report is provided in Appendix B.

Compound	Reporting Limit (ppb/v)	Reporting Limit (µg/m^3)
Trichloroethylene	0.4	2.2
Tetrachloroethylene	0.2	1.4

4.3 Quality Control Procedures

The following quality control procedures were used for the on-site air grab sample analysis.

- Syringe blank injections were made after every 10 samples and as needed to

assess carryover from high concentration samples. Blank values were subtracted from sample values when calculating compound concentrations.

- A one level calibration standard was analyzed repeatedly and throughout the duration of sample analyses to maintain a consistent standard chromatogram.
- Duplicate/replicate analyses were performed to determine field precision. All of the relative percent differences (RPDs) were within the ± 20% acceptance criteria.

5.0 Soil Gas Sampling and Analysis Methodology for VOCs

5.1 Soil Gas Sampling Procedures

The installation of each sub-slab soil gas sampling probe was performed using the EPA Region I Standard Operating Procedure for Sub-Slab Soil Gas Sampling, October 7, 2014, Revision 3. Initially a hole was drilled down to a depth of 11 inches through the concrete slab and soil material below. Then a soil gas sampling probe was inserted to a depth of the concrete slab and soil interface, between 2 ½ inches and 5 inches. The probe was secured with clay and concrete. To collect the sample, a battery operated, portable vacuum pump, calibrated to approximately 1 liter per minute, was attached at the end of a "T" fitting to purge 1 liter from the sampling probe before collecting each sample. The pump continuously withdrew soil gas as a sample was collected. This was accomplished by inserting the needle of a glass syringe through the septa of the "T" fitting and extracting a sample from the soil gas path. Samples were then analyzed on site using the Air Grab Field Analytical Procedures described in Section 4.2.

At selected soil gas sampling locations, the sampling probe remained in the same position and a new "T" fitting, made of a stainless steel flexible line and an in-line valve, was connected for collecting a canister grab sample. The vacuum pump was attached to one end of the "T" fitting and the canister with flow controller was connected to the other end of the "T" fitting. The canister valve remained closed as the pump purged 1 liter from the probe. Immediately after the in-line valve on the pump end of the "T" fitting was closed, the canister valve was opened to collect a grab sample. Using a flow controller on the canister calibrated to flow rate of approximately 200 ml/min. and collecting a sample for approximately 1-hour, the canister reached atmospheric pressure. All the soil gas canister grab samples were brought back to the OEME Laboratory for analysis following the procedure described in Section 3.1.

6.0 Meteorological Measurement

Ambient Air Meteorological Data

In general, sampling during winter months is a good strategy to maximize the probability of encountering "worse case" conditions. A key factor in this regard is the movement of gases in and out of the building basement or slab on-grade, to and from the surrounding subsurface environment. Meteorological conditions and observations during and prior to the sampling event provide some insight in this regard. With respect to encountering worse-case conditions, a change in barometric pressure can promote a modest "barometric pumping" action, where higher pressure gases in the subsurface migrate to

lower pressure overlying areas (including buildings). Also, moderate rainfall in the preceding days of a sampling event, moderate to high wind speeds around a building and hot forced air heating and cooling systems cycling on and off within a building during the sampling event could promote movement of subsurface vapors into a building. Meteorological data were obtained from the Norwood Memorial Airport in Norwood, MA using the following NOAA web Site, https://www.ncdc.noaa.gov/cdo-web/. The airport is approximately 15 miles southeast of Ashland, MA where sampling took place.

The tables provided on the following pages show the daily weather conditions for March 25 – 30, 2018; followed by a summary table showing the average 24-hour meteorological conditions for each day during this period. These data include: temperature, relative humidity, wind direction, wind speed, atmospheric pressure and precipitation amounts. Thirty-three hours prior to the first sampling event that began on March 26 at 9:59, 0.09 inches of precipitation were recorded. From the start of the first sampling event until the end of the last sampling event on March 30 at 17:14, 0.06 inches of precipitation were recorded. As a result, the soil pore spaces potentially contained very little moisture prior to and during the sampling event. Therefore, soil gases potentially had accumulated in the soil pore spaces and migrated into the building, if a pathway existed. The average wind speed recorded throughout the week sampling was performed was 5 mph, ranging from 0 to 17 mph, which probably did not have an effect on promoting the movement of subsurface vapors into the structure. The barometric pressure steadily decreased from 30.70 inches of mercury beginning at 9:53 on 3/26/18 to 29.66 inches of mercury at 16:53 on 5/30/18. Changes in barometric pressure over this period of time may have caused soil gases to begin moving out of the soil pore spaces and potentially into the building, if a pathway existed. Buildings with furnaces that force hot air throughout the building were most likely operational during the sampling period. As a result, of the system cycling on and off could promote the movement of subsurface vapors into a building.

NORWOOD MUNICIPAL AIRPORT
NORWOOD, MA
3/25/2018

Time	Temperature (F)	Relative Humidity (%)	Wind Speed (MPH)	Wind Direction (Degrees)	Wind Gusts (MPH)	Atmospheric Pressure (in. hg)	Precipitation (Inches)
0:53	37	86	5	330		30.15	Trace
1:53	37	86	3	330		30.16	Trace
2:53	36	93	6	360		30.17	0.02
3:53	36	89	8	20		30.20	0.03
4:53	36	89	7	20		30.23	0.04
5:53	35	89	7	40	20	30.26	Trace
6:53	36	82	10	10		30.30	Trace
7:53	36	73	9	20		30.33	Trace
8:53	36	73	7	360		30.36	
9:53	36	70	14	10	21	30.39	
10:53	37	62	14	20	22	30.41	
11:53	37	57	15	40	22	30.42	
12:53	37	57	11	30	20	30.43	
13:53	39	55	16	30	21	30.44	Trace
14:53	39	48	11	20	24	30.44	Trace
15:53	37	50	13	30	25	30.46	
16:53	37	54	8	40		30.47	
17:53	36	57	6	50		30.49	
18:53	35	59	0	Calm		30.50	
19:53	31	69	0	Calm		30.53	
20:53	29	82	0	Calm		30.53	
21:53	28	85	0	Calm		30.54	
22:53	27	85	0	Calm		30.55	
23:53	27	85	0	Calm		30.56	
Average	35	72	7	98		30.39	Total 0.09

NORWOOD MUNICIPAL AIRPORT
NORWOOD, MA
3/26/2018

Time	Temperature (F)	Relative Humidity (%)	Wind Speed (MPH)	Wind Direction (Degrees)	Wind Gusts (MPH)	Atmospheric Pressure (in. hg)	Precipitation (Inches)
0:53	30	82	5	340		30.58	
1:53	31	79	3	350		30.58	
2:53	32	75	5	350		30.57	
3:53	30	79	5	360		30.58	
4:53	30	79	3	360		30.6	
5:53	30	79	3	340		30.62	
6:53	34	70	6	360		30.65	
7:53	38	62	11	20	17	30.66	
8:53	39	55	11	40	21	30.68	
9:53	40	47	17	50	24	30.7	
10:53	42	43	13	Variable	24	30.69	
11:53	43	38	15	40	24	30.69	
12:53	42	41	17	50	22	30.69	
13;53	42	43	13	60	22	30.68	
14:53	41	41	11	60	21	30.66	
15:53	40	30	13	40	22	30.66	
16:53	39	38	10	60		30.65	
17:53	37	48	7	70		30.65	
18:53	35	50	0	Calm		30.66	
19:53	30	66	0	Calm		30.67	
20:53	29	72	0	Calm		30.67	
21:53	27	75	0	Calm		30.67	
22:53	26	81	0	Calm		30.66	
23:53	26	81	0	Calm		30.63	
Average	35	61	7	174		30.65	Total 0

NORWOOD MUNICIPAL AIRPORT
NORWOOD, MA
3/27/2018

Time	Temperature (F)	Relative Humidity (%)	Wind Speed (MPH)	Wind Direction (Degrees)	Wind Gusts (MPH)	Atmospheric Pressure (in. hg)	Precipitation (Inches)
0:53	24	84	0	Calm		30.61	
1:53	23	88	0	Calm		30.58	
2:53	24	84	0	Calm		30.57	
3:53	24	84	0	Calm		30.56	
4:53	22	89	3	200		30.56	
5:53	23	85	0	Calm		30.57	
6:53	31	79	0	Calm		30.57	
7:53	37	62	5	10		30.54	
8:53	42	36	10	40		30.53	
9:53	44	43	10	10	17	30.51	
10:53	45	34	9	50		30.48	
11:53	47	30	9	70		30.44	
12:53	46	35	6	Variable		30.41	
13:53	48	28	6	Variable		30.38	
14:53	48	41	9	80		30.34	
15:53	46	42	8	50		30.31	
16:53	44	49	6	90		30.28	
17:53	41	49	5	50		30.26	
18:53	39	55	3	80		30.23	
19:53	38	60	5	290		30.24	
20:53	38	60	0	Calm		30.22	
21:53	36	67	0	Calm		30.18	
22:53	37	70	0	Calm		30.16	
23:53	37	70	0	Calm		30.15	
Average	37	59	4	85		30.40	Total 0

NORWOOD MUNICIPAL AIRPORT
NORWOOD, MA
3/28/2018

Time	Temperature (F)	Relative Humidity (%)	Wind Speed (MPH)	Wind Direction (Degrees)	Wind Gusts (MPH)	Atmospheric Pressure (in. hg)	Precipitation (Inches)
0:53	38	65	3	250		30.10	
1:53	38	68	3	170		30.06	
2:53	39	65	0	Calm		30.05	
3:53	38	79	0	Calm		30.05	
4:53	38	76	0	Calm		30.05	Trace
5:53	37	86	0	Calm		30.02	0.01
6:53	38	89	0	Calm		30.00	
7:53	41	70	3	180		30.00	
8:53	44	53	5	210		29.99	
9:53	46	46	5	170		29.99	
10:53	49	48	7	230		29.96	
11:53	52	47	9	210		29.93	
12:53	55	45	7	300		29.92	
13:53	57	44	5	Variable		29.89	
14:53	59	42	3	330		29.88	
15:53	60	44	7	260		29.88	
16:53	60	44	3	210		29.89	
17:53	59	46	3	230		29.90	
18:53	51	61	3	150		29.92	
19:53	47	69	3	150		29.94	
20:53	44	76	3	180		29.96	
21:53	42	85	0	Calm		29.95	
22:53	38	89	0	Calm		29.96	
23:53	37	93	0	Calm		29.97	
Average	46	64	3	215		29.97	Total 0.01

NORWOOD MUNICIPAL AIRPORT
NORWOOD, MA
3/29/2018

Time	Temperature (F)	Relative Humidity (%)	Wind Speed (MPH)	Wind Direction (Degrees)	Wind Gusts (MPH)	Atmospheric Pressure (in. hg)	Precipitation (Inches)
0:53	37	89	0	Calm		29.97	
1:53	36	89	0	Calm		29.96	
2:53	34	92	0	Calm		29.97	
3:53	34	92	0	Calm		29.97	
4:53	32	96	0	Calm		29.99	
5:53	33	92	0	Calm		30.00	
6:53	39	96	0	Calm		30.02	
7:53	46	73	0	Calm		30.02	
8:53	51	56	3	Variable		30.03	
9:53	54	49	6	100		30.02	
10:53	57	45	6	60		29.99	
11:53	58	46	5	330		30.00	
12:53	55	51	6	40		29.99	
13:53	60	46	3	Variable		29.95	
14:53	59	58	7	180		29.96	
15:53	53	61	7	40		29.94	
16:53	52	61	5	360		29.94	
17:53	50	74	0	Calm		29.95	Trace
18:53	49	83	0	Calm		29.92	Trace
19:53	49	86	0	Calm		29.92	
20:53	51	80	7	150		29.89	
21:53	50	89	7	170		29.86	
22:53	50	93	3	140		29.83	
23:53	50	96	0	Calm		29.81	
Average	47	75	3	157		29.95	Total 0

NORWOOD MUNICIPAL AIRPORT
NORWOOD, MA
3/30/2018

Time	Temperature (F)	Relative Humidity (%)	Wind Speed (MPH)	Wind Direction (Degrees)	Wind Gusts (MPH)	Atmospheric Pressure (in. hg)	Precipitation (Inches)
0:53	51	92	0	Calm		29.77	
1:53	52	97	6	170		29.73	
2:53	52	97	8	170		29.68	
3:53	52	97	8	180	17	29.65	
4:53	53	93	7	200		29.65	
5:53	54	93	7	200		29.65	
6:53	55	90	8	190		29.65	
7:53	56	90	10	210		29.64	
8:53	58	87	8	210		29.64	Trace
9:53	62	80	13	220		29.64	
10:53	67	73	10	210	17	29.63	
11:53	65	78	8	280		29.63	Trace
12:53	65	78	8	270		29.61	
13:53	61	87	13	280		29.62	0.04
14:53	59	83	5	250		29.62	0.01
15:53	61	78	7	300		29.63	Trace
16:53	59	75	8	310		29.66	
17:53	55	74	15	300	22	29.69	
18:53	53	77	8	290		29.73	Trace
19:53	50	74	8	320		29.76	0.01
20:53	50	66	7	330		29.78	
21:53	50	59	10	320		29.81	
22:53	49	59	10	330		29.84	
23:53	47	61	9	320		29.88	
Average	56	81	8	255		29.69	Total 0.06

Date	Temp. (F)	Relative Humidity (%)	Wind Speed (mph)	Wind Direction	Barometric Pressure (inches Hg)
3/25/18	35	72	7	ESE	30.39
3/26/18	35	61	7	SSE	30.65
3/27/18	37	59	4	ENE	30.40
3/28/18	46	64	3	SSW	29.97
3/29/18	47	75	3	SSE	29.95
3/30/29	56	81	8	WSW	29.69

7.0 Indoor Air Ambient Air and Soil Gas Sampling Locations and Results

Ambient/Background Air Sample Locations

89 – 91 Pleasant Street

Canister #13492 was collected over a 24-hour period from March 26, 2018 09:59 to March 27, 2018 09:59, outside the house as an ambient air sample, at the south side of the house 6 feet 10 inches above the ground, 8 feet from the southwest corner and 4 feet south of the homes north side.

103 -105 Pleasant Street

Canister #22686 was collected over a 24-hour period from March 28, 2018 10:59 to March 29, 2018 10:59, outside the house as an ambient air sample, at the south side of the house 6 feet 7 inches above the ground and 5 feet from the southeast corner.

90 – 92 Pleasant Street

Canister #15047 was collected over a 24-hour period from March 29, 2018 14:56 to March 30, 2018 14:56, outside the house as an ambient air sample, at the north side of the house approximately 5 feet above the gound and 15 feet from the northeast corner.

118 Main Street

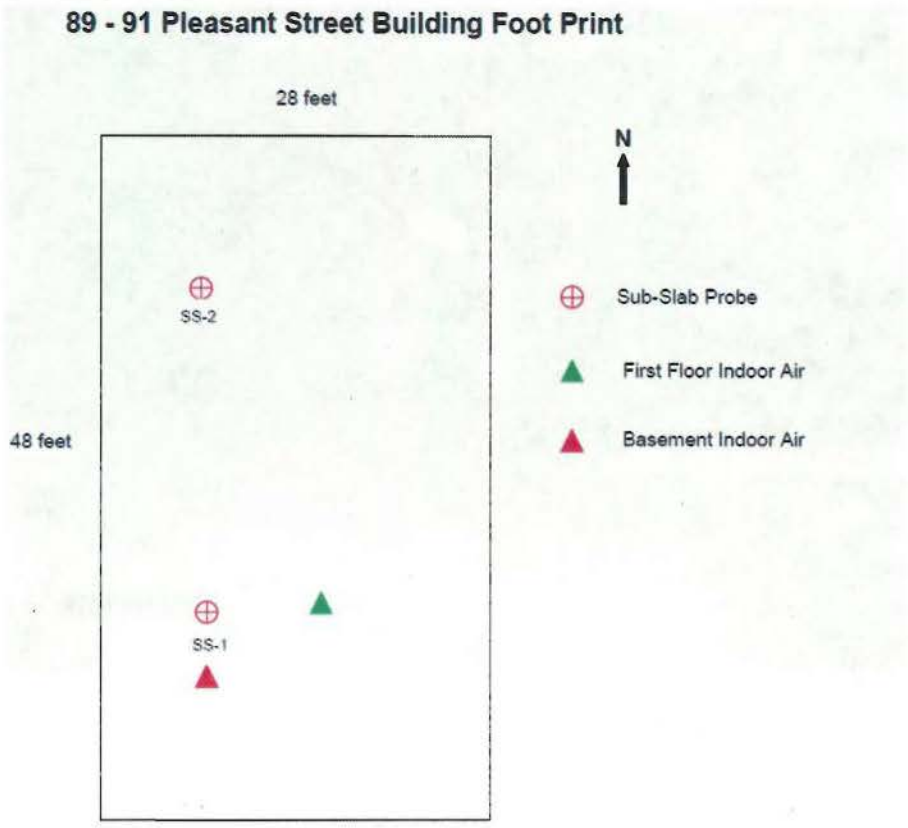
Canister #20858 was collected over an 8-hour period March 28, 2018 from 09:39 to 17:59, outside the front of the church on the southwest corner as an ambient air sample, 5 feet 8 inches above the ground and 6 feet west of the buildings edge.

Ambient/Background Air Sampling Results

The ambient/background air canister sampling results are shown on Table 3, which lists both target and non-target compounds detected above the reporting limits.

Indoor Air and Sub-Slab Soil Gas Sample Locations

89 – 91 Pleasant Street

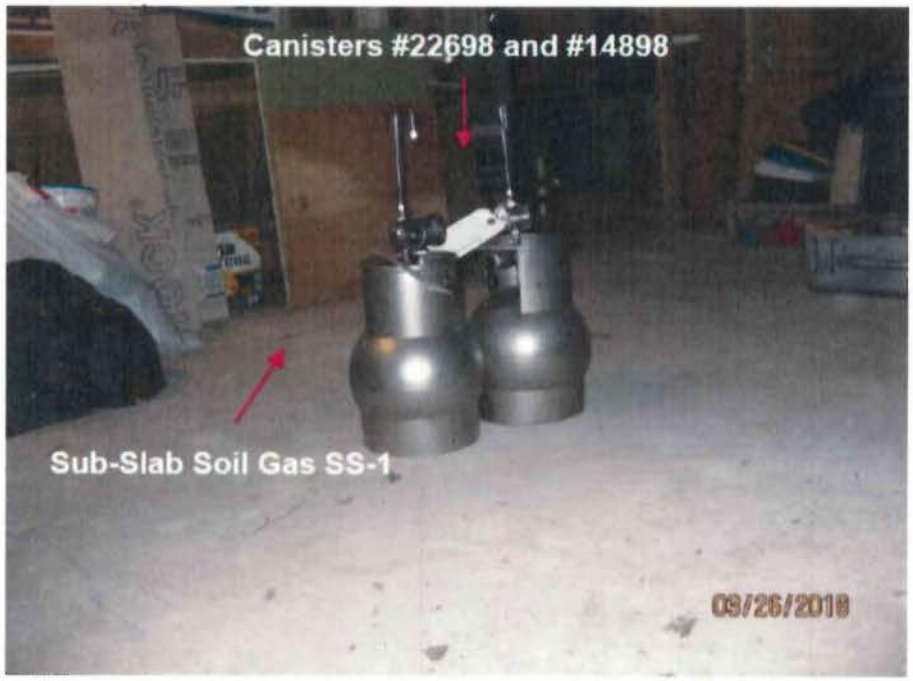


Pleasant St.

Scale: 1 inch = 10 feet

Indoor Air Samples Locations

Canister #22698 and Canister #14898 were collected over a 24-hour period from March 26, 2018 10:02 to March 27, 2018 10:02, in the basement, 1 foot 9 inches above the floor, 7 feet 6 inches from the west exterior wall, 10 feet from the south exterior wall and 3 feet from sub-slab soil gas sample SS-1. Canister #14898 was a duplicate sample collected with canister #22698.



Canister #14898 was collected over a 24-hour period from March 26, 2018 10:05 to March 27, 2018 10:05, in the first floor apartment living room, 3 feet 8 inches above the floor, 15 feet 6 inches from the south exterior wall and 14 feet 8 inches from the east exterior wall.

Air Grab Samples for Field Screening

The concrete slab is cut away in northwest corner of the basement for a sump pump; water was present. Syringe air grab sample #1 was collected in this area on 3/26/18.

In the basement, two small areas (6 inches x 2 inches x 3 inches deep) of concrete cut away where an old furnace was attached. Syringe air grab sample #2 was collected in this area on 3/26/18.

Syringe grab sample #3 was collected at the same location where the 24-hour ambient air canister sample was collected (Canister #13492).

Sub-Slab Soil Gas Sample Locations

SS-1 was collected on 3/26/18, 4 inches below the concrete slab, 7 feet 6 inches from the west exterior wall, 13 feet from the south exterior wall.

SS-2 was collected on 3/26/18, 4 inches below the concrete slab, approximately 6 feet 9 inches from the west exterior wall, approximately 10 feet 6 inches from the north exterior wall. A canister grab sample (Canister #15045) was collected as a confirmation sample and then analyzed at the EPA New England Regional laboratory (NERL).

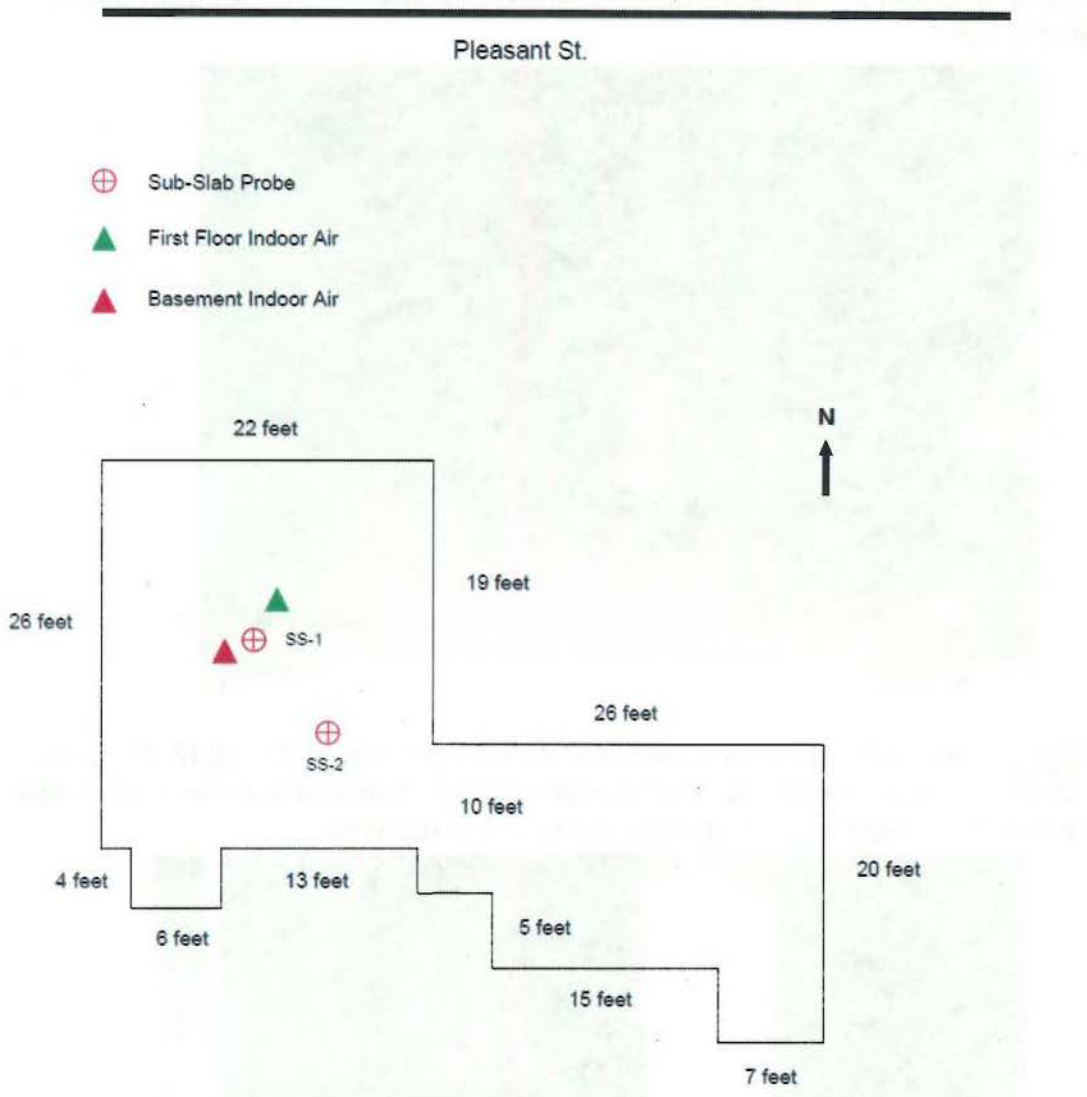
Sampling Results

The indoor air, soil gas canister and ambient air sampling results are shown on Table 4, which lists both target and non-target compounds detected above the reporting limits. Table 14 shows indoor air, ambient air and soil gas canister and grab sampling results for trichloroethene and tetrachloroethene.

To obtain additional information about the building, an Indoor Air Assessment Survey was completed by EPA's contractor, Nobis, which is provided in Appendix C.

106 – 108 Pleasant Street

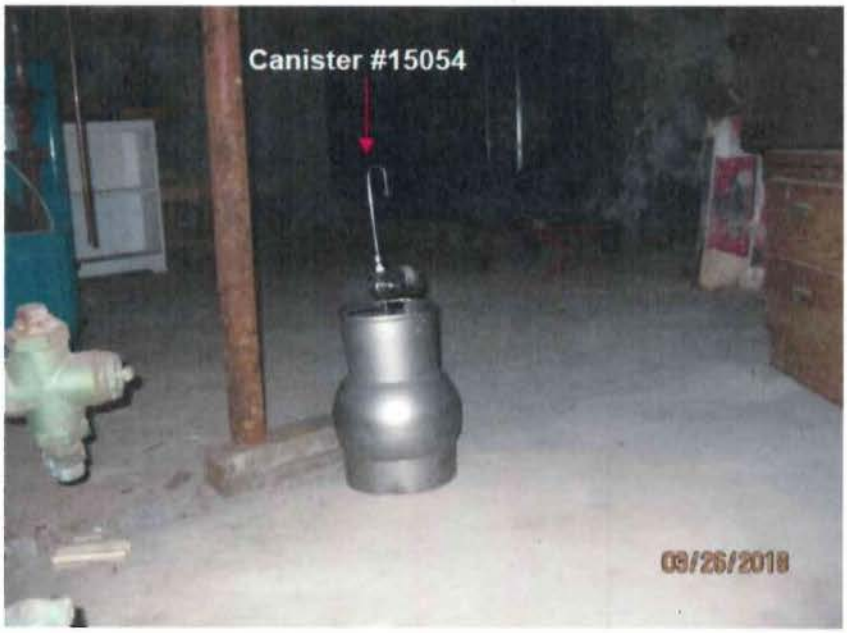
106 - 108 Pleasant Street Building Foot Print



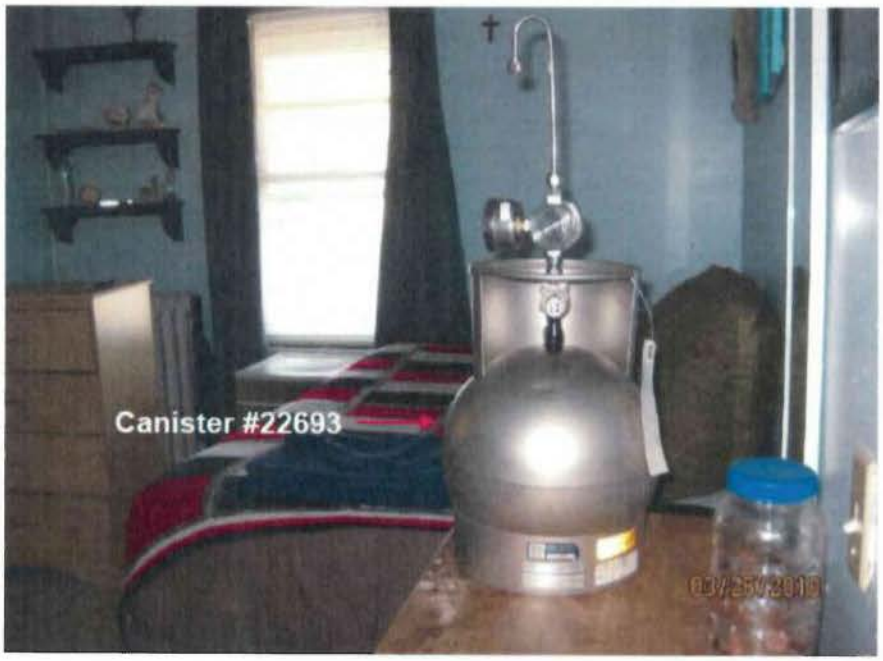
Scale: 1 inch = 10 feet

Indoor Air Samples Locations

Canister #15054 was collected over a 24-hour period from March 26, 2018 12:15 to March 27, 2018 12:15, in the basement, 1 foot 9 inches above the floor, 13 feet from the north exterior wall, 8 feet 6 inches from the west exterior wall and 2 feet from sub-slab soil gas sample SS-1.



Canister #22693 was collected over a 24-hour period from March 26, 2018 12:18 to March 27, 2018 12:18, in one of the first floor bed rooms, 5 feet above the floor, 9 feet from the north exterior wall and 1 foot from the east interior wall.



Air Grab Samples for Field Screening

The concrete slab is cut away in southeast corner of the basment for sump pump; water was present. Syringe air grab sample #1 was collected in this area on 3/26/18.

The concrete slab is cut away in northwest corner of the basement for sump pump; water was present. Syringe air grab sample #2 was collected in this area on 3/26/18.

Sub-Slab Soil Gas Sample Locations

SS-1 was collected on 3/26/18, 4 inches below the concrete slab, 10 feet from the west exterior wall, 12 feet from the north exterior wall.

SS-2 was collected on 3/26/18, 2.5 inches below the concrete slab, 8 feet from the south exterior wall, 15 feet from the west exterior wall. A canister grab sample (Canister #12571) was collected as a confirmation sample and then analyzed at the EPA New England Regional laboratory (NERL).

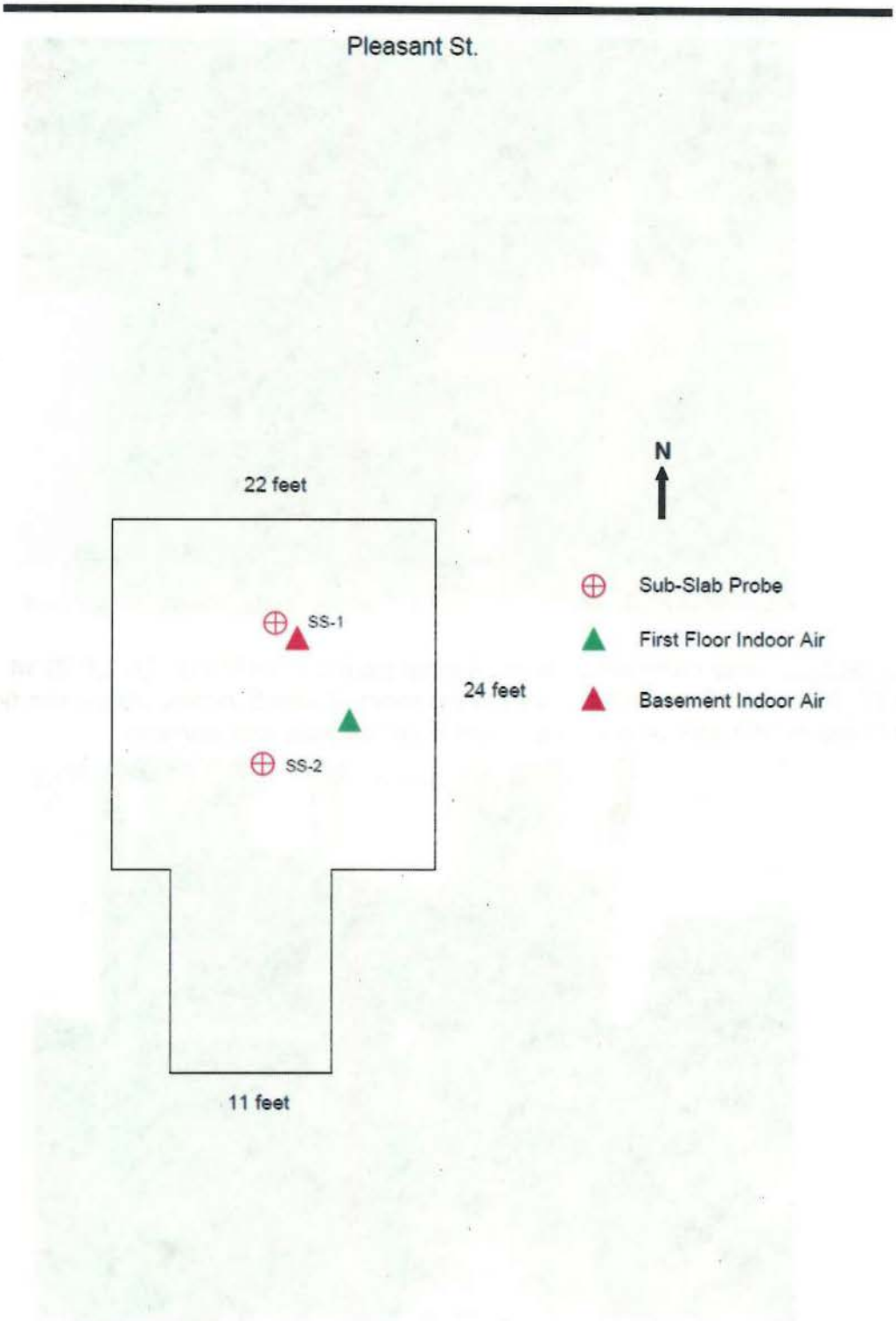
Sampling Results

The indoor air, soil gas canister and ambient air sampling results are shown on Table 5, which lists both target and non-target compounds detected above the reporting limits. Table 15 shows indoor air and soil gas canister and air grab sampling results for trichloroethene and tetrachloroethene.

To obtain additional information about the building, an Indoor Air Assessment Survey was completed by EPA's contractor, Nobis, which is provided in Appendix C.

102 Pleasant Street

102 Pleasant Street Building Foot Print



Scale: 1 inch = 10 feet

Indoor Air Samples Locations

Canister #13484 was collected over a 24-hour period from March 26, 2018 14:20 to March 27, 2018 14:20, in the basement, 1 foot 9 inches above the floor, 9 feet 5 inches from the east exterior wall, 8 feet 1 inches from the north exterior wall and 1 foot 6 inches from sub-slab soil gas sample SS-1.

Canister #22691 was collected over a 24-hour period from March 26, 2018 14:19 to March 27, 2018 14:19, in the first floor living room, 2 feet 5 inches above the floor, 14 feet from the north exterior wall and 6 feet from the east exterior wall.

Air Grab Samples for Field Screening

The concrete slab is cut away under stairs in the basement for sump pump; water was present. Syringe air grab sample #1 was collected in this area on 3/26/18.

The concrete slab is cut away next to boiler in the basement for sump pump; water was present. Syringe air grab sample #2 was collected in this area on 3/26/18.

Sub-Slab Soil Gas Sample Locations

SS-1 was collected on 3/26/18, 5 inches below the concrete slab, 7 feet from the north exterior wall, 10 feet 9 inches from the east exterior wall. A canister grab sample (Canister #22105) was collected as a confirmation sample and then analyzed at the EPA New England Regional laboratory (NERL).

SS-2 was collected on 3/26/18, 3 inches below the concrete slab, 8 feet 4 inches from the south exterior wall, 10 feet 2 inches from the west exterior wall.

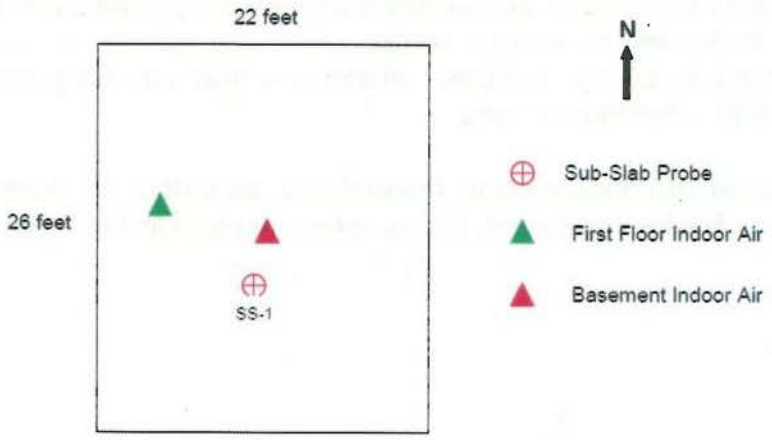
Sampling Results

The indoor air, soil gas canister and ambient air sampling results are shown on Table 6, which lists both target and non-target compounds detected above the reporting limits. Table 16 shows indoor air and soil gas canister and grab sampling results for trichloroethene and tetrachloroethene.

To obtain additional information about the building, an Indoor Air Assessment Survey was completed by EPA's contractor, Nobis, which is provided in Appendix C.

136 Pleasant Street

136 Pleasant Street Building Foot Print



Scale: 1 inch = 10 feet

Indoor Air Samples Locations

Canister #14893 was collected over a 24-hour period from March 26, 2018 15:29 to March 27, 2018 15:29, in the basement, 1 foot 8 inches above the floor, 11 feet 6 inches from the west exterior wall and 12 feet 8 inches from the south exterior wall.

Canister #20859 was collected over a 24-hour period from March 26, 2018 15:30 to March 27, 2018 15:30, in the basement, 4 feet 9 inches above the floor, 10 feet 6 inches from the north exterior wall and 4 feet from the east exterior wall.

Air Grab Samples for Field Screening

The concrete slab is cut away in northwest corner of the basement for sump pump; water was present. Syringe air grab sample #1 was collected in this area on 3/26/18.

Sub-Slab Soil Gas Sample Locations

SS-1 was collected on 3/26/18, 3 inches below the concrete slab, 9 feet 8 inches from the south exterior wall, 11 feet 8 inches from the east exterior wall. A canister grab sample (Canister #13493) was collected as a confirmation sample and then analyzed at the EPA New England Regional laboratory (NERL).

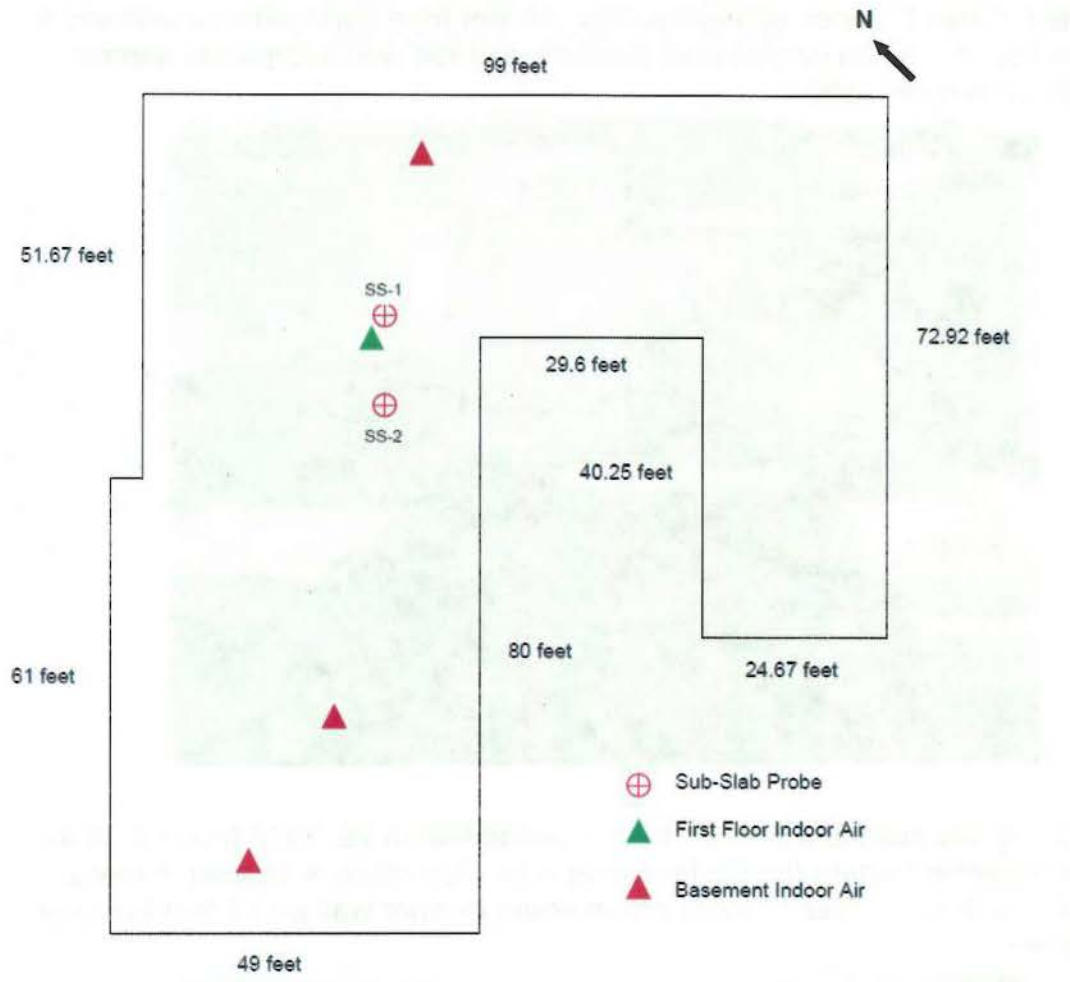
Sampling Results

The indoor air, soil gas canister and ambient air sampling results are shown on Table 7, which lists both target and non-target compounds detected above the reporting limits. Table 17 shows indoor air and soil gas canister and grab sampling results for trichloroethene and tetrachloroethene.

To obtain additional information about the building, an Indoor Air Assessment Survey was completed by EPA's contractor, Nobis, which is provided in Appendix C.

118 Main Street

118 Main Street Building Foot Print

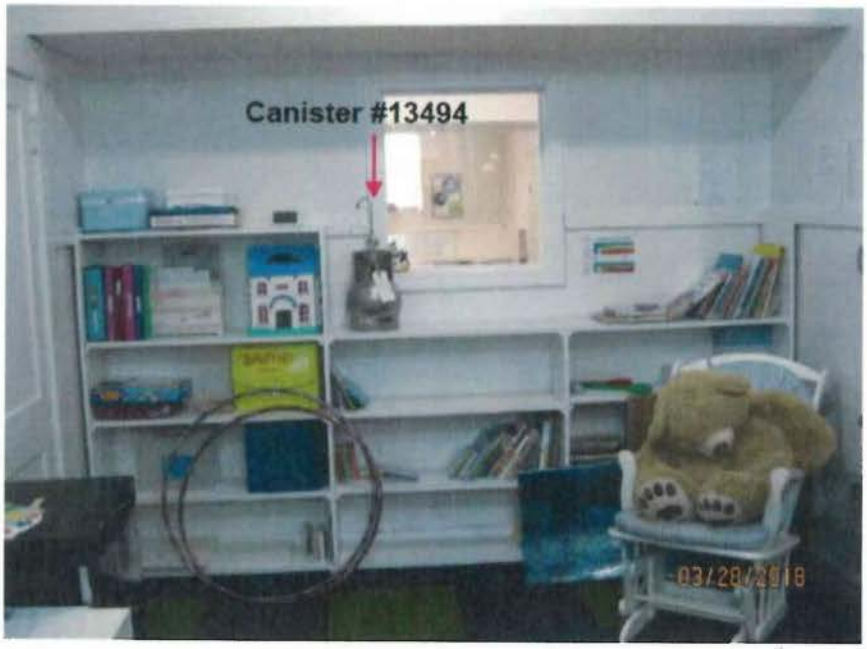


Scale: 1 inch = 20 feet

Indoor Air Samples Locations

Canister #12563 and Canister #14894 were collected over an 8-hour period March 28, 2018 from 09:36 to 17:36, in the basement where the Cedar Street Kids Club pre-school area is located, 5 feet 7 inches above the floor, 18 feet from north exterior wall and 9 feet 6 inches from the south interior wall. Canister #14894 was a duplicate sample collected with canister #12563.

Canister #13494 was collected over an 8-hour period March 28, 2018 from 09:35 to 17:35, in the basement where the Cedar Street Kids Club office is located, 5 feet 2 inches above the floor, 17 feet 10 inches from south exterior wall and 7 feet from the north interior wall.



Canister #22153 was collected over an 8-hour period March 28, 2018 from 09:33 to 17:33, in the basement where the church as a long room (14 feet 6 inches x 71 feet 1 inch) that can be sectioned off into three separate rooms for over night guests. The sample was located 3 feet above the floor, 8 feet from the east exterior wall, 6 feet 6 inches from the west interior wall, 37 feet 1 inches from the north exterior wall and 34 feet from the south interior wall.

Canister #22688 was collected over an 8-hour period March 28, 2018 from 09:31 to 17:31, in the first floor church office, 6 feet above the floor, 14 feet 1 inch from the south exterior wall, 10 feet 5 inches from the east interior wall, 6 feet 5 inches from the west interior wall, and 1 foot 10 inches from north interior wall.

Air Grab Samples for Field Screening

No air grab samples were collected from this building.

Sub-Slab Soil Gas Sample Locations

SS-1 was collected on 3/28/18, in a basement storage room, 5 inches below the concrete slab, 4 feet 9 inches from the west exterior wall, 5 feet 2 inches from the north interior wall, 11 feet from the south interior wall, 3 feet 11 inches from the east interior wall . A canister grab sample (Canister #15048) was collected as a confirmation sample and then analyzed at the EPA New England Regional laboratory (NERL).

SS-2 was collected on 3/28/18, in the basement boiler room, 4 inches below the concrete slab, 3 feet 7 inches from the north interior wall, 12 feet 3 inches from the east exterior wall.

Sampling Results

The indoor air, soil gas canister and ambient air sampling results are shown on Table 9, which lists both target and non-target compounds detected above the reporting limits. Table 18 shows indoor air and soil gas canister and grab sampling results for trichloroethene and tetrachloroethene.

To obtain additional information about the building, an Indoor Air Assessment Survey was completed by EPA's contractor, Nobis, which is provided in Appendix C.

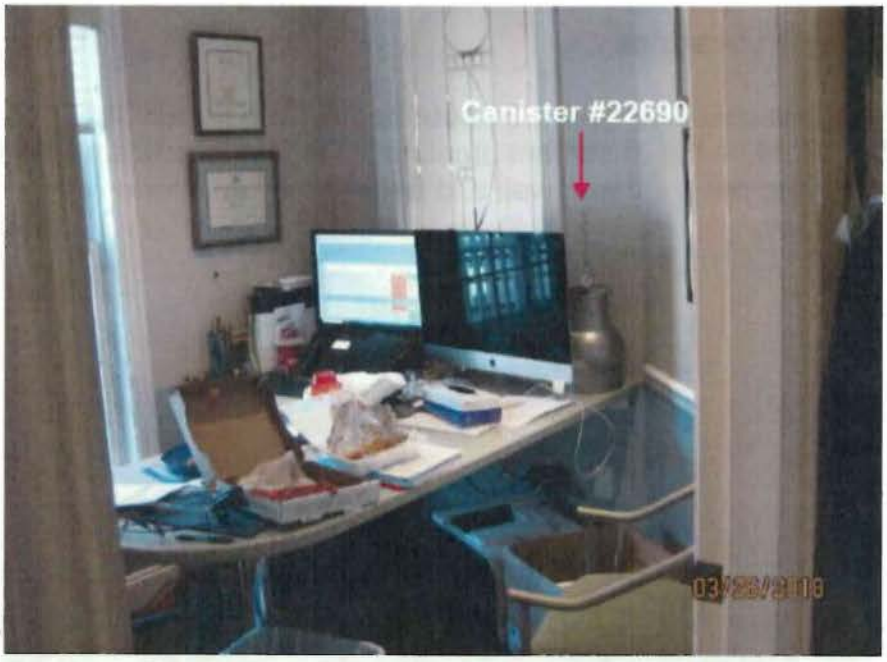
37 Main Street

No building sketch prepared showing sampling locations.

Indoor Air Samples Locations

Canister #15059 was collected over a 24-hour period from March 26, 2018 13:40 to March 27, 2018 13:40, in the basement break room, 4 feet 2 inches above the floor, 1 foot 4 inches from the north exterior wall and 5 feet from wst interior wall.

Canister #22690 was collected over a 24-hour period from March 26, 2018 13:42 to March 27, 2018 13:42, in the first floor office, 4 feet 2 inches above the floor and 2 feet 10 inches from the north exterior wall.



Air Grab Samples for Field Screening

No air grab samples were collected from this building.

Sub-Slab Soil Gas Sample Locations

No sub-slab soil gas samples collected from this building. Building has an installed and functioning sub-slab soil gas mitigation system.

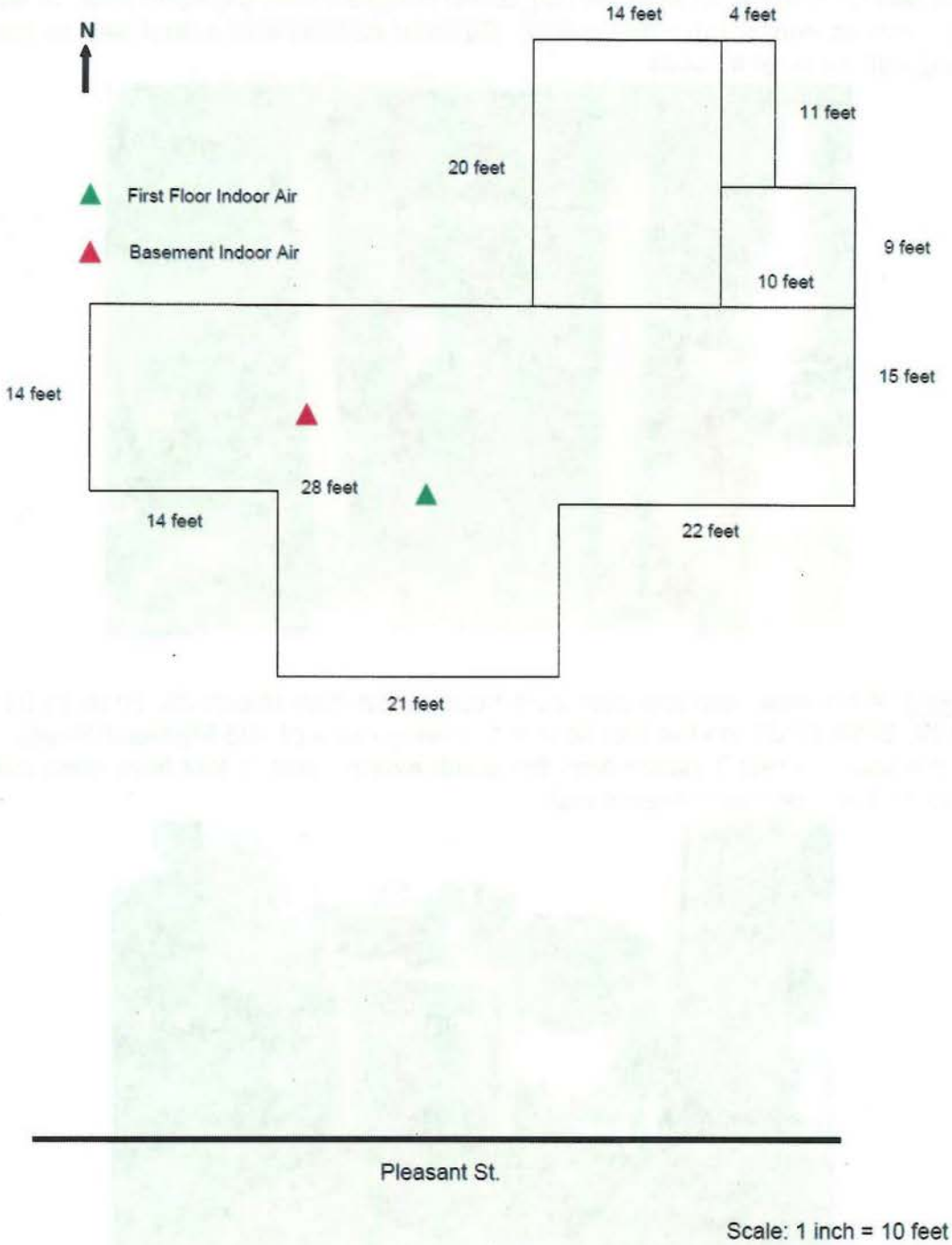
Sampling Results

The indoor air, soil gas canister and ambient air sampling results are shown on Table 8, which lists both target and non-target compounds detected above the reporting limits.

To obtain additional information about the building, an Indoor Air Assessment Survey was completed by EPA's contractor, Nobis, which is provided in Appendix C.

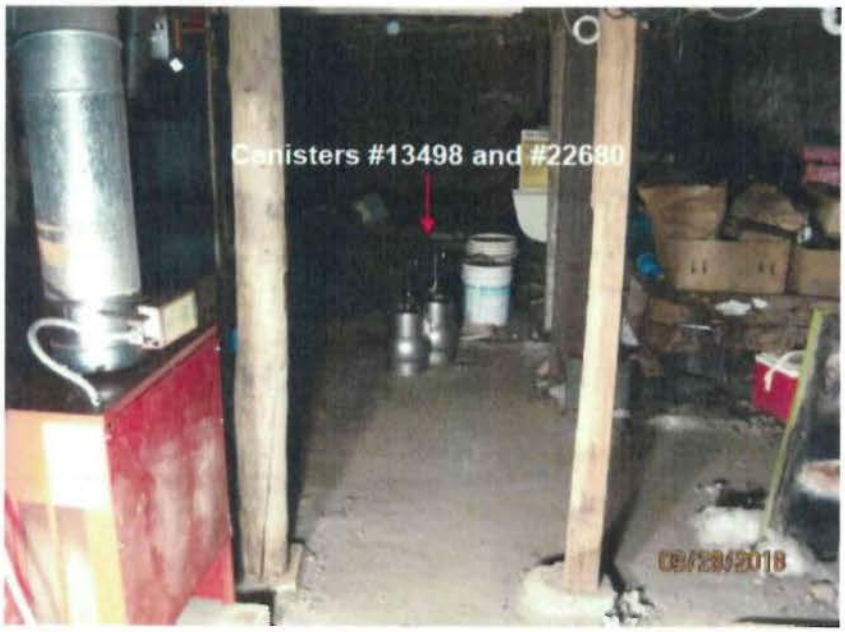
103 - 105 Pleasant Street

103 - 105 Pleasant Street Building Foot Print



Indoor Air Samples Locations

Canister #13498 and Canister #22680 were collected over a 24-hour period from March 28, 2018 11:03 to March 29, 2018 11;03, in the basement, 1 foot 9 inches above the floor, 16 feet from the west exterior wall, 8 feet 6 inches from the north exterior wall and 18 feet 6 inches from south exterior wall. Canister #22680 was a duplicate sample collected with canister #13498.



Canister #14891 was collected over a 24-hour period from March 28, 2018 11:01 to March 29, 2018 11:01, on the first floor in the living room of 103 Pleasant Street, 3 feet above the floor, 13 feet 6 inches from the south exterior wall, 1 foot from north interior wall and 11 feet from west interior wall.

Air Grab Samples for Field Screening

Syringe air grab sample #1 was collected on 3/28/18 at the same location where the 24-hour ambient air canister sample was collected (Canister #22686).

Syringe air grab #2 sample was collected on 3/28/18 where the water line enters at the basement wall/floor interface.

Syringe air grab #3 sample was collected on 3/28/18 where the sewer line enters through basement floor.

Syringe air grab #4 sample was collected on 3/28/18 in the basement at the same location where the 24-hour indoor air canister samples (Canisters #13498 and #22680) were collected.

Sub-Slab Soil Gas Sample Locations

No sub-slab soil gas samples collected; concrete slab was too thin for installing probe.

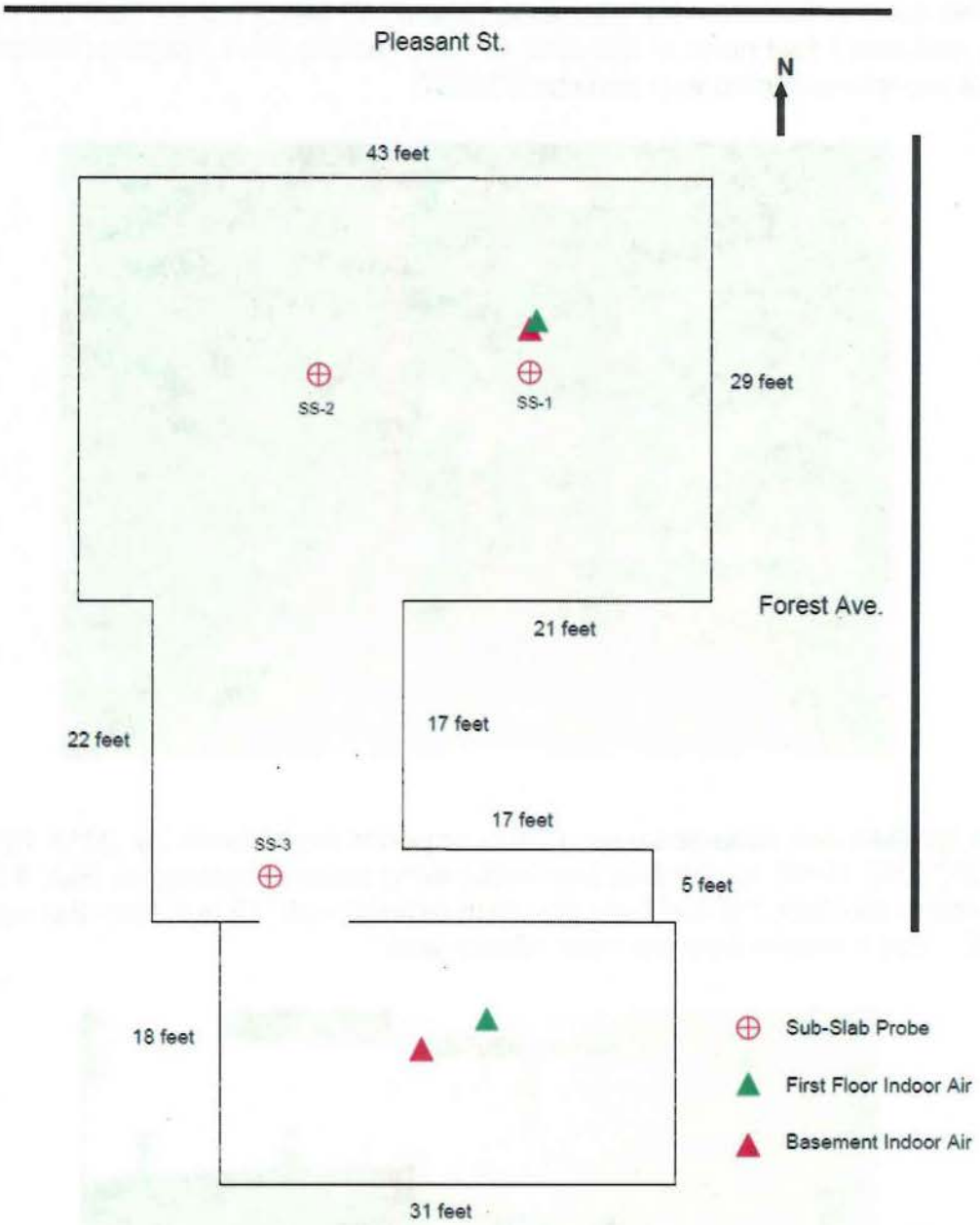
Sampling Results

The indoor air, soil gas canister and ambient air sampling results are shown on Table 10, which lists both target and non-target compounds detected above the reporting limits. Table 19 shows indoor air and soil gas canister and grab sampling results for trichloroethene and tetrachloroethene.

To obtain additional information about the building, an Indoor Air Assessment Survey was completed by EPA's contractor, Nobis, which is provided in Appendix C.

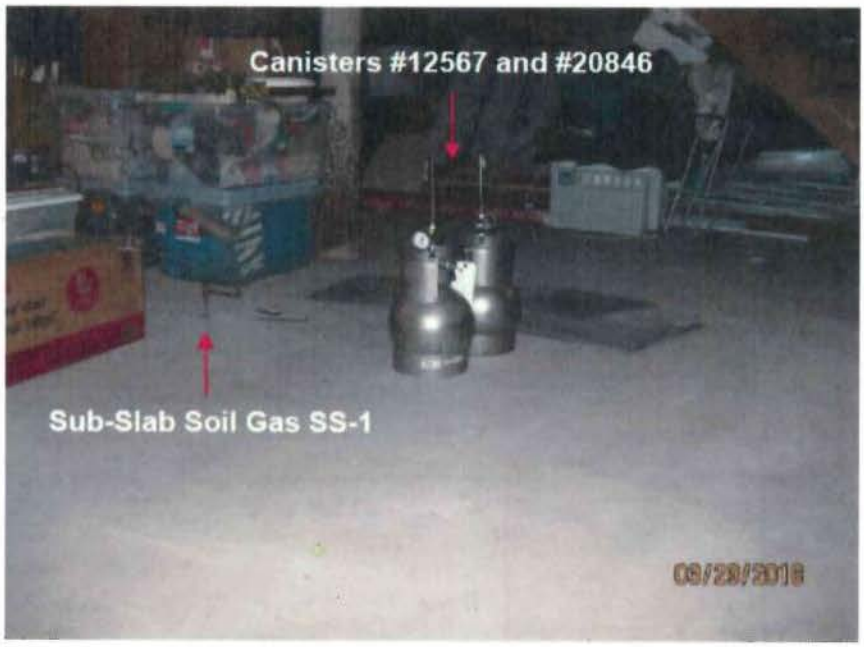
90 - 92 Pleasant Street/3 Forest Avenue

90 – 92 Pleasant Street/3 Forest Avenue Building Foot Print



Indoor Air Samples Locations

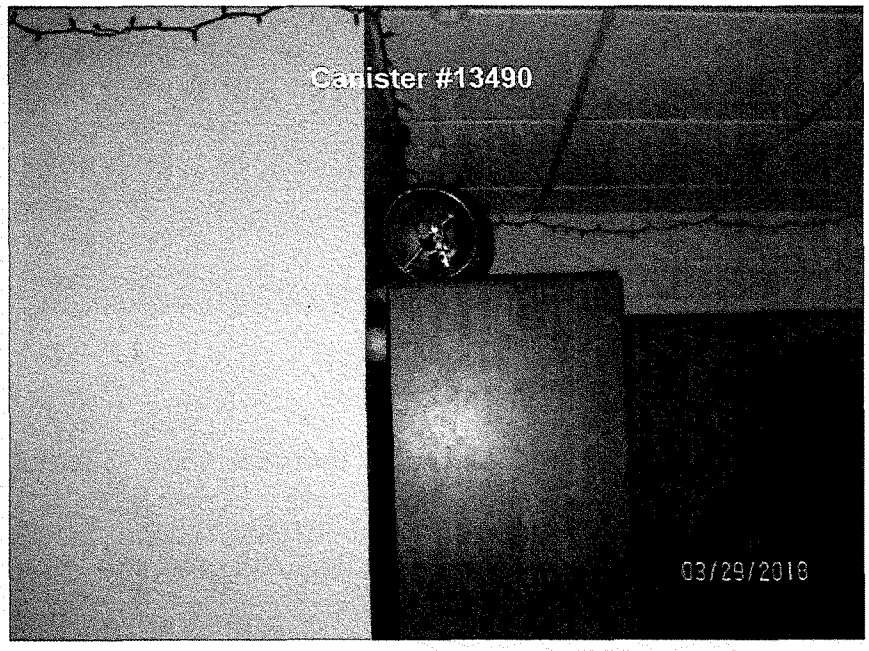
Canister #12567 and Canister #20846 were collected over a 24-hour period from March 29, 2018 15:07 to March 30, 2018 15:07, in the basement area #1, 1 foot 8 inches above the floor, 12 feet from the east exterior wall, 10 feet 3 inches from the north exterior wall and 3 feet north of sub-slab soil gas sample SS-1. Canister #20846 was a duplicate sample collected with canister #12567.



Canister #20848 was collected over a 24-hour period from March 29, 2018 15:03 to March 30, 2018 15:03, on the first floor in the living room of apartment 90A, 4 feet 3 inches above the floor, 10 feet from the north exterior wall, 12 feet from the east exterior wall and 1 foot 3 inches from the west interior wall.

Canister #14899 was collected over a 24-hour period from March 29, 2018 15:07 to March 30, 2018 15:07, in the basement area #2 (under 3 Forest Ave.), 3 feet 7 inches above the floor, 6 feet 6 inches from the south exterior wall, 17 feet from the east exterior wall, 9 feet from the north exterior wall and 12 feet from the west exterior wall. The basement area for 90 – 92 Pleasant Street and 3 Forest Avenue are connected to one another. No photo available.

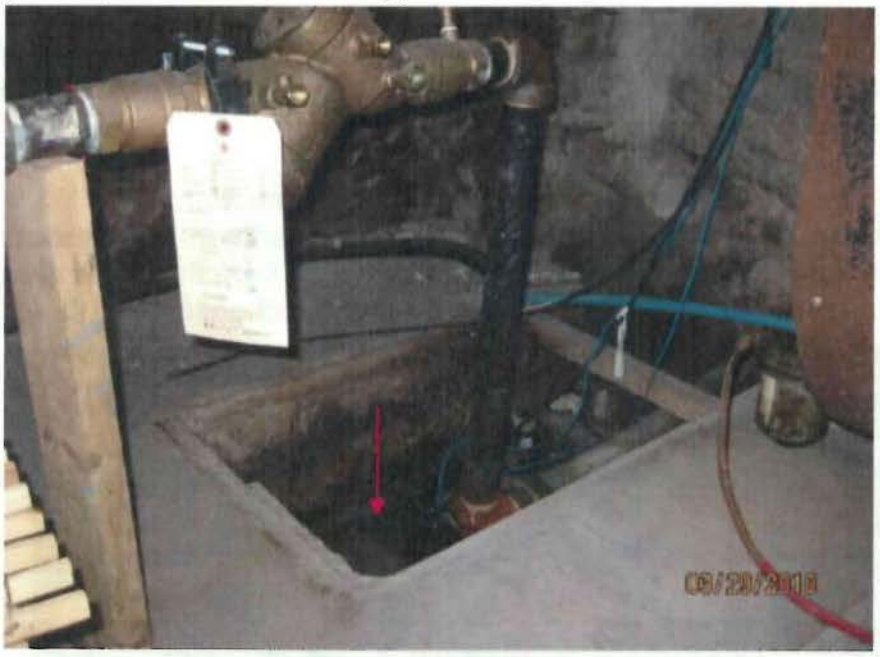
Canister #13490 was collected over a 24-hour period from March 29, 2018 14:59 to March 30, 2018 14:59, in the 3 Forest Ave. first floor apartment living room on top of a book case, 6 feet 1 inch above the floor, 6 feet 2 inches from the east interior wall, 8 feet 7 inches from the west interior wall, and 10 feet 6 inches from south exterior wall.



Air Grab Samples for Field Screening

Syringe air grab sample #1 was collected on 3/29/18 at the same location where the 24-hour ambient air canister sample was collected (Canister #15047).

Syringe air grab sample #2 was collected on 3/29/18 in the basement from a concrete slab cut away area (39" x 19" x 12" deep).



Sub-Slab Soil Gas Sample Locations

SS-1 was collected on 3/29/18, 5 inches below the concrete slab, 13 feet 6 inches from the north exterior wall, 12 feet from the east exterior wall, 12 feet 8 inches from the south exterior wall. A canister grab sample (Canister #20841) was collected as a confirmation sample and then analyzed at the EPA New England Regional laboratory (NERL).

SS-2 was collected on 3/29/18, 5 inches below the concrete slab, 13 feet 8 inches from the north exterior wall, 12 feet 10 inches from the west exterior wall.

SS-3 was collected on 3/29/18, 5 inches below the concrete slab, 8 feet from the west exterior wall, 7 feet 2 inches from the east exterior wall, 13 feet 5 inches from the south wall that is shared with basement partion wall for 3 Forest Ave.

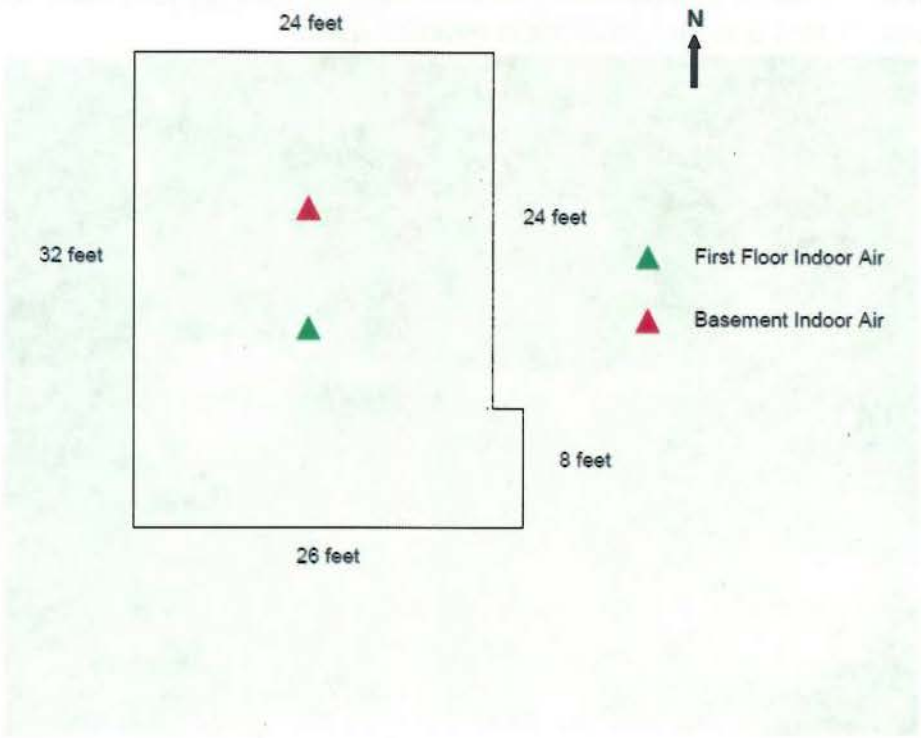
Sampling Results

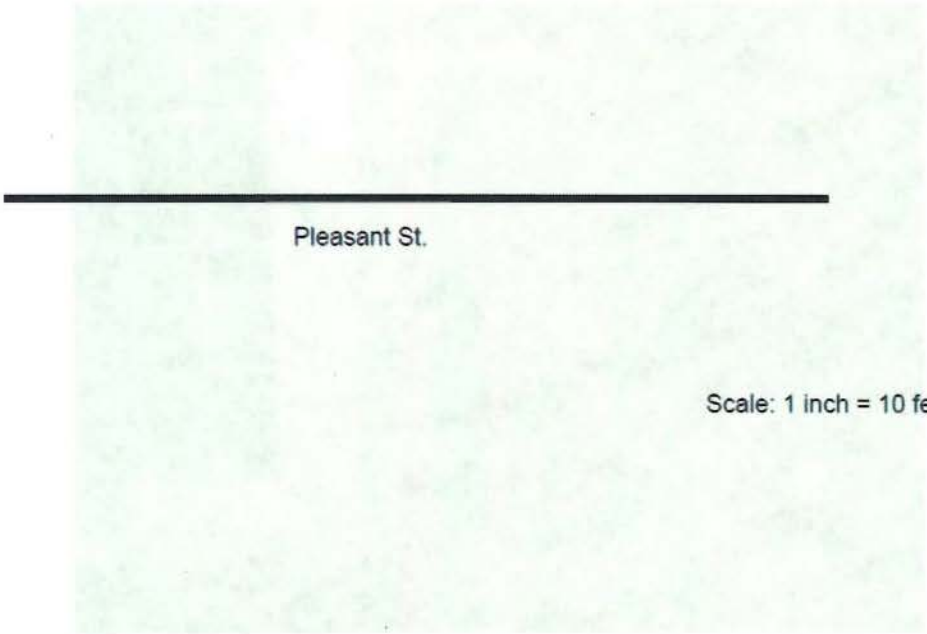
The indoor air, soil gas canister and ambient air sampling results are shown on Table 11, which lists both target and non-target compounds detected above the reporting limits. Table 20 shows indoor air and soil gas canister and grab sampling results for trichloroethene and tetrachloroethene.

To obtain additional information about the building, an Indoor Air Assessment Survey was completed by EPA's contractor, Nobis, which is provided in Appendix C.

153 Pleasant Street

153 Pleasant Street Building Foot Print





Indoor Air Samples Locations

Canister #13497 was collected over a 24-hour period from March 29, 2018 16:10 to March 30, 2018 16:10, in the basement, 1 foot 9 inches above the floor, 11 feet from the east exterior wall, 10 feet 6 inches from the north exterior wall, 20 feet from south exterior wall and 11 feet 6 inches from west exterior wall.

Canister #20844 was collected over a 24-hour period from March 29, 2018 16:11 to March 30, 2018 16:11, in the first floor living room, 3 feet 10 inches above the floor, 13 feet from the south exterior wall and 11 feet 6 inches from the west exterior wall.

Air Grab Samples for Field Screening

Syringe air grab sample #1 was collected on 3/29/18 within a vertical stand pipe located in the basement northeast corner.

Syringe air grab sample #2 was collected on 3/29/18 where an old septic waste pipe enters basement wall in northeast corner.

Sub-Slab Soil Gas Sample Locations

No sub-slab soil gas samples collected; owner did want holes drilled through basement floor.

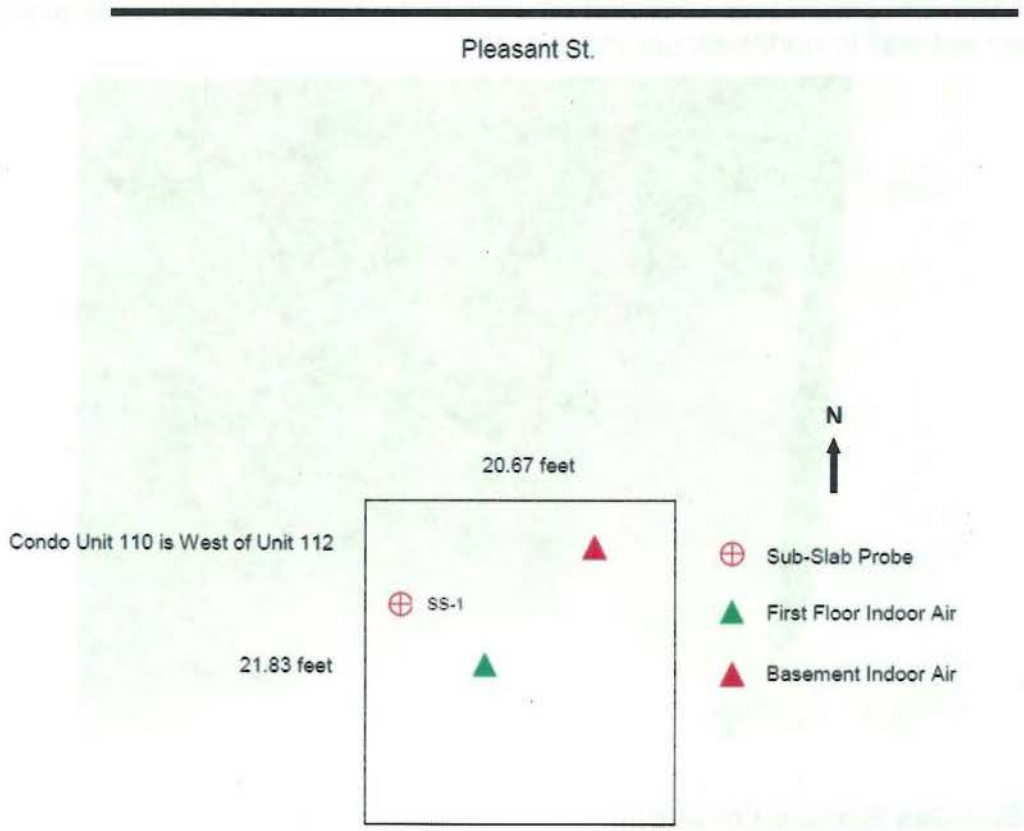
Sampling Results

The indoor air, soil gas canister and ambient air sampling results are shown on Table 12, which lists both target and non-target compounds detected above the reporting limits. Table 21 shows indoor air and soil gas canister and grab sampling results for trichloroethene and tetrachloroethene.

To obtain additional information about the building, an Indoor Air Assessment Survey was completed by EPA's contractor, Nobis, which is provided in Appendix C.

112 Pleasant Street

112 Pleasant Street Basement Inside Dimensions
(one unit of duplex)



Indoor Air Samples Locations

Canister #22679 was collected over a 24-hour period from March 29, 2018 17:13 to March 30, 2018 17:13, in the basement, 3 feet 8 inches above the floor, 17 feet 8 inches from the south exterior wall, 6 feet from the north exterior wall and 16 feet 4 inches from west exterior wall.

Canister #22689 was collected over a 24-hour period from March 29, 2018 17:14 to March 30, 2018 17:14, in the first floor living room, 4 feet 3 inches above the floor, 8 feet from the west exterior wall, 11 feet 3 inches from the north exterior wall and 14 feet 3 inches from the south exterior wall.

Air Grab Samples for Field Screening

The concrete slab is cut away in the southwest corner of the basement for sump pump; water was present. Syringe air grab sample #1 was collected in this area on 3/29/18.

Sub-Slab Soil Gas Sample Locations

SS-1 was collected on 3/29/18, 5 inches below the concrete slab, 18 feet 4 inches from the west exterior wall, 15 feet from the south exterior wall. A canister grab sample (Canister #13501) was collected as a confirmation sample and then analyzed at the EPA New England Regional laboratory (NERL).

Sampling Results

The indoor air, soil gas canister and ambient air sampling results are shown on Table 13, which lists both target and non-target compounds detected above the reporting limits. Table 22 shows indoor air and soil gas canister and grab sampling results for trichloroethene and tetrachloroethene.

To obtain additional information about the building, an Indoor Air Assessment Survey was completed by EPA's contractor, Nobis, which is provided in Appendix C

TABLES
(attached separate file)

Table 1 EPA Method TO15 VOC List
Table 2A Duplicate Sampling Results, March 26 – 27, 2018
Table 2B Duplicate Sampling Results, March 28, 2018
Table 2C Duplicate Sampling Results, March 28 – 29, 2018
Table 2D Duplicate Sampling Results, March 29 – 30, 2018
Table 3 Ambient/Background Air Data Summary
Table 4 89 -91 Pleasant St. Indoor Air, Ambient Air and Soil Gas Canister Results Summary
Table 5 106 – 108 Pleasant St. Indoor Air, Ambient Air and Soil Gas Canister Results Summary
Table 6 102 Pleasant St. Indoor Air, Ambient Air and Soil Gas Canister Results Summary
Table 7 136 Pleasant St. Indoor Air, Ambient Air and Soil Gas Canister Results Summary
Table 8 37 Main St. Indoor Air and Ambient Air Canister Results Summary
Table 9 118 Main St. Indoor Air, Ambient Air and Soil Gas Canister Results Summary
Table 10 103 Pleasant St. Indoor Air, Ambient Air and Soil Gas Canister Results Summary
Table 11 90 – 93 Pleasant St./3Forest Ave. Indoor Air, Ambient Air and Soil Gas Canister Results Summary
Table 12 153 Pleasant St. Indoor Air, Ambient Air and Soil Gas Canister Results Summary
Table 13 112 Pleasant St. Indoor Air, Ambient Air and Soil Gas Canister Results Summary
Table 14 89 -91 Pleasant St. Soil Gas, Indoor Air, and Ambient Air Mobile Laboratory and Canister GC/MS Data
Table 15 106 - 108 Pleasant St. Soil Gas and Indoor Air Mobile Laboratory and Canister GC/MS Data
Table 16 102 Pleasant St. Soil Gas and Indoor Air Mobile Laboratory and Canister GC/MS Data
Table 17 136 Pleasant St. Soil Gas and Indoor Air Mobile Laboratory and Canister GC/MS Data
Table 18 118 Main St. Soil Gas Mobile Laboratory and Canister GC/MS Data
Table 19 103 Pleasant St. Indoor Air, Ambient Air and Soil Gas Canister Results Summary
Table 20 90 - 92 Pleasant St. Indoor Air, Ambient Air and Soil Gas Canister Results Summary
Table 21 153 Pleasant St. Indoor Air Canister Results Summary
Table 22 112 Pleasant St. Indoor Air Mobile Laboratory and Canister GC/MS Data

APPENDIX A

Laboratory Analytical Reports
(attached separate file)

APPENDIX B

Mobile Laboratory Analytical Report
(attached separate file)

APPENDIX C

Indoor Air Assessment Surveys
(attached separate file)

APPENDIX C

Compound Product Use Description

COMPOUND	PRODUCT USE
1, 1,1-trichloroethane	no 1,1,1-trichloroethane is supposed to be manufactured for domestic use in the US after January 1, 2002; it had many industrial and household uses, including use as a solvent to dissolve other substances, such as glues and paints, to remove oil or grease from manufactured metal parts and as an ingredient of household products such as spot cleaners, glues, and aerosol sprays
1,1,2,2-tetrachloroethane	in the past was used in large amounts to produce other chemicals, as an industrial solvent to clean and degrease metals and as an ingredient in paints and pesticides; commercial production for these uses has stopped in the US, presently used only as a chemical intermediate in the production of other chemicals
1,1,2-trichloroethane	used as a solvent and as an intermediate in the production of the chemical 1,1-dichloroethane; is sometimes present as an impurity in other chemicals and it may be formed when another chemical breaks down in the environment under conditions where there is no air
1,1-dichloroethane	in the past was used as a surgical anesthetic, but it is no longer used this way; today it is used primarily to make other chemicals, to dissolve substances such as paint, varnish, and finish removers, and to remove grease
1,1-dichloroethylene	used to make certain plastics, such as flexible films like food wrap and in packaging materials; used to make flame retardant coatings for fiber and carpet backings and in piping, coating for steel pipes and in adhesive applications
1,2,4-trichlorobenzene	used as a solvent to make dyes, pesticides and other chemicals, added to dielectric fluids, transformer oils, cleaners, and lubricants; a gasoline additive; occurs naturally in coal tar and petroleum
1, 2, 4-trimethylbenzene	used as an industrial solvent, paint thinner and in the manufacture of dyes, perfumes, resins, chemical intermediates and pharmaceuticals; enters the environment primarily from gasoline evaporation and as an emission from gasoline-powered vehicles, municipal waste-treatment plants, and coal-fired power stations; emitted from many building materials including: vinyl & rubber molding, particle board, linoleum tile, tar paper, telephone cable, latex paint, foam & duct insulation, urethane sealant, adhesives, latex caulk, and carpet occurs
1,2-dibromoethane	manufactured chemical and also occurs naturally in small amounts in the ocean where it is formed, probably by algae and kelp; used as a pesticide in soil and on citrus, vegetable and grain crops, most of these uses have been stopped by the EPA since 1984; was used as an additive in leaded gasoline, however since leaded gasoline is now banned, it is no longer used for this purpose; uses today include treatment of logs for termites and beetles, control of moths in beehives, as a solvent, as a preparation for dyes and waxes and in waterproofing preparations
1,2-dichlorobenzene	used as a fumigant, solvent, chemical intermediate and to make insecticides
1,2-dichloroethane	manufactured chemical that is not found naturally in the environment; most common use is in the production of vinyl chloride which is used to make a variety of plastic and vinyl products including PVC pipes, furniture and automobile upholstery, wall coverings, house wares and automobile parts; used as a solvent, fumigant, degreaser, paint thinner; added to leaded gasoline to remove lead

COMPOUND	PRODUCT USE
1,2-dichloropropane	does not occur naturally in the environment; production in the US has declined over the past 20 years; was used in the past as a soil fumigant, chemical intermediate and industrial solvent and was found in paint strippers, varnishes and furniture finish removers; most of these uses were discontinued; today used as a chemical intermediate to make perchloroethylene and several other related chlorinated chemical
1, 3, 5-trimethylbenzene	used as an industrial solvent, paint thinner and in the manufacture of dyes, perfumes, resins, chemical intermediates and pharmaceuticals; enters the environment primarily from gasoline evaporation and as an emission from gasoline-powered vehicles, municipal waste-treatment plants, and coal-fired power stations; emitted from many building materials including: vinyl & rubber molding, particle board, linoleum tile, tar paper, telephone cable, latex paint, foam & duct insulation, urethane sealant, adhesives, latex caulk and carpet
1, 3-butadiene	made from the processing of petroleum; about 75% manufactured is used to make synthetic rubber, which is widely used for tires on cars and trucks; used to make plastics including acrylics; small amounts are found in gasoline, automobile exhaust, cigarette smoke and wood fires
1,3-dichlorobenzene	used to make herbicides, insecticides, medicine and dyes
1,4-dichlorobenzene	used as a fumigant to control mildew and mold; used to make insecticides
2-hexanone	used in the past in paint and paint thinner, to make other chemical substances and to dissolve oils and waxes; no longer made or used in the US because it has harmful health effects; formed as a waste product resulting from industrial activities such as making wood pulp and producing gas from coal and in oil shale operations
4-ethyltoluene	man-made chemical used principally as an additive to petroleum; used as a solvent in a variety of industrial, agricultural and domestic products; major release route to the atmosphere is from evaporation of petroleum during production, transport and refueling and from car exhausts; released when used as a solvent
acrylonitrile	used to make other chemicals such as plastics, synthetic rubber and acrylic fibers; a mixture of acrylonitrile and carbon tetrachloride was used as a pesticide in the past; all uses in pesticide have stopped
ally chloride	used to make epichlorohydrin and glycerin; used in the synthesis of allyl compounds such as allyl alcohol, allyl amines, allyl esters and polyesters; derivatives are found in varnish, plastics, adhesives, perfumes, insecticides and pharmaceuticals
Benzene	widely used in the US; some industries use it to make other chemicals which are used to make plastics, resins, nylon and synthetic fibers; used to make some types of rubbers, lubricants, dyes, detergents, drugs and pesticides; natural sources include volcanoes and forest fires; a natural part of crude oil and gasoline; found in industrial emissions, waste and storage operations, motor vehicle exhaust, evaporation from gasoline service stations and tobacco smoke
benzylchloride	used as a chemical intermediate in the manufacture of certain dyes, lubricants, gasoline and pharmaceutical products and as a photographic developer; emissions from floor tile plasticized by butyl benzyl phthalate have been reported; has been detected in emissions from the burning of polyvinyl chloride, neoprene and rigid urethane foam compounds

COMPOUND	PRODUCT USE
bromodichloromethane	small amounts are formed naturally by algae in the oceans; only small quantities are produced in the US; small quantities that are produced are used in laboratories or to make other chemicals; most is formed as a by-product when chlorine is added to drinking water to kill bacteria
bromoform	small amounts are formed naturally by plants in the ocean; formed as byproducts when chlorine is added to drinking water to kill bacteria; were used in the past as solvents and flame retardants, or to make other chemicals; small quantities are produced in the US and used mainly as laboratory reagents
carbon tetrachloride	manufactured chemical that does not occur naturally; was used in the production of refrigeration fluid and propellants for aerosol cans, as a pesticide, as a cleaning fluid and degreasing agent, in fire extinguishers and in spot removers; these uses are now banned and it is only used in some industrial applications
chlorobenzene	does not occur naturally in the environment; production in the US has declined by more than 60% from its peak in 1960; was used in the past to make other chemicals, such as phenol and DDT; now chlorobenzene is used as a solvent for some pesticide formulations, to degrease automobile parts, and as a chemical intermediate to make several other chemicals
chloroethane	In the past was used in leaded gasoline; used in the production of cellulose, dyes, medicinal drugs, and other commercial products and as a solvent and refrigerant; used to numb the skin before medical procedures such as ear piercing and skin biopsies and as a treatment in sports injuries
Chloroform	used to make other chemicals and can also be formed in small amounts when chlorine is added to water
cyclohexane	occurs naturally in petroleum crude oil, in volcanic gases, and in cigarette smoke; used to make nylon, benzene, cyclohexanone, nitrocyclohexane, adhesives and perfumes; added to lacquers and resins, paint and varnish removers and fungicides; used as a fuel for camp stoves
dibromochloromethane	small amounts are formed naturally by plants in the ocean; formed as byproducts when chlorine is added to drinking water to kill bacteria; were used in the past as solvents and flame retardants or to make other chemicals; small quantities are produced in the US and used mainly as laboratory reagents
dichlorodifluoromethane	used as a refrigerant in air conditioning systems, as a blowing or foaming agent for aerosols, in fire extinguishers; banned in the US along with many other countries in 1994
dichlorotetrafluoromethane	used as a refrigerant in air conditioning systems, as a blowing or foaming agent for aerosols, in fire extinguishers
dichlorotetrafluoroethane	primary use has been as a refrigerant; found in consumer products, such as hair mousse and hairspray aerosol
ethylbenzene	found in natural products such as coal tar and petroleum; found in manufactured products such as inks, insecticides and paints; used primarily to make styrene; used as a solvent and in fuels; releases into the air occur from burning oil, gas and coal

COMPOUND	PRODUCT USE
Heptanes	produced and used as a solvent in organic synthesis and as a standard for octane-rating determinations; found in gasoline and petroleum-based products
hexachloro-1,3-butadiene	not found naturally in the environment, formed when other chemicals are made; mainly used to make rubber compounds; used as a solvent and to make lubricants, used in gyroscopes, as a heat transfer liquid and as a hydraulic fluid
Hexane	made from crude oil; pure *n*-Hexane is used in laboratories; mixed with similar chemicals called solvents and used to extract vegetable oils from crops such as soybeans; these solvents are also used as cleaning agents in the printing, textile, furniture, and shoemaking industries; used in certain kinds of special glues used in the roofing, shoe and leather industries; contained in several consumer products, such as gasoline, quick-drying glues and rubber cement, used in various hobbies
methyl ethyl ketone	manufactured chemical but it is also present in the environment from natural sources; produced in large quantities, nearly half of its use is in paints and other coatings; used in glues and as a cleaning agent; made by some trees and found in some fruits and vegetables in small amounts; also released to the air from car and truck exhausts
methyl isobutyl ketone	occurs naturally in certain foods and beverages; added to protective surface coatings, adhesives, printing ink, and special lubricating oils; used to make pesticides and to separate and purify several other organic; used to make textiles and leather; exposure can occur when people use certain paints, varnishes, or glues
methyl-t-butyl ether	was used since the 1980s as an additive for unleaded gasoline to achieve more efficient burning, today it is not being used and has been replaced by ethanol
methylbromide	manufactured chemical; also occurs naturally in small amounts in the ocean where it is formed, probably by algae and kelp; used to kill a variety of pests including rats, insects and fungi; used to make other chemicals or as a solvent to get oil out of nuts, seeds, and wool
methylchloride	used as a methylating agent, laboratory reagent, refrigerant, aerosol propellant, pesticide, fumigant, fire-extinguishing agent, anesthetic, degreaser, blowing agent for plastic foam and chemical intermediate; present at very low concentrations throughout the atmosphere
methylene chloride	does not occur naturally in the environment; used as an industrial solvent and as a paint stripper; found in some aerosol and pesticide products; used in the manufacture of photographic film
Styrene	found in insulation, fiberglass, plastic pipes, automobile parts, shoes, drinking cups and other food containers, carpet backing, tobacco smoke, automobile exhaust and off gases from photocopy machines; used to make plastics and rubber; occurs naturally in a variety of foods such as fruits, vegetables, nuts, beverages and meats
tetrachloroethene	used in dry cleaning and metal degreasing; used to make other chemicals and is used in some consumer products
tetrahydrofuran	used as a solvent for PVC, natural and synthetic resins; used as a monomer and chemical intermediate; used in varnishes
Toluene	occurs naturally in crude oil and in the tolu tree; produced in the process of making gasoline and other fuels from crude oil and making coke from coal; used in making paints, paint thinners, fingernail polish, lacquers, adhesives and rubber and in some printing and leather tanning processes; found in automobile exhaust and tobacco smoke

COMPOUND	PRODUCT USE
trichloroethene	used mainly as a solvent to remove grease from metal parts, is an ingredient in adhesives, paint removers, typewriter correction fluids and spot removers
trichlorofluoromethane	was used in consumer products including hair sprays, deodorants and cosmetics, in products to control home and garden insects and pests, in cleaners, spray paints and floor and furniture polish; in industry it was used as a refrigerant, to make foam and as an active part of liquid-type fire extinguishers; it is no longer made in the US
trichlorotrifluoroethane	does not occur naturally; EPA restricted production and after 1995 was significantly lower; used to clean metal surfaces, as a coolant in commercial and industrial air conditioners, as an ingredient in aerosols sprays, by foam makers as a blowing agent, to make high temperature lubricants and fluorocarbon resins and as a dry cleaning solvent
vinyl bromide	used primarily in the production of polymers and copolymers; used in polymers as a flame retardant and in the production of monoacrylic fibers for carpet-backing material; combined with acrylonitrile as a co-monomer, used to produce fabrics and fabric blends used in sleepwear (mostly children's) and home furnishings; when copolymerized with vinyl acetate and maleic anhydride, used to produce granular products; copolymers of vinyl chloride and vinyl bromide are used to prepare films, for impregnating or laminating fibers, and as rubber substitutes; used in leather and fabricated metal products
vinyl chloride	manufactured substance that does not occur naturally; formed when other substances such as trichloroethane, trichloroethylene, and tetrachloroethylene are broken down; used to make PVC, which is used to make a variety of plastic products, including pipes, wire and cable coatings and packaging materials.
cis-1,2-dichloroethene	used to produce solvents and in chemical mixtures
cis-1,3-dichloropropene	used mainly in farming as a pesticide
m/p/o-xylenes	occurs naturally in petroleum and coal tar; chemical industries produce xylene from petroleum; used as a solvent and in the printing, rubber, and leather industries; used as a cleaning agent, a thinner for paint and in paints and varnishes; found in small amounts in airplane fuel and gasoline and cigarette smoke
trans-1,2-dichloroethene	used to produce solvents and in chemical mixtures
trans-1,3-dichloropropene	used mainly in farming as a pesticide

Information Sources: http://www.atsdr.cdc.gov
http://www.epa.gov/chemicalfact/
http://www.epa.gov/ttn/atw/
http://web.doh.state.nj.us

Table 1
EPA METHOD TO15 TARGET VOC LIST

EPA Region I TO-15 VOC Reported Compounds	CAS No.
1, 1, 1-Trichloroethane	71-55-6
1, 1, 2, 2-Tetrachloroethane	79-34-5
1, 1, 2-Trichloroethane	79-00-5
1, 1-Dichloroethane	75-34-3
1, 1-Dichloroethylene	75-35-4
1, 2, 4-Trichlorobenzene	120-82-1
1, 2, 4-Trimethylbenzene	95-63-6
1, 2-Dibromoethane	106-93-4
1, 2-Dichlorobenzene	95-50-1
1, 2-Dichloroethane	107-06-2
1, 2-Dichloropropane	78-87-5
1, 3, 5-Trimethylbenzene	108-67-8
1, 3-Butadiene	106-99-0
1, 3-Dichlorobenzene (m-Dichlorobenzene)	541-73-1
1, 4-Dichlorobenzene (p-Dichlorobenzene)	106-46-7
2-Hexanone	591-78-6
4-Ethyl Toluene	622-96-8
Acrylonitrile	107-13-1
Allyl Chloride	107-05-1
Benzene	71-43-2
Benzylchloride	100-44-7
Bromodichloromethane	75-27-4
Bromoform	75-25-2
Carbon Tetrachloride	56-23-5
Chlorobenzene	108-90-7
Chloroethane (Ethyl chloride)	75-00-3
Chloroform	67-66-3
Cyclohexane	110-82-7
Dibromochloromethane	124-48-1
Dichlorodifluoromethane (F12)	75-71-8
Dichlorotetrafluoroethane	1320-37-2
Ethylbenzene	100-41-4
Heptane	142-82-5
Hexachloro-1, 3-butadiene (Hexachlorobutadiene)	87-68-3
Hexane (n-Hexane)	110-54-3
Methyl Ethyl Ketone (2-butanone)	78-93-3
Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1
Methyl-t-butyl ether	1634-04-4
Methylbromide (Bromomethane)	74-83-9
Methylchloride (Chloromethane)	74-87-3
Methylene Chloride	75-09-2
Styrene	100-42-5
Tetrachloroethene	127-18-4
Tetrahydrofuran	109-99-9
Toluene	108-88-3
Trichloroethene	79-01-6
Trichlorofluoromethane	75-69-4
Trichlorotrifluoroethane	76-13-1
Vinyl Bromide	593-60-2
Vinyl chloride	75-01-4
cis-1, 2-Dichloroethene	156-59-2
cis-1,3-Dichloropropene	10061-01-5
m, p-Xylene (Xylene, mixture)	1330-20-7
o-Xylene	95-47-6
trans-1, 2-Dichloroethene	156-60-5
trans-1, 3-Dichloropropene	10061-02-6

TABLE 2A
DUPLICATE SAMPLING RESULTS
89 - 91 PLEASANT STREET
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR 89 - 91 PLEASANT STREET		
	CANISTER #22698 3/26/18 - 3/27/18 24-HOUR AVG. ($\mu g/m^3$)	DUPLICATE CANISTER #14898 3/26/18 - 3/27/18 24-HOUR AVG. ($\mu g/m^3$)	RPD (%)
Trichloroethene	**ND (0.41)**	**ND (0.41)**	**NA**
Benzene	**0.69**	**0.71**	**3**
Chlorobenzene	**ND (0.35)**	**ND (0.35)**	**NA**
1,4-Dichlorobenzene	**ND (0.46)**	**ND (0.46)**	**NA**
Vinyl Chloride	**ND (0.20)**	**ND (0.20)**	**NA**
Dichlorodifluoromethane	3.0	2.9	3
Trichlorofluoromethane	1.5	1.5	0
Methylene Chloride	0.52	0.52	0
Methyl Ethyl Ketone	7.4	7.4	0
Hexane	0.60	0.60	0
Chloroform	1.0	1.0	0
Tetrahydrofuran	1.4	1.4	0
Carbon Tetrachloride	0.52	0.52	0
Methyl Isobutyl Ketone	0.34	0.38	11
Toluene	1.9	2.1	10
Ethylbenzene	0.48	0.48	0
m/p-Xylenes	1.4	1.4	0
o-Xylene	0.43	0.43	0

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
NA = not applicable, concentrations for these compounds were either less than 10 times the reporting limit or not detected above the reporting limits to calculate an RPD

Compounds in bold type are target compounds for project.

TABLE 2B
DUPLICATE SAMPLING RESULTS
118 MAIN STREET
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR 118 MAIN STREET		
	CANISTER #12563 3/28/18 8-HOUR AVG. ($\mu g/m^3$)	DUPLICATE CANISTER #14894 3/28/18 8-HOUR AVG. ($\mu g/m^3$)	RPD (%)
Trichloroethene	**ND (0.47)**	**ND (0.42)**	**NA**
Benzene	**0.89**	**0.88**	**1**
Chlorobenzene	**ND (0.40)**	**ND (0.36)**	**NA**
1,4-Dichlorobenzene	**ND (0.53)**	**ND (0.47)**	**NA**
Vinyl Chloride	**ND (0.22)**	**ND (0.20)**	**NA**
Dichlorodifluoromethane	3.1	2.9	7
Trichlorofluoromethane	1.6	1.5	6
Methylene Chloride	0.50	0.47	6
Methyl Ethyl Ketone	1.2	1.1	9
Hexane	1.0	0.95	5
Chloroform	0.63	0.61	3
Carbon Tetrachloride	ND (0.55)	0.52	NA
Toluene	2.2	2.3	4
Ethylbenzene	0.48	0.46	4
m/p-Xylenes	1.4	1.5	7
o-Xylene	0.57	0.63	10

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
NA = not applicable, concentrations for these compounds were either less than 10 times the reporting limit or not detected above the reporting limits to calculate an RPD

Compounds in bold type are target compounds for project.

TABLE 2C
DUPLICATE SAMPLING RESULTS
103 PLEASANT STREET
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR 103 PLEASANT STREET		
	CANISTER #13498 3/28/18 - 3/29/18 24-HOUR AVG. ($\mu g/m^3$)	DUPLICATE CANISTER #22680 3/28/18 - 3/29/18 24-HOUR AVG. ($\mu g/m^3$)	RPD (%)
Trichloroethene	**ND (0.42)**	**ND (0.42)**	**NA**
Benzene	**0.66**	**0.67**	**2**
Chlorobenzene	**ND (0.36)**	**ND (0.36)**	**NA**
1,4-Dichlorobenzene	**ND (0.47)**	**ND (0.47)**	**NA**
Vinyl Chloride	**ND (0.20)**	**ND (0.20)**	**NA**
Dichlorodifluoromethane	2.6	2.6	0
Trichlorofluoromethane	1.4	1.4	0
Methylene Chloride	1.7	1.8	6
Methyl Ethyl Ketone	0.86	0.96	11
Hexane	0.71	0.80	12
Toluene	1.3	1.3	0
1,2,4-Trimethylbenzene	0.49	0.52	6

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
NA = not applicable, concentrations for these compounds were either less than 10 times the reporting limit or not detected above the reporting limits to calculate an RPD

Compounds in bold type are target compounds for project.

TABLE 2D
DUPLICATE SAMPLING RESULTS
90 - 92 PLEASANT STREET
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR 90 - 92 PLEASANT STREET		
	CANISTER #12567 3/29/18 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)	DUPLICATE CANISTER #20846 3/28/18 - 3/29/18 24-HOUR AVG. ($\mu g/m^3$)	RPD (%)
Trichloroethene	**ND (0.44)**	**ND (0.41)**	**NA**
Benzene	**4.0**	**4.2**	**5**
Chlorobenzene	**ND (0.38)**	**ND (0.35)**	**NA**
1,4-Dichlorobenzene	**ND (0.49)**	**ND (0.46)**	**NA**
Vinyl Chloride	**ND (0.21)**	**ND (0.20)**	**NA**
Dichlorodifluoromethane	2.4	2.5	4
1,3-Butadiene	ND (0.36)	0.36	NA
Trichlorofluoromethane	1.4	1.4	0
Methylene Chloride	1.2	1.3	8
Methyl Ethyl Ketone	2.8	3.0	7
Hexane	10	10	0
Cyclohexane	9.2	9.4	2
Methyl Isobutyl Ketone	0.76	0.77	1
Toluene	17	18	6
Tetrachloroethylene	1.1	1.2	9
Ethylbenzene	5.7	5.9	3
m/p-Xylenes	15	15	0
o-Xylene	5.9	6.2	5
4-Ethyltoluene	6.1	6.4	5
1,3,5-Trimethylbenzene	2.3	2.4	4
1,2,4-Trimethylbenzene	6.3	6.5	3

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
NA = not applicable, concentrations for these compounds were either less than 10 times the reporting limit or not detected above the reporting limits to calculate an RPD

Compounds in bold type are target compounds for project.

TABLE 3
AMBIENT/BACKGROUND AIR DATA SUMMARY
ASHLAND, MA
NYANZA SITE

COMPOUND	AMBIENT AIR OUTSIDE 89 - 91 PLEASANT ST. CANISTER #13492 3/26/18 - 3/27/18 24-HOUR AVG. ($\mu g/m^3$)	AMBIENT AIR OUTSIDE 103 PLEASANT ST. CANISTER #22686 3/28/18 - 3/29/18 24-HOUR AVG. ($\mu g/m^3$)	AMBIENT AIR OUTSIDE 118 MAIN ST. CANISTER #20858 3/28/18 8-HOUR AVG. ($\mu g/m^3$)	AMBIENT AIR OUTSIDE 90 - 92 PLEASANT ST. CANISTER #15047 3/29/18 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)
Trichloroethene	**ND (0.40)**	**ND (0.40)**	**ND (0.47)**	**ND (0.36)**
Benzene	**0.68**	**1.0**	**0.79**	**0.59**
Chlorobenzene	**ND (0.35)**	**ND (0.34)**	**ND (0.40)**	**ND (0.31)**
1,4-Dichlorobenzene	**ND (0.45)**	**ND (0.45)**	**ND (0.53)**	**ND (0.41)**
Vinyl Chloride	**ND (0.19)**	**ND (0.19)**	**ND (0.22)**	**ND (0.17)**
Dichlorodifluoromethane	2.6	2.8	2.8	2.2
Trichlorofluoromethane	1.3	1.5	1.5	1.1
Methylene Chloride	0.53	0.66	0.40	0.27
Trichlorotrifluoroethane	ND (0.57)	0.60	ND (0.67)	ND (0.52)
Methyl Ethyl Ketone	0.58	1.1	0.84	1.2
Hexane	0.38	1.0	0.43	0.58
Carbon Tetrachloride	0.46	0.48	ND (0.55)	ND (0.43)
Toluene	0.73	2.0	1.1	6.2
m/p-Xylene	ND (0.65)	0.86	ND (0.76)	0.78

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
Compounds in bold type are target compounds for project.

TABLE 4
INDOOR AIR, AMBIENT AIR AND SOIL GAS CANISTER SAMPLING RESULTS SUMMARY
89 - 91 PLEASANT STREET
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR BASEMENT CANISTER #22698 3/26/18 - 3/27/18 24-HOUR AVG. (µg/m^3)	INDOOR AIR BASEMENT DUPLICATE CANISTER #14898 3/26/18 - 3/27/18 24-HOUR AVG. (µg/m^3)	INDOOR AIR FIRST FLOOR CANISTER #14895 3/26/18 - 3/27/18 24-HOUR AVG. (µg/m^3)	SUB-SLAB SOIL GAS SS#2 CANISTER #15045 3/26/18 GRAB SAMPLE (µg/m^3)	AMBIENT AIR OUTSIDE CANISTER #13492 3/26/18 - 3/27/18 24-HOUR AVG. (µg/m^3)
Trichloroethene	**ND (0.41)**	**ND (0.41)**	**ND (0.42)**	**44**	**ND (0.40)**
Benzene	**0.69**	**0.71**	**0.60**	**ND (0.34)**	**0.68**
Chlorobenzene	**ND (0.35)**	**ND (0.35)**	**ND (0.36)**	**ND (0.49)**	**ND (0.35)**
1,4-Dichlorobenzene	**ND (0.46)**	**ND (0.46)**	**ND (0.47)**	**ND (0.64)**	**ND (0.45)**
Vinyl Chloride	**ND (0.20)**	**ND (0.20)**	**ND (0.20)**	**ND (0.27)**	**ND (0.19)**
Dichlorodifluoromethane	3.0	2.9	3.0	2.4	2.6
Trichlorofluoromethane	1.5	1.5	1.5	1.1	1.3
Methylene Chloride	0.52	0.52	ND (0.27)	ND (0.37)	0.53
Methyl Ethyl Ketone	7.4	7.4	3.2	ND (0.32)	0.58
Hexane	0.60	0.60	1.2	8.3	0.38
1,2-Dichloroethane	ND (0.31)	ND (0.31)	0.62	ND (0.43)	ND (0.30)
Chloroform	1.0	1.0	0.69	0.90	ND (0.37)
Tetrahydrofuran	1.4	1.4	ND (0.23)	ND (0.32)	ND (0.22)
Carbon Tetrachloride	0.52	0.52	ND (0.49)	ND (0.67)	0.46
Methyl Isobutyl Ketone	0.34	0.38	ND (0.32)	ND (0.44)	ND (0.31)
Toluene	1.9	2.1	1.3	0.74	0.73
Ethylbenzene	0.48	0.48	ND (0.34)	ND (0.46)	ND (0.33)
m/p-Xylenes	1.4	1.4	0.72	ND (0.93)	ND (0.65)
Styrene	ND (0.33)	ND (0.33)	ND (0.33)	0.81	ND (0.32)
o-Xylene	0.43	0.43	0.35	ND (0.46)	ND (0.33)

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
Compounds in bold type are target compounds for project.

TABLE 5
INDOOR AIR, AMBIENT AIR AND SOIL GAS CANISTER SAMPLING RESULTS SUMMARY
106 - 108 PLEASANT STREET
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR BASEMENT CANISTER #15054 3/26/18 - 3/27/18 24-HOUR AVG. ($\mu g/m^3$)	INDOOR AIR FIRST FLOOR CANISTER #22693 3/26/18 - 3/27/18 24-HOUR AVG. ($\mu g/m^3$)	SUB-SLAB SOIL GAS SS#2 CANISTER #12571 3/26/18 GRAB SAMPLE ($\mu g/m^3$)	AMBIENT AIR OUTSIDE CANISTER #13492 3/26/18 - 3/27/18 24-HOUR AVG. ($\mu g/m^3$)
Trichloroethene	**ND (0.40)**	**ND (0.43)**	**1.2**	**ND (0.40)**
Benzene	**0.87**	**1.3**	**ND (0.33)**	**0.68**
Chlorobenzene	**ND (0.34)**	**ND (0.36)**	**ND (0.47)**	**ND (0.35)**
1,4-Dichlorobenzene	**ND (0.45)**	**ND (0.47)**	**ND (0.61)**	**ND (0.45)**
Vinyl Chloride	**ND (0.19)**	**ND (0.20)**	**ND (0.26)**	**ND (0.19)**
Dichlorodifluoromethane	3.0	2.9	2.5	2.6
Trichlorofluoromethane	1.6	1.9	2.9	1.3
1,1-Dichloroethylene	ND (0.30)	ND (0.31)	3.2	ND (0.30)
Methylene Chloride	0.95	0.99	ND (0.36)	0.53
Trichlorotrifluoroethane	0.58	ND (0.61)	ND (0.78)	ND (0.57)
Methyl Ethyl Ketone	0.57	0.99	0.30	0.58
Hexane	0.57	0.67	0.68	0.38
Chloroform	ND (0.36)	ND (0.39)	5.5	ND (0.37)
1,2-Dichloroethane	ND (0.30)	0.43	ND (0.41)	ND (0.30)
1,1,1-Trichloroethane	ND (0.41)	ND (0.43)	22	ND (0.41)
Carbon Tetrachloride	0.54	ND (0.50)	ND (0.64)	0.46
Toluene	1.2	1.5	0.41	0.73
Tetrachloroethylene	ND (0.51)	ND (0.54)	12	ND (0.51)
m/p-Xylenes	0.66	0.97	ND (0.89)	ND (0.65)

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
Compounds in bold type are target compounds for project.

TABLE 6
INDOOR AIR, AMBIENT AIR AND SOIL GAS CANISTER SAMPLING RESULTS SUMMARY
102 PLEASANT STREET
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR BASEMENT CANISTER #13484 3/26/18 - 3/27/18 24-HOUR AVG. ($\mu g/m^3$)	INDOOR AIR FIRST FLOOR CANISTER #22691 3/26/18 - 3/27/18 24-HOUR AVG. ($\mu g/m^3$)	SUB-SLAB SOIL GAS SS#1 CANISTER #22105 3/26/18 GRAB SAMPLE ($\mu g/m^3$)	AMBIENT AIR OUTSIDE CANISTER #13492 3/26/18 - 3/27/18 24-HOUR AVG. ($\mu g/m^3$)
Trichloroethene	**ND (0.40)**	**ND (0.44)**	**ND (0.55)**	**ND (0.40)**
Benzene	**0.80**	**0.82**	**ND (0.33)**	**0.68**
Chlorobenzene	**ND (0.34)**	**ND (0.37)**	**ND (0.47)**	**ND (0.35)**
1,4-Dichlorobenzene	**ND (0.45)**	**ND (0.49)**	**ND (0.62)**	**ND (0.45)**
Vinyl Chloride	**ND (0.19)**	**ND (0.21)**	**ND (0.26)**	**ND (0.19)**
Dichlorodifluoromethane	2.8	2.9	2.6	2.6
Trichlorofluoromethane	1.4	1.4	1.3	1.3
1,1-Dichloroethylene	ND (0.30)	ND (0.32)	1.0	ND (0.30)
Methylene Chloride	0.92	0.69	ND (0.36)	0.53
Trichlorotrifluoroethane	0.57	ND (0.62)	ND (0.79)	ND (0.57)
Methyl Ethyl Ketone	2.2	1.1	ND (0.30)	0.58
Hexane	0.51	0.59	ND (0.36)	0.38
Chloroform	0.42	ND (0.40)	2.5	ND (0.37)
1,1,1-Trichloroethane	ND (0.41)	ND (0.44)	4.6	ND (0.41)
Carbon Tetrachloride	ND (0.47)	ND (0.51)	ND (0.65)	0.46
Toluene	2.6	1.9	ND (0.39)	0.73
Ethylbenzene	0.38	ND (0.35)	ND (0.45)	ND (0.33)
m/p-Xylenzes	1.2	0.81	ND (0.89)	ND (0.65)
o-Xylene	0.36	ND (0.35)	ND (0.45)	ND (0.33)

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
Compounds in bold type are target compounds for project.

TABLE 7
INDOOR AIR, AMBIENT AIR AND SOIL GAS CANISTER SAMPLING RESULTS SUMMARY
136 PLEASANT STREET
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR BASEMENT CANISTER #14893 3/26/18 - 3/27/18 24-HOUR AVG. (µg/m^3)	INDOOR AIR FIRST FLOOR CANISTER #20859 3/26/18 - 3/27/18 24-HOUR AVG. (µg/m^3)	SUB-SLAB SOIL GAS SS#1 CANISTER #13493 3/26/18 GRAB SAMPLE (µg/m^3)	AMBIENT AIR OUTSIDE CANISTER #13492 3/26/18 - 3/27/18 24-HOUR AVG. (µg/m^3)
Trichloroethene	**ND (0.42)**	**ND (0.43)**	**8.1**	**ND (0.40)**
Benzene	**1.5**	**1.6**	**0.86**	**0.68**
Chlorobenzene	**ND (0.36)**	**ND (0.37)**	**1.2**	**ND (0.35)**
1,4-Dichlorobenzene	**ND (0.47)**	**ND (0.48)**	**5.3**	**ND (0.45)**
Vinyl Chloride	**ND (0.20)**	**ND (0.21)**	**ND (0.25)**	**ND (0.19)**
Dichlorodifluoromethane	3.1	3.2	2.9	2.6
Trichlorofluoromethane	1.6	1.6	2.2	1.3
Methylene Chloride	0.65	0.67	ND (0.34)	0.53
Trichlorotrifluoroethane	ND (0.59)	0.63	ND (0.75)	ND (0.57)
Methyl Ethyl Ketone	1.5	1.7	0.84	0.58
c-1,2-Dichloroethylene	ND (0.31)	ND (0.32)	3.2	ND (0.30)
Hexane	2.9	3.0	1.9	0.38
Chloroform	1.3	2.3	2.2	ND (0.37)
1,2-Dichloroethane	0.64	0.47	ND (0.40)	ND (0.30)
Carbon Tetrachloride	ND (0.49)	0.62	ND (0.62)	0.46
Cyclohexane	0.75	ND (0.28)	ND (0.34)	ND (0.26)
Bromodichloromethane	ND (0.52)	0.71	ND (0.66)	ND (0.50)
Heptane	3.3	7.6	ND (0.40)	ND (0.31)
Toluene	2.7	3.2	1.4	0.73
2-Hexanone	ND (0.32)	0.69	ND (0.40)	ND (0.31)
Ethylbenzene	0.44	0.49	0.62	ND (0.33)
m/p-Xylenzes	1.3	1.4	ND (0.85)	ND (0.65)
o-Xylene	0.47	0.52	ND (0.43)	ND (0.33)
1,2,4-Trimethylbenzene	0.45	0.55	ND (0.48)	ND (0.33)
1,3-Dichlorobenzene	ND (0.47)	ND (0.48)	1.5	ND (0.45)
1,2-Dichlorobenzene	ND (0.47)	ND (0.48)	3.6	ND (0.45)

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
Compounds in bold type are target compounds for project.

TABLE 8
INDOOR AIR AND AMBIENT AIR CANISTER SAMPLING RESULTS SUMMARY
37 MAIN STREET
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR BASEMENT CANISTER #15059 3/26/18 - 3/27/18 24-HOUR AVG. (µg/m^3)	INDOOR AIR FIRST FLOOR CANISTER #22690 3/26/18 - 3/27/18 24-HOUR AVG. (µg/m^3)	AMBIENT AIR OUTSIDE CANISTER #13492 3/26/18 - 3/27/18 24-HOUR AVG. (µg/m^3)
Trichloroethene	**ND (0.43)**	**ND (0.43)**	**ND (0.40)**
Benzene	**0.84**	**0.82**	**0.68**
Chlorobenzene	**ND (0.37)**	**ND (0.36)**	**ND (0.35)**
1,4-Dichlorobenzene	**ND (0.48)**	**ND (0.48)**	**ND (0.45)**
Vinyl Chloride	**ND (0.20)**	**ND (0.21)**	**ND (0.19)**
Dichlorodifluoromethane	2.8	3.2	2.6
Trichlorofluoromethane	1.4	1.4	1.3
Methylene Chloride	2.8	2.7	0.53
Methyl Ethyl Ketone	2.5	5.2	0.58
Hexane	0.58	0.85	0.38
Chloroform	0.81	5.5	ND (0.37)
Carbon Tetrachloride	ND (0.50)	0.58	0.46
Methyl Isobutyl Ketone	ND (0.32)	0.36	ND (0.31)
Toluene	2.9	6.3	0.73
Ethylbenzene	ND (0.35)	0.51	ND (0.33)
m/p-Xylenes	0.88	1.6	ND (0.65)
Styrene	ND (0.34)	0.36	ND (0.32)
o-Xylene	ND (0.35)	0.53	ND (0.33)
1,2,4-Trimethylbenzene	ND (0.39)	0.40	ND (0.37)

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
Compounds in bold type are target compounds for project.

TABLE 9
INDOOR AIR, AMBIENT AIR AND SOIL GAS CANISTER SAMPLING RESULTS SUMMARY
118 MAIN STREET
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR BASEMENT PRE-SCHOOL CANISTER #12563 3/28/18 8-HOUR AVG. (µg/m^3)	INDOOR AIR BASEMENT PRE-SCHOOL DUPLICATE CANISTER #14894 3/28/18 8-HOUR AVG. (µg/m^3)	INDOOR AIR BASEMENT PRE-SCHOOL OFFICE CANISTER #13494 3/28/18 8-HOUR AVG. (µg/m^3)	INDOOR AIR BASEMENT CHURCH ACTIVITY ROOMS CANISTER #22153 3/28/18 8-HOUR AVG. (µg/m^3)	INDOOR AIR FIRST FLOOR CHURCH OFFICE CANISTER #22688 3/28/18 8-HOUR AVG. (µg/m^3)	SUB-SLAB SOIL GAS SS #1 STORAGE CLOSET CANISTER #15048 3/28/18 GRAB SAMPLE (µg/m^3)	AMBIENT AIR OUTSIDE CANISTER #20858 3/28/18 8-HOUR AVG. (µg/m^3)
Trichloroethene	**ND (0.47)**	**ND (0.42)**	**ND (0.46)**	**ND (0.50)**	**ND (0.40)**	**56**	**ND (0.47)**
Benzene	**0.89**	**0.88**	**1.0**	**0.96**	**0.97**	**ND (0.23)**	**0.79**
Chlorobenzene	**ND (0.40)**	**ND (0.36)**	**ND (0.39)**	**ND (0.43)**	**ND (0.35)**	**ND (0.33)**	**ND (0.40)**
1,4-Dichlorobenzene	**ND (0.53)**	**ND (0.47)**	**ND (0.51)**	**ND (0.56)**	**ND (0.45)**	**ND (0.44)**	**ND (0.53)**
Vinyl Chloride	**ND (0.22)**	**ND (0.20)**	**ND (0.22)**	**ND (0.24)**	**ND (0.19)**	**ND (0.19)**	**ND (0.22)**
Dichlorodifluoromethane	3.1	2.9	3.3	3.1	3.0	2.6	2.8
Trichlorofluoromethane	1.6	1.5	1.6	1.6	2.0	1.5	1.5
1,1-Dichloroethylene	ND (0.35)	ND (0.31)	ND (0.34)	ND (0.37)	ND (0.30)	1.9	ND (0.35)
Methylene Chloride	0.50	0.47	0.54	0.57	0.60	ND (0.25)	0.40
Trichlorotrifluoroethane	ND (0.67)	ND (0.60)	0.73	ND (0.72)	0.61	0.58	ND (0.67)
t-1,2-Dichloroethylene	ND (0.35)	ND (0.31)	ND (0.34)	ND (0.37)	ND (0.30)	0.59	ND (0.35)
1,1-Dichloroethane	ND (0.35)	ND (0.32)	ND (0.34)	ND (0.38)	ND (0.30)	1.0	ND (0.35)
Methyl-t-Butyl-Ketone	ND (0.31)	ND (0.28)	ND (0.30)	ND (0.33)	ND (0.26)	0.95	ND (0.31)
Methyl Ethyl Ketone	1.2	1.1	1.5	1.1	1.1	0.36	0.84
c-1,2-Dichloroethylene	ND (0.35)	ND (0.31)	ND (0.34)	ND (0.37)	ND (0.30)	110	ND (0.35)
Hexane	1.0	0.95	1.3	0.94	0.95	0.97	0.43
Chloroform	0.63	0.61	0.81	ND (0.46)	0.43	82	ND (0.43)
1,1,1-Trichloroethane	ND (0.48)	ND (0.43)	ND (0.46)	ND (0.51)	ND (0.41)	4.8	ND (0.48)
Carbon Tetrachloride	ND (0.55)	0.52	0.59	ND (0.59)	0.59	ND (0.46)	ND (0.55)
Bromodichloromethane	ND (0.59)	ND (0.53)	ND (0.57)	ND (0.63)	ND (0.50)	11	ND (0.59)
c-1,3-Dichloropropylene	ND (0.40)	ND (0.36)	ND (0.39)	ND (0.42)	ND (0.34)	0.46	ND (0.40)
Methyl Isobutyl Ketone	ND (0.36)	ND (0.32)	ND (0.35)	ND (0.38)	0.53	ND (0.30)	ND (0.36)
Toluene	2.2	2.3	3.1	2.0	2.8	ND (0.27)	1.1
Tetrachloroethylene	ND (0.59)	ND (0.53)	ND (0.58)	ND (0.63)	ND (0.51)	4.6	ND (0.59)
Ethylbenzene	0.48	0.46	0.48	ND (0.41)	0.36	ND (0.32)	ND (0.38)
m/p-Xylenes	1.4	1.5	1.6	0.92	1.0	ND (0.63)	ND (0.76)
o-Xylene	0.57	0.63	0.65	ND (0.41)	0.39	ND (0.32)	ND (0.38)

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
Compounds in bold type are target compounds for project.

TABLE 10
INDOOR AIR, AMBIENT AIR AND SOIL GAS CANISTER SAMPLING RESULTS SUMMARY
103 PLEASANT STREET
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR BASEMENT CANISTER #13498 3/28/2018 - 3/29/18 24-HOUR AVG. (µg/m^3)	INDOOR AIR BASEMENT DUPLICATE CANISTER #22680 3/28/2018 - 3/29/18 24-HOUR AVG. (µg/m^3)	INDOOR AIR FIRST FLOOR CANISTER #14891 3/28/2018 - 3/29/18 24-HOUR AVG. (µg/m^3)	AMBIENT AIR OUTSIDE CANISTER #22686 3/28/2018 - 3/29/18 24-HOUR AVG. (µg/m^3)
Trichloroethene	**ND (0.42)**	**ND (0.42)**	**ND (0.42)**	**ND (0.40)**
Benzene	**0.66**	**0.67**	**1.6**	**1.0**
Chlorobenzene	**ND (0.36)**	**ND (0.36)**	**ND (0.36)**	**ND (0.34)**
1,4-Dichlorobenzene	**ND (0.47)**	**ND (0.47)**	**ND (0.47)**	**ND (0.45)**
Vinyl Chloride	**ND (0.20)**	**ND (0.20)**	**ND (0.20)**	**ND (0.19)**
Dichlorodifluoromethane	2.6	2.6	2.8	2.8
1,3-Butadiene	ND (0.35)	ND (0.35)	0.46	ND (0.33)
Trichlorofluoromethane	1.4	1.4	1.6	1.5
Methylene Chloride	1.7	1.8	12	0.66
Trichlorotrifluoroethane	ND (0.60)	ND (0.60)	ND (0.59)	0.60
Methyl Ethyl Ketone	0.86	0.96	6.6	1.1
Hexane	0.71	0.80	1.4	1.0
Chloroform	ND (0.38)	ND (0.38)	1.1	ND (0.36)
1,2-Dichloroethane	ND (0.32)	ND (0.32)	0.61	ND (0.30)
Carbon Tetrachloride	ND (0.49)	ND (0.50)	0.54	0.48
Cyclohexane	ND (0.27)	ND (0.27)	0.37	ND (0.26)
Toluene	1.3	1.3	7.8	2.0
Ethylbenzene	ND (0.34)	ND (0.34)	0.88	ND (0.32)
m/p-Xylene	ND (0.68)	ND (0.68)	2.6	0.86
o-Xylene	ND (0.34)	ND (0.34)	0.65	ND (0.32)
4-Ethyltoluene	ND (0.38)	ND (0.39)	0.60	ND (0.37)
1,2,4-Trimethylbenzene	0.49	0.52	0.78	ND (0.37)

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
Compounds in bold type are target compounds for project.

TABLE 11
INDOOR AIR, AMBIENT AIR AND SOIL GAS CANISTER SAMPLING RESULTS SUMMARY
90 - 92 PLEASANT STREET/3 FOREST AVENUE
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR BASEMENT 90-92 PLEASANT CANISTER #12567 3/29/2018 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)	INDOOR AIR BASEMENT 90-92 PLEASANT DUPLICATE CANISTER #20846 3/29/2018 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)	INDOOR AIR BASEMENT 3 FOREST CANISTER #14899 3/29/2018 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)	INDOOR AIR FIRST FLOOR 3 FOREST CANISTER #13490 3/29/2018 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)	INDOOR AIR FIRST FLOOR 90A PLEASANT CANISTER #20848 3/29/2018 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)	SUB-SLAB SOIL GAS SS #1 90-92 PLEASANT CANISTER #20841 3/29/18 GRAB SAMPLE ($\mu g/m^3$)	AMBIENT AIR OUTSIDE CANISTER #15047 3/29/2018 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)
Trichloroethene	**ND (0.44)**	**ND (0.41)**	**ND (0.41)**	**ND (0.41)**	**ND (0.44)**	**11**	**ND (0.36)**
Benzene	**4.0**	**4.2**	**5.5**	**2.0**	**1.1**	**0.53**	**0.59**
Chlorobenzene	**ND (0.38)**	**ND (0.35)**	**ND (0.35)**	**ND (0.35)**	**ND (0.38)**	**ND (0.30)**	**ND (0.31)**
1,4-Dichlorobenzene	**ND (0.49)**	**ND (0.46)**	**ND (0.46**	**ND (0.46)**	**ND (0.49)**	**ND (0.40)**	**ND (0.41)**
Vinyl Chloride	**ND (0.21)**	**ND (0.20)**	**ND (0.20)**	**ND (0.20)**	**ND (0.21)**	**ND (0.17)**	**ND (0.17)**
Dichlorodifluoromethane	2.4	2.5	1.9	2.2	2.2	2.6	2.2
1,3-Butadiene	ND (0.36)	0.36	0.39	1.2	ND (0.36)	ND (0.29)	ND (0.30)
Trichlorofluoromethane	1.4	1.4	1.1	1.2	1.1	1.6	1.1
1,1-Dichloroethylene	ND (0.33)	ND (0.31)	ND (0.30)	ND (0.30)	ND (0.33)	1.5	ND (0.27)
Methylene Chloride	1.2	1.3	0.79	0.35	0.39	0.29	0.27
t-1,2-Dichloroethylene	ND (0.33)	ND (0.31)	ND (0.30)	ND (0.30)	3.0	ND (0.26)	ND (0.27)
Methyl Ethyl Ketone	2.8	3.0	2.2	2.2	1.2	1.5	1.2
Hexane	10	10	15	2.3	1.6	3.1	0.58
Chloroform	ND (0.40)	ND (0.38)	ND (0.37)	ND (0.37)	ND (0.40)	1.4	ND (0.33)
1,2-Dichloroethane	ND (0.33)	ND (0.31)	ND (0.31)	ND (0.31)	0.69	ND (0.27)	ND (0.27)
1,1,1-Trichloroethane	ND (0.45)	ND (0.42)	ND (0.42)	ND (0.42)	ND (0.45)	4.2	ND (0.37)
Carbon Tetrachloride	ND (0.52)	ND (0.49)	ND (0.48)	ND (0.48)	ND (0.52)	0.75	ND (0.43)
Cyclohexane	9.2	9.4	14	0.81	0.83	ND (0.23)	ND (0.23)
Methyl Isobutyl Ketone	0.76	0.77	0.40	ND (0.31)	ND (0.34)	1.5	ND (0.28)
Toluene	17	18	22	5.8	3.9	3.2	6.2
Tetrachloroethylene	1.1	1.2	ND (0.52)	ND (0.52)	ND (0.56)	1.2	ND (0.46)
Ethylbenzene	5.7	5.9	8.1	0.97	0.75	0.57	ND (0.29)
m/p-Xylenes	15	15	21	3.1	2.2	1.9	0.78
Styrene	ND (0.35)	ND (0.33)	ND (0.32)	0.40	0.84	1.1	ND (0.29)
o-Xylene	5.9	6.2	8.5	0.94	0.77	0.80	ND (0.29)
4-Ethyltoluene	6.1	6.4	9.0	0.81	0.67	0.79	ND (0.33)
1,3,5-Trimethylbenzene	2.3	2.4	3.3	ND (0.37)	ND (0.40)	0.39	ND (0.33)
1,2,4-Trimethylbenzene	6.3	6.5	8.9	0.83	0.74	1.4	ND (0.33)

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
Compounds in bold type are target compounds for project.

TABLE 12
INDOOR AIR, AMBIENT AIR CANISTER SAMPLING RESULTS SUMMARY
153 PLEASANT STREET
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR BASEMENT CANISTER #13497 3/29/2018 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)	INDOOR AIR FIRST FLOOR CANISTER #20844 3/29/2018 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)	AMBIENT AIR OUTSIDE CANISTER #15047 3/29/2018 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)
Trichloroethene	**ND (0.38)**	**ND (0.42)**	**ND (0.36)**
Benzene	**0.55**	**0.55**	**0.59**
Chlorobenzene	**ND (0.33)**	**ND (0.36)**	**ND (0.31)**
1,4-Dichlorobenzene	**ND (0.43)**	**ND (0.47)**	**ND (0.41)**
Vinyl Chloride	**ND (0.18)**	**ND (0.20)**	**ND (0.17)**
Dichlorodifluoromethane	2.3	2.3	2.2
Trichlorofluoromethane	1.2	1.1	1.1
Methylene Chloride	0.51	3.6	0.27
Methyl Ethyl Ketone	1.0	1.2	1.2
Hexane	0.74	0.87	0.58
Chloroform	ND (0.35)	0.42	ND (0.33)
Toluene	1.2	1.7	6.2
Tetrachloroethylene	ND (0.48)	0.74	ND (0.46)
m/p-Xylenes	0.62	0.77	0.78
Styrene	1.3	0.41	ND (0.29)
1,2,4-Trimethylbenzene	ND (0.35)	0.53	ND (0.33)

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
Compounds in bold type are target compounds for project.

TABLE 13
INDOOR AIR, AMBIENT AIR AND SOIL GAS CANISTER SAMPLING RESULTS SUMMARY
112 PLEASANT STREET
ASHLAND, MA
NYANZA SITE

COMPOUND	INDOOR AIR BASEMENT CANISTER #22679 3/29/2018 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)	INDOOR AIR FIRST FLOOR CANISTER #22689 3/29/2018 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)	SUB-SLAB SOIL GAS SS#1 CANISTER #13501 3/29/18 GRAB SAMPLE ($\mu g/m^3$)	AMBIENT AIR OUTSIDE CANISTER #15047 3/29/2018 - 3/30/18 24-HOUR AVG. ($\mu g/m^3$)
Trichloroethene	**ND (0.41)**	**ND (0.41)**	**2.5**	**ND (0.36)**
Benzene	**0.47**	**0.48**	**ND (0.22)**	**0.59**
Chlorobenzene	**ND (0.35)**	**ND (0.35)**	**ND (0.32)**	**ND (0.31)**
1,4-Dichlorobenzene	**ND (0.46)**	**ND (0.46)**	**ND (0.41)**	**ND (0.41)**
Vinyl Chloride	**ND (0.20)**	**ND (0.20)**	**ND (0.18)**	**ND (0.17)**
Dichlorodifluoromethane	2.2	2.1	2.2	2.2
Trichlorofluoromethane	1.1	1.0	1.3	1.1
1,1-Dichloroethylene	ND (0.30)	ND (0.30)	0.78	ND (0.27)
Methylene Chloride	0.31	0.32	ND (0.24)	0.27
Methyl Ethyl Ketone	1.7	2.0	0.32	1.2
Hexane	0.96	0.82	ND (0.24)	0.58
Chloroform	0.72	0.95	0.35	ND (0.33)
1,1,1-Trichloroethane	ND (0.42)	ND (0.42)	1.9	ND (0.37)
Methyl Isobutyl Ketone	0.35	0.34	ND (0.28)	ND (0.28)
Toluene	1.5	1.3	ND (0.26)	6.2
Tetrachloroethylene	ND (0.52)	ND (0.52)	1.1	ND (0.46)
Ethylbenzene	0.37	ND (0.33)	ND (0.30)	ND (0.29)
m/p-Xylenes	1.2	0.95	ND (0.60)	0.78
o-Xylene	0.41	0.38	ND (0.30)	ND (0.29)

NOTES: ND = Not detected above reporting limits; reporting limit in parentheses
Compounds in bold type are target compounds for project.

Table 14
March 26, 2018
89 - 91 Pleasant Street
Ashland, MA
Nyanza Site
Soil Gas, Indoor Air, and Ambient Air Mobile Laboratory and Canister GC/MS Data

Sample Location	TCE ($\mu g/m^3$)	PCE ($\mu g/m^3$)
Basement		
Syringe air grab #1 sample above water in sump pump area (screening values only)	ND (2.2)	ND (1.4)
Syringe air grab #2 sample above slab cut away area (6" x 2" x 3" deep) (screening values only)	ND (2.2)	ND (1.4)
SS-1: grab sub-slab soil gas sample (screening values only)	81	ND (1.4)
SS-2: canister sub-slab soil gas grab sample (canister #15045)	44	ND (0.73)
SS-2: grab sub-slab soil gas sample (screening values only)	41	ND (1.4)
Outside/Ambient Air		
Ambient air 24-hour canister sample (canister #13492)	ND (0.40)	ND (0.51)
Syringe air grab #3 sample at outside ambient air location	ND (2.2)	ND (1.4)

NOTES:
COCs = Compounds of Concern
ND = Not detected above reporting limits; reporting limit in parentheses
TCE = Trichloroethylene, PCE = Tetrachloroethylene

Table 15
March 26, 2018
106 - 108 Pleasant Street
Ashland, MA
Nyanza Site
Soil Gas and Indoor Air Mobile Laboratory and Canister GC/MS Data

Sample Location	TCE ($\mu g/m^3$)	PCE ($\mu g/m^3$)
Basement		
Syringe air grab #1 sample above water in sump pump area in southeast corner (screening values only)	ND (2.2)	ND (1.4)
Syringe air grab #2 sample above water in sump pump area in northwest corner (screening values only)	ND (2.2)	ND (1.4)
SS-1: grab sub-slab soil gas sample (screening values only)	ND (2.2)	8
SS-1: grab sub-slab soil gas sample duplicate (screening values only)	ND (2.2)	7
SS-2: canister sub-slab soil gas grab sample (canister #12571)	1.2	12
SS-2: grab sub-slab soil gas sample (screening values only)	ND (2.2)	12

NOTES:
COCs = Compounds of Concern
ND = Not detected above reporting limits; reporting limit in parentheses
TCE = Trichloroethylene, PCE = Tetrachloroethylene

Table 16
March 26, 2018
102 Pleasant Street
Ashland, MA
Nyanza Site
Soil Gas and Indoor Air Mobile Laboratory and Canister GC/MS Data

Sample Location	TCE ($\mu g/m^3$)	PCE ($\mu g/m^3$)
Basement		
Syringe air grab #1 sample above water in sump pump area under stairs (screening values only)	ND (2.2)	ND (1.4)
Syringe air grab #2 sample above water in sump pump area next to boiler (screening values only)	ND (2.2)	ND (1.4)
SS-1: canister sub-slab soil gas grab sample (canister #22105)	ND (0.55)	ND (0.70)
SS-1: grab sub-slab soil gas sample (screening values only)	ND (2.2)	ND (1.4)
SS-2: grab sub-slab soil gas sample (screening values only)	ND (2.2)	ND (1.4)

NOTES:
COCs = Compounds of Concern
ND = Not detected above reporting limits; reporting limit in parentheses
TCE = Trichloroethylene, PCE = Tetrachloroethylene

Table 17
March 26, 2018
136 Pleasant Street
Ashland, MA
Nyanza Site
Soil Gas and Indoor Air Mobile Laboratory and Canister GC/MS Data

Sample Location	TCE ($\mu g/m^3$)	PCE ($\mu g/m^3$)
Basement		
Syringe air grab #1 sample above water in sump pump area in northwest corner (screening values only)	ND (2.2)	ND (1.4)
SS-1: canister sub-slab soil gas grab sample (canister #13493)	8.1	ND (0.66)
SS-1: grab sub-slab soil gas sample (screening values only)	23	ND (1.4)
SS-1: grab sub-slab soil gas sample duplicate (screening values only)	23	ND (1.4)

NOTES:
COCs = Compounds of Concern
ND = Not detected above reporting limits; reporting limit in parentheses
TCE = Trichloroethylene, PCE = Tetrachloroethylene

Table 18
March 28, 2018
118 Main Street
Ashland, MA
Nyanza Site
Soil Gas Mobile Laboratory and Canister GC/MS Data

Sample Location	TCE ($\mu g/m^3$)	PCE ($\mu g/m^3$)
Basement		
SS-1: canister sub-slab soil gas grab sample (canister #15048)	56	4.6
SS-1: grab sub-slab soil gas sample (screening values only)	45	3.4
SS-1: grab sub-slab soil gas sample duplicate (screening values only)	50	4.7
SS-2: grab sub-slab soil gas sample (screening values only)	45	0.68

NOTES:
COCs = Compounds of Concern
ND = Not detected above reporting limits; reporting limit in parentheses
TCE = Trichloroethylene, PCE = Tetrachloroethylene

Table 19
March 28, 2018
103 Pleasant Street
Ashland, MA
Nyanza Site
Soil Gas, Indoor Air, and Ambient Air Mobile Laboratory and Canister GC/MS Data

Sample Location	TCE ($\mu g/m^3$)	PCE ($\mu g/m^3$)
Basement		
Syringe air grab #2 sample where water line enters at wall/floor interface (screening values only)	ND (2.2)	ND (1.4)
Syringe air grab #3 sample where sewer line enters through floor (screening values only)	ND (2.2)	ND (1.4)
Indoor air 24-hour canister sample (canister #13498)	ND (0.42)	ND (0.53)
Indoor air 24-hour canister sample duplicate (canister #22680)	ND (0.42)	ND (0.53)
Syringe air grab #4 sample at indoor air sampling location (screening values only)	ND (2.2)	ND (1.4)
Outside/Ambient Air		
Ambient air 24-hour canister sample (canister #22686)	ND (0.40)	ND (0.51)
Syringe air grab #1 sample at outside ambient air location	ND (2.2)	ND (1.4)

COCs = Compounds of Concern
ND = Not detected above reporting limits; reporting limit in parentheses
TCE = Trichloroethylene, PCE = Tetrachloroethylene

Table 20
March 29, 2018
90 - 92 Pleasant Street/3 Forest Avenue
Ashland, MA
Nyanza Site
Soil Gas, Indoor Air, and Ambient Air Mobile Laboratory and Canister GC/MS Data

Sample Location	TCE ($\mu g/m^3$)	PCE ($\mu g/m^3$)
Basement		
Syringe air grab #2 sample within slab cut away area (39" x 19" x 12" deep) (screening values only)	ND (2.2)	ND (1.4)
SS-1: canister sub-slab soil gas grab sample (canister #20841)	11	1.2
SS-1: grab sub-slab soil gas sample (screening values only)	12	ND (1.4)
SS-1: grab sub-slab soil gas sample duplicate (screening values only)	12	ND (1.4)
SS-1: grab sub-slab soil gas sample triplicate (screening values only)	12	ND (1.4)
SS-2: grab sub-slab soil gas sample (screening values only)	ND (2.2)	ND (1.4)
SS-3: grab sub-slab soil gas sample (screening values only)	ND (2.2)	ND (1.4)
Outside/Ambient Air		
Ambient air 24-hour canister sample (canister #15047)	ND (0.36)	ND (0.46)
Syringe air grab #1 sample at outside ambient air location	ND (2.2)	ND (1.4)

COCs = Compounds of Concern
ND = Not detected above reporting limits; reporting limit in parentheses
TCE = Trichloroethylene, PCE = Tetrachloroethylene

Table 21
March 29, 2018
153 Pleasant Street
Ashland, MA
Nyanza Site
Indoor Air Mobile Laboratory Data

Sample Location	TCE ($\mu g/m^3$)	PCE ($\mu g/m^3$)
Basement		
Syringe air grab #1 sample within vertical stand pipe in northeast corner (screening values only)	ND (2.2)	ND (1.4)
Syringe air grab #2 sample where old septic waste pipe enters wall in northeast corner (screening values only)	ND (2.2)	ND (1.4)

COCs = Compounds of Concern
ND = Not detected above reporting limits; reporting limit in parentheses
TCE = Trichloroethylene, PCE = Tetrachloroethylene

Table 22
March 29, 2018
112 Pleasant Street
Ashland, MA
Nyanza Site
Soil Gas and Indoor Air Mobile Laboratory and Canister GC/MS Data

Sample Location	TCE ($\mu g/m^3$)	PCE ($\mu g/m^3$)
Basement		
Syringe air grab #1 sample above water in sump pump area (screening values only)	ND (2.2)	ND (1.4)
SS-1: canister sub-slab soil gas grab sample (canister #13501)	2.5	1.1
SS-1: grab sub-slab soil gas sample (screening values only)	ND (2.2)	ND (1.4)

COCs = Compounds of Concern
ND = Not detected above reporting limits; reporting limit in parentheses
TCE = Trichloroethylene, PCE = Tetrachloroethylene

APPENDIX C

A-Plus Construction Services Corp.
Surveying · Field Engineering · GPS Services
17 Accord Park Drive, Unit 102
Norwell, MA 02061-1629
(781) 681-6667 * Fax (781) 681-6673

TRANSMITTAL

TO: **Dominic Mattioni**
Nobis Engineering Inc.
18 Chennell Drive
Concord, NH 03301

FROM: **Mike Coleman**

DATE: **May 22, 2018**

SUBJECT: **Nyanza Superfund Site**
Ashland, MA

Dominic,
Enclosed are 2 copies of the of the Base Mapping and Well Survey Report for the Nyanza Chemical Waste Dump Site in Ashland, MA. If you require anything further please let me know.

Sincerely,

Mike Coleman

JN3835

A-PLUS
CONSTRUCTION SERVICES CORP.

CIVIL ENGINEERING
LAND SURVEYING
CONSTRUCTION SERVICES

A-Plus Construction Services Corp.
Civil Engineering ▪ Land Surveying ▪ Construction Services
17 Accord Park Drive, Unit 102
Norwell, MA 02061-1629
(781) 681-6667 * Fax (781) 681-6673

Base Mapping and Well Survey Report
Nyanza Chemical Waste Dump Site
Ashland, Massachusetts

May 22, 2018

1.0 Summary

On behalf of Nobis Engineering, Inc., A-Plus Construction Services Corp. has performed base mapping and a well survey at the Nyanza Chemical Waste Dump Site in Ashland, Massachusetts. The most recent plan entitled Base Mapping and Well Survey, Nyanza Chemical Waste Dump Site is dated May 9, 2018. The plan is an update from previous surveys of monitoring wells in the area of the site dating back to 2009. Several new monitoring wells were located in the field via GPS instrumentation. These wells are identified as MW-701S, MW-702S, and MW-40MAIN. Several existing wells were also located to confirm the accuracy of the GPS signals in the area on the day of the survey.

Survey field notes were recorded in book A-210 pages 116-117. The field notes are attached to this report.

Attachment 1

Survey Field Notes

Attachment 2

Plan entitled Base Mapping and Well Survey, Nyanza Chemical Waste Dump Site is dated May 9, 2018

Attachment 1

Survey Field Notes

116 3835

NYANZA DUMP SITE
NEW WELLS WATER & MAIN ST
MW-40MAIN, MW-701S & MW-702S

	5/2/18 MEASURED	RECORD
MW-302 @ TOWN HALL PARKING LOT (OLD)	2920161.904 665,179.696 EL= 193.84	2,920,161.87 665, 179.77 EL= 193.4'
MW-40MAIN (NEW)	2920122.53 ✓ 665140.77 ✓ EL= 195.12 (TOP CASING) ✓	
MW-701S (NEW)	2,920,568.75' ✓ 664,574.64' ✓ EL. 196.25' ✓ (TOC)	
MW-702S (NEW)	2,920,889.71 ✓ 664,842.44 ✓ EL.= 192.98 ✓ (PVC)	
MADEP-MW-1 @ #31 PLEASANT ST (OLD)	2,920,517.63 664,614.97 EL= 196.79	2920,517.64 664,615.07 EL=196.4'
MADEP-MW-2 @ #49 PLEASANT ST. (OLD)	2,920,508.27 664,493.84 EL= 197.82	2,920,508.24 664,493.86 EL= 194.7'

?

5/2/18 CLEAR 61°@8:00AM / 30.1 HG A-71/32

TRIMBLE 28

WILD NAK 1

J. SHOREY
M. ERICKSON

(SEE PG. A-71/32)

2.761 201.499		198.738	MW-40 MAIN U.P. 4.34/6 ALSO PLEASANT ST.
	5.735	195.764	MW-701S (TOP CASING) & GROUND
	5.937	195.562	RL
4.220 199.782			
	5.960	193.822	TP
4.604 198.426			
	5.702	192.724	MW-702S (TOC & GROUND)
4.920 ~~5.594~~ 197.044			
	4.530	192.514	(PVC)
	6.045	190.999	TP
5.790 196.789			
	5.13	191.66'	MW-40 MAIN GROUND
	2.084	194.705	(TOC)
	2.195	194.594	PVC
3.296 197.88			
	2.929	194.961	"X" CUT SAW IND. HOOD FRONT @ NW CORN. INT PLEASANT & MAIN ST
		(194.970)	(PG. A-71/32)
		-0.009	

Peter de Rham

Attachment 2

Plan entitled Base Mapping and Well Survey, Nyanza Chemical Waste Dump Site is dated May 9, 2018

NOTES:

1. CONTOURS SHOWN WERE INTERPOLATED FROM 3 METER CONTOURS OBTAINED FROM THE MASSGIS WEBSITE.

2. HORIZONTAL DATUM IS IN REFERENCE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83).

3. VERTICAL DATUM IS IN REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

4. PROPERTY LINES SHOWN ARE APPROXIMATE AND WERE OBTAINED FROM THE MASSGIS WEBSITE.

LEGEND:

- SG-1 STREAM GAUGE
- MW-4 MONITORING WELL
- WETLAND DELINEATION LINE
- APPROX. PROPERTY LINE
- 625 CONTOUR 25' INTERVAL
- 625 CONTOUR 5' INTERVAL

EXISTING MONITORING WELL TABLE:

WELLS ID	NORTHING (FT NAD83)	EASTING (FT NAD83)	GROUND ELEVATION (FT NAVD88)	TOC ELEVATION (FT NAVD88)	PROTECTIVE ELEVATION (FT NAVD88)	A-PLUS POINT NUMBER
EPA WELL	2,020,153.14	693,133.97	195.3	195.28	195.12	1973
EPA-2	2,019,998.99	693,212.43	197.3	197.69	197.69	1970
MADEP-MW-1	2,020,517.64	694,015.07	195.4	195.38		1969
MADEP-MW-2	2,020,525.34	694,455.98	197.4	197.44		1951
MW-B-11	2,019,525.62	692,171.72	199.6	202.98	202.67	1990
MW-B-5	2,020,135.40	693,164.39	195.5	195.30	195.39	1988
MW-102A	2,019,135.59	693,374.99	195.3	195.25	195.04	1984
MW-102B	2,019,135.55	693,380.95	195.3	195.63	195.45	1985
MW-103	2,019,417.33	694,230.04	195.5	200.95	200.67	1979
MW-104A	2,019,979.30	693,392.96	201.2	202.96	202.76	1987
MW-104B	2,019,998.88	693,394.62	203.0	203.94	203.55	1986
MW-105	2,019,677.50	694,432.16	194.7	194.44	193.91	1976
MW-106	2,019,691.79	694,633.00	195.0	195.93	195.39	1985
MW-107	2,019,998.34	694,542.02	194.0	194.02	193.91	1980
MW-11	2,019,995.69	693,745.13	195.0	195.33	195.18	1977
MW-110	2,020,045.86	693,951.38	195.8	195.30	195.38	1989
MW-112A	2,020,077.56	693,499.98	195.3	197.93	197.61	1984
MW-112B	2,020,081.74	693,494.65	195.3	198.69	197.88	1986
MW-113A	2,020,145.57	693,139.34	195.6	195.89	195.35	1981
MW-113B	2,020,149.68	693,139.12	195.1	195.49	194.85	1982
MW-114A	2,020,304.59	694,695.97	192.2	192.31	192.10	1973
MW-114B	2,020,309.53	694,698.96	192.3	192.69	191.94	1976
MW-201	2,020,422.97	694,342.31	197.2	199.80	199.73	1995
MW-202	2,020,440.93	694,386.53	199.3	199.33	199.11	1994
MW-203A	2,020,302.23	694,195.74	194.9	194.22	193.99	1983
MW-203B	2,020,305.93	694,198.64	199.9	194.29	193.97	1982
MW-204A	2,020,365.86	693,691.99	198.6	199.69	199.14	1987
MW-204B	2,020,468.39	693,695.97	199.0	199.97	199.69	1988
MW-201	2,019,920.77	693,482.44	207.3	209.39	209.69	1993
MW-202	2,020,191.97	695,179.77	193.4	193.35	193.35	1945
MW-204A	2,020,045.80	693,929.96	192.5	192.54	192.39	1983
MW-204B	2,020,049.91	693,933.31	192.7	192.72	192.46	1982
MW-205B	2,020,633.87	693,457.69	195.6	199.89	199.38	1985
MW-3A	2,019,991.05	692,694.78	195.1	197.89	197.39	1913
MW-3B	2,019,997.95	692,694.69	195.1	197.69	197.39	1914
MW-401	2,020,099.98	693,397.83	195.7	199.69	199.38	1992
MW-402	2,019,993.05	693,168.63	239.2	222.69	222.52	1996
MW-402A	2,020,018.91	695,691.98	194.9	197.35	196.98	1973
MW-404A	2,019,203.71	695,485.82	189.9	191.89	191.79	1946
MW-404B	2,019,202.91	695,488.91	189.9	191.73	191.67	1947
MW-405A	2,019,016.16	695,143.33	189.8	195.57	195.30	1949
MW-405B	2,019,018.89	695,131.82	189.7	195.69	195.34	1951
MW-407A	2,019,693.39	693,928.77	193.8	195.47	195.42	1968
MW-407B	2,019,693.71	693,916.91	193.8	195.64	195.34	1969
MW-408A	2,019,762.12	697,238.80	194.4	197.34	197.12	1942
MW-408B	2,019,763.77	697,234.96	194.3	197.65	197.35	1943
MW-4A	2,020,197.80	692,833.91	199.2	199.92	199.16	1979
MW-4B	2,020,198.92	692,839.97	199.1	199.91	199.67	1978
MW-4C	2,020,203.33	692,571.13	199.0	199.35	199.09	1989
MW-503A	2,019,549.62	693,128.39	239.9	241.67	241.77	1911
MW-503B	2,019,536.49	693,126.68	239.2	241.95	241.49	1913
MW-508A	2,019,097.34	692,683.35	239.5	233.89	232.82	1915
MW-508B	2,019,099.76	692,676.09	239.4	232.79	232.41	1916
MW-9A	2,020,048.91	693,998.94	192.9	192.65	192.48	1991
MW-9B	2,019,942.39	694,003.98	191.9	192.69	192.45	1957
MW-9	2,019,995.57	693,211.23	197.5	199.49	199.23	1989
MW-9A	2,019,499.64	693,002.39	199.9	199.22	199.32	1999
MW-9B	2,019,497.33	693,005.99	197.9	197.89	197.82	1997
MW-9C	2,019,498.99	693,995.94	198.2	197.91	197.83	1998
P-1	2,020,131.20	693,192.12	199.2	199.39	199.09	1989
P-1B	2,020,129.62	693,195.17	198.3	199.35	199.07	1988
P-1S	2,020,134.69	693,199.99	199.4	199.35	199.09	1985
P-2	2,020,123.96	693,335.36	197.1	197.11	199.69	1984
P-4	2,020,118.27	693,169.43	198.3	199.30	198.83	1986
P-5	2,020,163.71	693,194.28	197.9	197.94	198.57	1977
RMW-102	2,020,748.66	693,398.76	192.4	194.69	193.85	1988
RMW-110A	2,021,434.47	694,916.63	191.2	193.81	192.44	1944
RMW-117A	2,021,481.89	693,321.69	209.9	212.79	211.94	1981
RMW-305A	2,020,836.40	693,453.20	199.9	199.47	199.32	1984
RMW-405B	2,020,797.97	695,695.93	199.9	197.83	197.13	1972
RMW-406A	2,020,995.67	695,695.47	199.8	199.49	199.19	1970
RMW-406B	2,020,993.64	695,917.87	191.9	199.65	199.34	1969
RW-1	2,020,141.47	693,177.40	199.2	199.22	199.80	1989
RWB-1	2,020,141.47	693,177.40	199.2	199.22	199.16	1989
SG-4SG	2,019,985.29	693,125.34	199.1	201.89	201.19	1971
SG-6SH	2,020,159.99	693,397.87	193.4	193.42	192.79	1921
SG-1A	2,020,049.49	691,456.69	TOP BRIDGE DECK		200.79	2000
SG-1B	2,020,032.29	691,312.79	TOP OF ROCK		199.79	2009
SG-2	2,020,991.53	693,451.64	STAFF READING AT "TOP OF STREAM GAUGE = 2.35 ft"		192.34	1935
SG-3A	2,020,871.16	693,030.61	TOP NAIL IN TREE		195.17	2002
SG-3B	2,021,139.79	693,034.61	TOP DAM WALL		191.19	2005
SG-3A	2,021,350.67	693,038.94	TOP BRIDGE ABUTMENT		192.89	2006
SG-3B	2,020,991.63	693,076.77	TOP OF NUT		189.86	2008
WP-101	2,019,921.57	694,951.38	192.0		195.21	1990
WP-105	2,020,722.64	694,942.98	191.5		193.35	1999
MW-701B	2,020,999.79	694,574.64	192.7	195.76	195.39	2008
MW-702B	2,020,939.71	694,942.64	192.7	192.73	192.91	2010
MW-406MW	2,020,722.83	695,149.77	191.7	194.73	194.89	2011

REVISIONS

REV.	COMMENTS	DATE
1	ADJUSTED NAMES OF WELLS AND ADDED WELL P-4	02/08/2013
2	ADDED STREAM GAUGES AND ADJUSTED WELL ELEV'S	06/28/2013
3	ADDED WELLS MW-701B, MW-702B, & MW-406MW	05/09/2018
	REVISED ELEVATIONS FOR WELL MADEP-MW-2	

ORIGINAL FULL SIZE DRAWING=4"
REPRODUCTIONS MAY BE REDUCED SIZE

PREPARED BY
A-PLUS CONSTRUCTION SERVICES CORPORATION
17 ASHFIELD PLACE [illegible] WEST BOX [illegible] BRIDGEWATER, MASS. 02324
TEL. (508) 697-0007 FAX. (508) 697-0500

FIELD CHIEF: JS	DES/COMP: BH	DRAFTED BY: BH	CHECKED BY: MC
DATE: 09 MAY 2018	SCALE: 1 IN. = 200 FT.	JOB# 3334	FILE:3334.DWG

BASE MAPPING AND WELL SURVEY
NYANZA CHEMICAL WASTE DUMP SITE
ASHLAND, MA

PREPARED FOR
NORRIS ENGINEERING, INC.

SHEET 1 of 1 OF REV.3

APPENDIX D

Nobis
Engineering a Sustainable Future

March 7, 2018
Nobis File No. 80113

Ms. Lynne Jennings
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No. EP-S1-06-03
Task Order No. 0113-RI-CO-0115
Case No. 0218S, Sample Delivery Group (SDG) No.: SC41501
Eurofins Spectrum Analytical, Agawam, Massachusetts
Nyanza Chemical Waste Dump, OU2 Superfund Site
Ashland, Massachusetts
CERCLIS No.: MAD990685422

Tier 1 Modified Data Review

Dissolved Gases, Biochemical and Chemical Oxygen Demand, Organic Carbon:
7/Aqueous/MW-115A-111317A, MW-115B-1317A, MW-115B-111317D, MW-3B-111317A, MW-203B-111317A, MW-2-3A-111317A, MW-104B-111317A
1/Field Duplicate: MW-115B-111317A/MW-115B-111317D

Dear Ms. Jennings:

Nobis Engineering, Inc. (Nobis) performed a Tier 1 Modified data review, modified for the analytical method on the organic analytical data for the samples listed above. The groundwater samples were collected by Nobis at the Nyanza Chemical Waste Dump, OU2 Superfund Site located in Ashland, Massachusetts. The samples were analyzed by Eurofins Spectrum Analytical using EPA Method RSK-175 and according to the DAS technical specification (DAS-RAC2-067) for dissolved gases, SM5310B for total organic carbon, SM5210B for biochemical oxygen demand, and SM5220D for chemical oxygen demand.

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (January 2017); and the Quality Assurance Project Plan (QAPP for the Nyanza Chemical Waste Dump OU2 Superfund Site (December 2017).

The data were evaluated based on the following parameters:

* • Overall Evaluation of Data and Potential Usability Issues
* • Data Completeness
* • Preservation and Technical Holding Times
* • Blanks

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

NA	•	Surrogate Compounds
	•	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
*	•	Laboratory Duplicates
*	•	Laboratory Control Samples (LCS)
	•	Field Duplicates
	•	Reported Quantitation Limits

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues

The objectives of the groundwater sampling at the site are to provide a comprehensive evaluation of the shallow and deep groundwater contaminants at the site and to evaluate the feasibility of implementing monitored natural attenuation (MNA) as a remedial alternative for the site.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

Dissolved Gases:

Results for two samples were qualified for field duplicate imprecision. The relative percent difference (RPD) for field duplicate pair MW-115B-111317A and MW-115B-111317D was greater than 30%.

Biochemical and Chemical Oxygen Demand:

Results for biochemical oxygen demand (BOD_5) were qualified for low matrix spike recovery and for likely presence of an interfering toxic substance, as evidenced by a high percent differences in the dilutions.

Chemical oxygen demand (COD) quantitation limits were higher than specified in the Quality Assurance Project Plan. Sample results in all but one sample were higher than the quantitation limit, and there is not a project action limit for COD. No action was taken.

Total and Dissolved Organic Carbon:

Results did not require qualification.

Please contact Lori Cox at (603) 513-1010 or lcox@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Lori A. L. Cox

Alyssa Epstein
Staff Scientist

Lori Cox
Data Validator

Tables: Data Summary Table - Tier 1 Mod Data Review

Enclosure: Data Review Checklist
Supporting information
COCs

Nyanza Chemical Waste Dump
SDG 0218S_SC41501
Methane, Ethane, Ethene in Groundwater

DATA SUMMARY TABLE

Lab Sample ID	SC41501-01A	SC41501-02B	SC41501-03A	SC41501-04A	SC41501-05A	SC41501-06A	SC41501-07A
Field Sample ID	MW-115A-111317A	MW-115B-111317A	MW-115B-111317D	MW-3B-111317A	MW-203B-111317A	MW-203A-111317A	MW-104B-111317A
Sample Location	MW-115A	MW-115B	MW-115B	MW-03B	MW-203B	MW-203A	MW-104B
Sample Date	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17
Methane, Ethane, Ethene (ug/L)							
Ethane	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethene	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methane	2.2 U	2.2 UJ	29 J	2.2 U	2.2 U	2.2 U	2.2 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	SC41501-01C	SC41501-01G	SC41501-02C	SC41501-02G	SC41501-03C	SC41501-03G	SC41501-04C	SC41501-04T	SC41501-05C	SC41501-05G	SC41501-06C
Field Sample ID	MW-115A-111317A	MW-115A-111317A	MW-115B-111317A	MW-115B-111317A	MW-115B-111317D	MW-115B-111317D	MW-3B-111317A	MW-3B-111317A	MW-203B-111317A	MW-203B-111317A	MW-203A-111317A
Sample Location	MW-115A	MW-115A	MW-115B	MW-115B	MW-115B	MW-115B	MW-03B	MW-03B	MW-203B	MW-203B	MW-203A
Sample Date	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17
Other Analyses (mg/L)											
Biologic Oxygen Demand, Five Day	NA	23 J	NA	20 J	NA	18 J	NA	3 UJ	NA	18 J	NA
Dissolved Organic Carbon	95	NA	88.8	NA	88.4	NA	1.26	NA	13.5	NA	76.9

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	SC41501-06G	SC41501-07C	SC41501-07G
Field Sample ID	MW-203A-111317A	MW-104B-111317A	MW-104B-111317A
Sample Location	MW-203A	MW-104B	MW-104B
Sample Date	11/13/17	11/13/17	11/13/17
Other Analyses (mg/L)			
Biologic Oxygen Demand, Five Day	43 J	NA	12 J
Dissolved Organic Carbon	NA	6.12	NA

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	SC41501-01E	SC41501-02E	SC41501-03E	SC41501-04M	SC41501-05E	SC41501-06E	SC41501-07E
Field Sample ID	MW-115A-111317A	MW-115B-111317A	MW-115B-111317D	MW-3B-111317A	MW-203B-111317A	MW-203A-111317A	MW-104B-111317A
Sample Location	MW-115A	MW-115B	MW-115B	MW-03B	MW-203B	MW-203A	MW-104B
Sample Date	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17
General Chemistry (mg/L)							
Total Organic Carbon	97.8	87.6	88.4	1.35	15	80.8	7.76

Lab Sample ID	SC41501-01	SC41501-02	SC41501-03	SC41501-04	SC41501-05	SC41501-06	SC41501-07
Field Sample ID	MW-115A-111317A	MW-115B-111317A	MW-115B-111317D	MW-3B-111317A	MW-203B-111317A	MW-203A-111317A	MW-104B-111317A
Sample Location	MW-115A	MW-115B	MW-115B	MW-03B	MW-203B	MW-203A	MW-104B
Other Analyses (mg/L)							
Sample Date	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17
Chemical Oxygen Demand	493	364	374	10 U	46	707	16

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

Generic Data Review Checklist

Project: Nyanza OU2
Project #: 80113
Case#: 0218S
Date: 3/2/18
Methods: Dissolved Gases (RSK-175), Biochemical Oxygen Demand (SM5210B), Organic Carbon (9060/SM5310B), Chemical Oxygen Demand (SM-5220D)
Laboratory: Spectrum Analytical
SDG: SC41501
Reviewer: Alyssa Epstein

1. **Case Narrative and Data Package Completeness (COC and Analyte List Review)**
   7 samples (SC41501-01 – SC41501-07)

2. **Holding Time and Sample Preservation Compliance**
   ok

3. **Lab and Field Blanks**
   Ok

4. **Laboratory Control Samples**
   ok

5. **Field Duplicate Precision**
   MW-115B-111317A (SC41501-02)/MW-115B-111317D (SC41501-03) – out of control for methane, in control for remaining analyses. Qualify these 2 samples with J/UJ.

6. **Laboratory Duplicate Precision**
   Ok for BOD, TOC, DOC, dissolved gases, COD

7. **Matrix Spikes**
   NA for dissolved gases. Low recovery and high RPD for BOD – J results for SC41501-04; Ok for TOC, DOC, COD

8. **Surrogate Spikes**
   NA

9. **Internal Standards**
   NA

10. **Performance Evaluation Samples**
    NA

11. **Reporting Limits**
    The QAPP specifies the RL for Chemical Oxygen Demand (COD) should be 5 mg/L; however, the RL for COD in this SDG was 10 mg/L. Results for COD are greater than 10 mg/L except for MW-3B-111317A. All remaining Reported RLs <QAPP.

12. Calibration Issues

None

13. Other

BOD: Lab notes high % difference in dilutions for all samples. This indicates the likely presence of a toxic substance that may be interfering with results. Estimate (J) all BOD results.

Nyanza OU2 - Nov. 2017
Field Duplicates
Case 0218S, SDG SC41501

					>30%	
	SC41501-02		SC41501-03		RPD	comment
Methane	2.2	U	29		Not calculated	Qualify J/UJ
Ethane	ND		ND		N/A	
Ethene	ND		ND		N/A	
Biologic Oxygen Demand, Five Day	20		18		10.53%	
Dissolved Organic Carbon	88.8		88.4		0.45%	
Total Organic Carbon	87.6		88.4		-0.91%	

SC41501 By

USEPA CLP Generic COC (LAB COPY)

Contact Name:
Contact Phone:
Case #: 0218S

CHAIN OF CUSTODY RECORD

Lab Address: 646 Camp Avenue
Lab Phone: 413-789-9018

No: 1-111317-163900-0056

Lab: Eurofins Spectrum Analytical
Lab Contact: Agnes Huntley
Lab_City: North Kingston

	Sample Identifier	CLP Sample No.	Matrix/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
01	MW-115A-111317A	D08591	Ground Water/ Chris Falco	Grab	DissGas(14), DOC(14), TOC(14), BOD(14), COD(14)	D (4 C), E (4 C), F (H3PO4), G (4 C), I (H2SO4) (8)	MW-115A	11/13/2017 11:00	
02	MW-115B-111317A	D08592	Ground Water/ Allie Goldberg	Grab	DissGas(14), DOC(14), TOC(14), BOD(14), COD(14)	D (4 C), E (4 C), F (H3PO4), G (4 C), I (H2SO4) (8)	MW-115B	11/13/2017 11:05	
03	MW-115B-111317D	D08593	Ground Water/ Allie Goldberg	Grab	DissGas(14), DOC(14), TOC(14), BOD(14), COD(14)	D (4 C), E (4 C), F (H3PO4), G (4 C), I (H2SO4) (8)	MW-115B	11/13/2017 15:40	
04	MW-3B-111317A	D08594	Ground Water/ Erik Johnson	Grab	DissGas(14), DOC(14), TOC(14), BOD(14), COD(14)	D (4 C), E (4 C), F (H3PO4), G (4 C), I (H2SO4) (24)	MW-3B	11/13/2017 12:00	
05	MW-203B-111317A	D08595	Ground Water/ Allie Goldberg	Grab	DissGas(14), DOC(14), TOC(14), BOD(14), COD(14)	D (4 C), E (4 C), F (H3PO4), G (4 C), I (H2SO4) (8)	MW-203B	11/13/2017 13:10	
06	MW-203A-111317A	D08596	Ground Water/ Chris Falco	Grab	DissGas(14), DOC(14), TOC(14), BOD(14), COD(14)	D (4 C), E (4 C), F (H3PO4), G (4 C), I (H2SO4) (8)	MW-203A	11/13/2017 13:50	
07	MW-104B-111317A	D08598	Ground Water/ Erik Johnson	Grab	DissGas(14), DOC(14), TOC(14), BOD(14), COD(14)	D (4 C), E (4 C), F (H3PO4), G (4 C), I (H2SO4) (8)	MW-104B	11/13/2017 15:35	

Sample(s) to be used for Lab QC: MW-3B-111317A Tag D, MW-3B-111317A Tag E, MW-3B-111317A Tag F, MW-3B-111317A Tag G, MW-3B-111317A Tag I

MW-3B 111317A 1 broken vial; 1 vial leaked (missing)

Shipment for Case Complete? N

Samples Transferred From Chain of Custody #

Analysis Key: DissGas=Dissolved Gases, DOC=Dissolved Organic Carbon, TOC=Total Organic Carbon, BOD=Biological Oxygen Demand, COD=Chemical Oxygen Demand

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
		11/14/17 1220		11/14/17 1220	
		11/14/17		11/14/17 1538	

0.6|0|0.6|2

USEPA

DateShipped: 11/14/2017
CarrierName: Courier
AirbillNo:

CHAIN OF CUSTODY RECORD

Site #: 80022
Contact Name:
Contact Phone:

No: 1-111317-163900-0056

Cooler #:
Lab: Eurofins Spectrum Analytical
Lab Phone: 413-789-9018

Lab #	Sample #	Location	CLP Sample #	Tag	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	Lab QC
	MW-115A-111317A	MW-115A	D08591	D	Dissolved Gases	Ground Water	11/13/2017	2	40 ml VOA	4 C	N
	MW-115A-111317A	MW-115A	D08591	E	Dissolved Organic Carbon	Ground Water	11/13/2017	2	40 ml VOA	4 C	N
	MW-115A-111317A	MW-115A	D08591	F	Total Organic Carbon	Ground Water	11/13/2017	2	40 ml VOA	H3PO4	N
	MW-115A-111317A	MW-115A	D08591	G	Biological Oxygen Demand	Ground Water	11/13/2017	1	1 L poly	4 C	N
	MW-115A-111317A	MW-115A	D08591	I	Chemical Oxygen Demand	Ground Water	11/13/2017	1	250ml Poly	H2SO4	N
	MW-115B-111317A	MW-115B	D08592	D	Dissolved Gases	Ground Water	11/13/2017	2	40 ml VOA	4 C	N
	MW-115B-111317A	MW-115B	D08592	E	Dissolved Organic Carbon	Ground Water	11/13/2017	2	40 ml VOA	4 C	N
	MW-115B-111317A	MW-115B	D08592	F	Total Organic Carbon	Ground Water	11/13/2017	2	40 ml VOA	H3PO4	N
	MW-115B-111317A	MW-115B	D08592	G	Biological Oxygen Demand	Ground Water	11/13/2017	1	1 L poly	4 C	N
	MW-115B-111317A	MW-115B	D08592	I	Chemical Oxygen Demand	Ground Water	11/13/2017	1	250ml Poly	H2SO4	N
	MW-115B-111317D	MW-115B	D08593	D	Dissolved Gases	Ground Water	11/13/2017	2	40 ml VOA	4 C	N

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			[illegible]	11/14/17	

53
18
71

USEPA

DateShipped: 11/14/2017
CarrierName: Courier
AirbillNo:

CHAIN OF CUSTODY RECORD

Site #: 80022
Contact Name:
Contact Phone:

No: 1-111317-163900-0056

Cooler #:
Lab: Eurofins Spectrum Analytical
Lab Phone: 413-789-9018

Lab #	Sample #	Location	CLP Sample #	Tag	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	Lab QC
	MW-115B-111317D	MW-115B	D08593	E	Dissolved Organic Carbon	Ground Water	11/13/2017	2	40 ml VOA	4 C	N
	MW-115B-111317D	MW-115B	D08593	F	Total Organic Carbon	Ground Water	11/13/2017	1 2	40 ml VOA	H3PO4	N
	MW-115B-111317D	MW-115B	D08593	G	Biological Oxygen Demand	Ground Water	11/13/2017	1	1 L poly	4 C	N
	MW-115B-111317D	MW-115B	D08593	I	Chemical Oxygen Demand	Ground Water	11/13/2017	1	250ml Poly	H2SO4	N
	MW-3B-111317A	MW-3B	D08594	D	Dissolved Gases	Ground Water	11/13/2017	6	40 ml VOA	4 C	Y
	MW-3B-111317A	MW-3B	D08594	E	Dissolved Organic Carbon	Ground Water	11/13/2017	6	40 ml VOA	4 C	Y
	MW-3B-111317A	MW-3B	D08594	F	Total Organic Carbon	Ground Water	11/13/2017	6	40 ml VOA	H3PO4	Y
	MW-3B-111317A	MW-3B	D08594	G	Biological Oxygen Demand	Ground Water	11/13/2017	3	1 L poly	4 C	Y
	MW-3B-111317A	MW-3B	D08594	I	Chemical Oxygen Demand	Ground Water	11/13/2017	3	250ml Poly	H2SO4	Y
	MW-203B-111317A	MW-203B	D08595	D	Dissolved Gases	Ground Water	11/13/2017	2	40 ml VOA	4 C	N
	MW-203B-111317A	MW-203B	D08595	E	Dissolved Organic Carbon	Ground Water	11/13/2017	2	40 ml VOA	4 C	N

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA

DateShipped: 11/14/2017
CarrierName: Courier
AirbillNo:

CHAIN OF CUSTODY RECORD

Site #: 80022
Contact Name:
Contact Phone:

No: 1-111317-163900-0056

Cooler #:
Lab: Eurofins Spectrum Analytical
Lab Phone: 413-789-9018

Lab #	Sample #	Location	CLP Sample #	Tag	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	Lab QC
	MW-203B-111317A	MW-203B	D08595	F	Total Organic Carbon	Ground Water	11/13/2017	2	40 ml VOA	H3PO4	N
	MW-203B-111317A	MW-203B	D08595	G	Biological Oxygen Demand	Ground Water	11/13/2017	1	1 L poly	4 C	N
	MW-203B-111317A	MW-203B	D08595	I	Chemical Oxygen Demand	Ground Water	11/13/2017	1	250ml Poly	H2SO4	N
	MW-203A-111317A	MW-203A	D08596	D	Dissolved Gases	Ground Water	11/13/2017	2	40 ml VOA	4 C	N
	MW-203A-111317A	MW-203A	D08596	E	Dissolved Organic Carbon	Ground Water	11/13/2017	2	40 ml VOA	4 C	N
	MW-203A-111317A	MW-203A	D08596	F	Total Organic Carbon	Ground Water	11/13/2017	2	40 ml VOA	H3PO4	N
	MW-203A-111317A	MW-203A	D08596	G	Biological Oxygen Demand	Ground Water	11/13/2017	1	1 L poly	4 C	N
	MW-203A-111317A	MW-203A	D08596	I	Chemical Oxygen Demand	Ground Water	11/13/2017	1	250ml Poly	H2SO4	N
	MW-104B-111317A	MW-104B	D08598	D	Dissolved Gases	Ground Water	11/13/2017	2	40 ml VOA	4 C	N
	MW-104B-111317A	MW-104B	D08598	E	Dissolved Organic Carbon	Ground Water	11/13/2017	2	40 ml VOA	4 C	N
	MW-104B-111317A	MW-104B	D08598	F	Total Organic Carbon	Ground Water	11/13/2017	2	40 ml VOA	H3PO4	N

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

USEPA

DateShipped: 11/14/2017
CarrierName: Courier
AirbillNo:

CHAIN OF CUSTODY RECORD

Site #: 80022
Contact Name:
Contact Phone:

No: 1-111317-163900-0056

Cooler #:
Lab: Eurofins Spectrum Analytical
Lab Phone: 413-789-9018

Lab #	Sample #	Location	CLP Sample #	Tag	Analyses	Matrix	Collected	Numb Cont	Container	Preservative	Lab QC
	MW-104B-111317A	MW-104B	D08598	G	Biological Oxygen Demand	Ground Water	11/13/2017	1	1 L poly	4 C	N
	MW-104B-111317A	MW-104B	D08598	I	Chemical Oxygen Demand	Ground Water	11/13/2017	1	250ml Poly	H2SO4	N

Special Instructions:

SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt

Nobis
Engineering a Sustainable Future

March 7, 2018
Nobis File No. 80113

Ms. Lynne Jennings
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No. EP-S1-06-03
Task Order No. 0113-RI-CO-0115
Case No. 0218S, Sample Delivery Group (SDG) No.: SC41552
Eurofins Spectrum Analytical, Agawam, Massachusetts
Nyanza Chemical Waste Dump, OU2 Superfund Site
Ashland, Massachusetts
CERCLIS No.: MAD990685422

Tier 1 Modified Data Review

Dissolved Gases, Biochemical and Chemical Oxygen Demand, Organic Carbon:
4/Aqueous/MW-104A-111417A, MW-112A-111417A, MW-305B-111417A, MW-112B-111417A

Dear Ms. Jennings:

Nobis Engineering, Inc. (Nobis) performed a Tier 1 Modified data review, modified for the analytical method on the organic analytical data for the samples listed above. The groundwater samples were collected by Nobis at the Nyanza Chemical Waste Dump, OU2 Superfund Site located in Ashland, Massachusetts. The samples were analyzed by Eurofins Spectrum Analytical using EPA Method RSK-175 and according to the DAS technical specification (DAS-RAC2-067) for dissolved gases, SM5310B for total organic carbon, SM5210B for biochemical oxygen demand, and SM5220D for chemical oxygen demand.

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008); and the Quality Assurance Project Plan (QAPP) for the Nyanza Chemical Waste Dump, OU2 Superfund Site (December 2017).

The data were evaluated based on the following parameters:

*	•	Overall Evaluation of Data and Potential Usability Issues
*	•	Data Completeness
*	•	Preservation and Technical Holding Times
*	•	Blanks
NA	•	Surrogate Compounds

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

*	•	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
*	•	Laboratory Duplicates
*	•	Laboratory Control Samples (LCS)
NA	•	Field Duplicates
	•	Reported Quantitation Limits

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues
The objectives of the groundwater sampling at the site are to provide a comprehensive evaluation of the shallow and deep groundwater contaminants at the site and to evaluate the feasibility of implementing monitored natural attenuation (MNA) as a remedial alternative for the site.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

Dissolved Gases:
Results did not require qualification.

Biochemical and Chemical Oxygen Demand:
Results for biochemical oxygen demand (BOD_5) were qualified for likely presence of an interfering toxic substance, as evidenced by a high percent differences in the dilutions.

Chemical oxygen demand (COD) quantitation limits were higher than specified in the QAPP. Sample results in all but one sample were higher than the quantitation limit, and there is not a project action limit for COD. No action was taken.

Total and Dissolved Organic Carbon:
Results did not require qualification.

Please contact Lori Cox at (603) 513-1010 or lcox@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Lori A. L. Cox

Alyssa Epstein
Staff Scientist

Lori Cox
Data Validator

Tables: Data Summary Table - Tier 1 Mod Data Review

Enclosure: Data Review Checklist
COCs

Nyanza Chemical Waste Dump
SDG 0218S_SC41552
Methane, Ethane, Ethene in Groundwater

DATA SUMMARY TABLE

Lab Sample ID	SC41552-01A	SC41552-02A	SC41552-03A	SC41552-04A
Field Sample ID	MW-104A-111417A	MW-112A-111417A	MW-305B-111417A	MW-112B-111417A
Sample Location	MW-104A	MW-112A	MW-305B	MW-112B
Sample Date	11/14/17	11/14/17	11/14/17	11/14/17
Methane, Ethane, Ethene (ug/L)				
Ethane	5 U	5 U	31	5 U
Ethene	5 U	5 U	54	5 U
Methane	14	2.2 U	2.2 U	2.2 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	SC41552-01C	SC41552-01G	SC41552-02C	SC41552-02G	SC41552-03C	SC41552-03G	SC41552-04C	SC41552-04G
Field Sample ID	MW-104A-111417A	MW-104A-111417A	MW-112A-111417A	MW-112A-111417A	MW-305B-111417A	MW-305B-111417A	MW-112B-111417A	MW-112B-111417A
Sample Location	MW-104A	MW-104A	MW-112A	MW-112A	MW-305B	MW-305B	MW-112B	MW-112B
Sample Date	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17
Other Analyses (mg/L)								
Biologic Oxygen Demand, Five Day	NA	3 UJ	NA	3 UJ	NA	3 UJ	NA	3 UJ
Dissolved Organic Carbon	3.58	NA	9.72	NA	1.03	NA	2.96	NA

Lab Sample ID	SC41552-01	SC41552-02	SC41552-02	SC41552-04
Field Sample ID	MW-104A-111417A	MW-112A-111417A	MW-305B-111417A	MW-112B-111417A
Sample Location	MW-104A	MW-112A	MW-305B	MW-112B
Sample Date	11/14/17	11/14/17	11/14/17	11/14/17
Other Analyses (mg/L)				
Chemical Oxygen Demand	20	40	10 U	20

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	SC41552-01E	SC41552-02E	SC41552-03E	SC41552-04E
Field Sample ID	MW-104A-111417A	MW-112A-111417A	MW-305B-111417A	MW-112B-111417A
Sample Location	MW-104A	MW-112A	MW-305B	MW-112B
Sample Date	11/14/17	11/14/17	11/14/17	11/14/17
General Chemistry (mg/L)				
Total Organic Carbon	4.45	10.5	1 U	4.15

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

Generic Data Review Checklist

Project: Nyanza OU2
Project #: 80113
Case#: 0218S
Date: 3/7/18
Methods: Dissolved Gases (RSK-175), Biochemical Oxygen Demand (SM5210B), Organic Carbon (9060/SM5310B), Chemical Oxygen Demand (SM-5220D)
Laboratory: Spectrum Analytical
SDG: SC41552
Reviewer: Alyssa Epstein

1. **Case Narrative and Data Package Completeness (COC and Analyte List Review)**
   4 samples (SC41552-01 – SC41552-04)

2. **Holding Time and Sample Preservation Compliance**
   ok

3. **Lab and Field Blanks**
   ok

4. **Laboratory Control Samples**
   ok

5. **Field Duplicate Precision**
   NA

6. **Laboratory Duplicate Precision**
   NA for BOD, DOC, and TOC; ok for dissolved gases and COD

7. **Matrix Spikes**
   NA for BOD, DOC, TOC, dissolved gases; ok for COD

8. **Surrogate Spikes**
   NA

9. **Internal Standards**
   NA

10. **Performance Evaluation Samples**
    NA

11. **Reporting Limits**
    The QAPP specifies the RL for Chemical Oxygen Demand (COD) should be 5 mg/L; however, the RL for COD in this SDG was 10 mg/L. COD concentration was greater than 10 mg/L, except for MW-305B-111417A. All remaining Reported RLs <QAPP.

12. **Calibration Issues**
    None reported.

13. Other

BOD: At least one dilution was out of acceptable range. Qualify results UJ.

SC 41552 e

USEPA CLP Generic COC (LAB COPY)

Contact Name:
Contact Phone:
Case #: 0218S

CHAIN OF CUSTODY RECORD

Lab Address: 646 Camp Avenue
Lab Phone: 413-789-9018

No: 1-111417-164816-0058

Lab: Eurofins Spectrum Analytical
Lab Contact: Agnes Huntley
Lab_City: North Kingston

Sample Identifier	CLP Sample No.	Matrix/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
MW-104A-111417A	D08601	Ground Water/ Erik Johnson	Grab	DissGas(14), DOC(14), TOC(14), BOD(14), COD(14)	D (4 C), E (4 C), F (H3PO4), G (4 C), I (H2SO4) (8)	MW-104A	11/14/2017 10:40	41552 -01
MW-112A-111417A	D08602	Ground Water/ Allie Goldberg	Grab	DissGas(14), DOC(14), TOC(14), BOD(14), COD(14)	D (4 C), E (4 C), F (H3PO4), G (4 C), I (H2SO4) (8)	MW-112A	11/14/2017 10:45	-02
MW-305B-111417A	D08603	Ground Water/ Chris Falco	Grab	DissGas(14), DOC(14), TOC(14), BOD(14), COD(14)	D (4 C), E (4 C), F (H3PO4), G (4 C), I (H2SO4) (8)	MW-305B	11/14/2017 10:35	-03
MW-112B-111417A	D08605	Ground Water/ Allie Goldberg	Grab	DissGas(14), DOC(14), TOC(14), BOD(14), COD(14)	D (4 C), E (4 C), F (H3PO4), G (4 C), I (H2SO4) (8)	MW-112B	11/14/2017 12:45	-04

Special Instructions:

Shipment for Case Complete? N
Samples Transferred From Chain of Custody #

Analysis Key: DissGas=Dissolved Gases, DOC=Dissolved Organic Carbon, TOC=Total Organic Carbon, BOD=Biological Oxygen Demand, COD=Chemical Oxygen Demand

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	NOBIS	11/15/17 1300	ESAI	11-17-17 1300	refrig.
		11/15/17		11/15/17 1638	2010/2011

Engineering a Sustainable Future

March 20, 2018
Nobis File No. 80113

Ms. Lynne Jennings
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No. EP-S1-06-03
Task Order No. 0113-RI-CO-0115
Case No. E044S
Laboratory Report Nos.: 17110021
Region I OEME Laboratory, North Chelmsford, Massachusetts
Nyanza Chemical Waste Dump, OU2 Superfund Site
Ashland, Massachusetts
CERCLIS No.: MAD990685422

Tier 1 Modified Data Review

VOCs, Metals, and Anions:
8/Aqueous: MW-115A-111317A, MW-115B-111317A, MW-115B-111317D, MW-3B-111317A, MW-203B-111317A, MW-203A-111317A, MW-202-111317A (VOCs only), MW-104B-111317A
1/Field Duplicate: MW-115B-111317A/MW-115B-111317D
1/Trip Blank: TB01-111317D
4/Performance Evaluation Samples (analyzed in SDG 17110031): VL01082, VL00717, AM0522, MS03731

Dear Ms. Jennings:

Nobis Engineering, Inc. (Nobis) performed a Tier 1 Modified data review on the analytical data for the samples listed above. The samples were collected by Nobis at the Nyanza Chemical Waste Dump, OU2 Superfund Site located in Ashland, Massachusetts. The samples were analyzed by OEME using in-house procedures for volatile organic compounds (VOCs) [EIASOP-VOAGCMS9], metals [EIASOP-OPTIMAS0], anions [EIASOP-INGIC13], and nitrogen (nitrate and nitrite) [EIASOP-INGNO2NO30].

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (January 2017); USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (September 2016); and the Quality Assurance Project Plan (QAPP) for the Nyanza Chemical Waste Dump, OU2 Superfund Site (December 2017).

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

The data were evaluated based on the following parameters:

*	• Overall Evaluation of Data and Potential Usability Issues
*	• Data Completeness
	• Preservation and Technical Holding Times
	• Blanks
*	• Surrogate Compounds
	• Matrix Spike/Matrix Spike Duplicate (MS/MSD)
*	• Laboratory Duplicates
*	• Laboratory Control Samples (LCS)
	• Performance Evaluation Samples
	• Field Duplicates
	• Reported Quantitation Limits

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues

The objectives of the groundwater sampling at the site are to provide a comprehensive evaluation of the shallow and deep groundwater contaminants at the site and to evaluate the feasibility of implementing monitored natural attenuation (MNA) as a remedial alternative for the site.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

VOCs:

Results were qualified as estimated due to field duplicate imprecision exceedance and matrix spike failure.

PE sample VL00717 failed with an “action low” score for tetrachloroethene. Tetrachloroethene was not detected in the samples analyzed; therefore, these results were rejected.

Metals:

No significant data quality issues were identified. It is noted that according to the QAPP, antimony, arsenic, beryllium, thallium, and vanadium were to be analyzed by ICP-MS to meet project action limits, and the listed reporting limits do not indicate that an ICP-MS analysis was run.

Anions:

Nitrate results for two samples were qualified due to holding time exceedances. The lab indicated that nitrate was not detected in six of the samples due to the color interfering with the cadmium column, and the reporting limit was qualified (UJ).

Please contact Lori Cox at (603) 513-1010 or lcox@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Alyssa Epstein
Staff Scientist

Lori Cox
Data Validator

Tables: Data Summary Table - Tier 1 Mod Data Review
Data Qualifier Actions

Enclosure: PE Scores
Data Review Checklist
COC

DATA SUMMARY TABLE

Lab Sample ID	AB71173	AB71174	AB71175	AB71176	AB71177	AB71178	AB71179	AB71180	AB71181
Field Sample ID	MW-115A-111317A	MW-115B-111317A	MW-115B-111317D	MW-3B-111317A	MW-203B-111317A	MW-203A-111317A	MW-202-111317A	MW-104B-111317A	TB01-111317A
Sample Location	MW-115A	MW-115B	MW-115B	MW-03B	MW-203B	MW-203A	MW-202	MW-104B	Unknown
Sample Date	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17
Volatiles (ug/L)									
1,1,1,2-Tetrachloroethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,1,1-Trichloroethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,1,2,2-Tetrachloroethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,1,2-Trichloroethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,1-Dichloroethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,1-Dichloroethene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,1-Dichloropropene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,2,3-Trichlorobenzene	100 U	100 U	100 U	10 U	92	50 U	98	1 U	1 U
1,2,3-Trichloropropane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,2,4-Trichlorobenzene	100 U	180 J	130 J	10 U	380	50 U	440	1 U	1 U
1,2,4-Trimethylbenzene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,2-Dibromo-3-chloropropane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,2-Dibromoethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,2-Dichlorobenzene	1400	1600	1500	10 U	1600	1900	1800	1.1	1 U
1,2-Dichloroethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,2-Dichloropropane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,3,5-Trimethylbenzene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,3-Dichlorobenzene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,3-Dichloropropane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
1,4-Dichlorobenzene	260	290	280	10 U	280	290	320	1 U	1 U
2,2-Dichloropropane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
2-Butanone	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1.7
2-Chlorotoluene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
2-Hexanone	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
4-Chlorotoluene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
4-Isopropyltoluene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
4-Methyl-2-pentanone	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Acetone	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	5.8
Acrylonitrile	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Benzene	100 U	100 U	100 U	10 U	50 U	130	50 U	1 U	1 U
Bromobenzene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Bromochloromethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Bromodichloromethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Bromoform	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Bromomethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Carbon disulfide	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Carbon tetrachloride	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Chlorobenzene	2700	1400	1400	10 U	1600	7600	1800	1 U	1 U
Chloroethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	AB71173	AB71174	AB71175	AB71176	AB71177	AB71178	AB71179	AB71180	AB71181
Field Sample ID	MW-115A-111317A	MW-115B-111317A	MW-115B-111317D	MW-3B-111317A	MW-203B-111317A	MW-203A-111317A	MW-202-111317A	MW-104B-111317A	TB01-111317A
Sample Location	MW-115A	MW-115B	MW-115B	MW-03B	MW-203B	MW-203A	MW-202	MW-104B	Unknown
Sample Date	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17
Chloroform	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Chloromethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
cis-1,2-Dichloroethene	170	410	390	10 U	610	50 U	580	10	1 U
cis-1,3-Dichloropropene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Dibromochloromethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Dibromomethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Dichlorodifluoromethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Diethyl ether	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Ethylbenzene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Hexachlorobutadiene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Isopropylbenzene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
m,p-Xylene	200 U	200 U	200 U	20 U	100 U	100 U	100 U	2 U	2 U
Methyl tert-butyl ether	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Methylene chloride	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Naphthalene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
n-Butylbenzene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
n-Propylbenzene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
o-Xylene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
sec-Butylbenzene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Styrene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
tert-Butylbenzene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Tetrachloroethene	R	R	R	R	R	R	R	R	R
Tetrahydrofuran	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Toluene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
trans-1,2-Dichloroethene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
trans-1,3-Dichloropropene	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Trichloroethene	2200	2000	1900	130 J	370	170	640	5.6	1 U
Trichlorofluoromethane	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Vinyl acetate	100 U	100 U	100 U	10 U	50 U	50 U	50 U	1 U	1 U
Vinyl chloride	100 U	100 U	100 U	10 U	50 U	1200	50 U	1 U	1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	AB71173	AB71174	AB71175	AB71176	AB71177	AB71178	AB71180
Field Sample ID	MW-115A-111317A	MW-115B-111317A	MW-115B-111317D	MW-3B-111317A	MW-203B-111317A	MW-203A-111317A	MW-104B-111317A
Sample Location	MW-115A	MW-115B	MW-115B	MW-03B	MW-203B	MW-203A	MW-104B
Sample Date	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17
Metals (ug/L)							
Aluminum	550 U	1200	1100	110 U	110 U	550 U	110 U
Antimony	100 U	100 U	100 U	20 U	20 U	100 U	20 U
Arsenic	100 U	100 U	100 U	20 U	25	100 U	20 U
Barium	100 U	100 U	100 U	20 U	20 U	100 U	20 U
Beryllium	40 U	40 U	40 U	8 U	8 U	40 U	8 U
Cadmium	50 U	50 U	50 U	10 U	10 U	50 U	10 U
Calcium	920000	100000	100000	42000	28000	460000	130000
Chromium	100 U	100 U	100 U	20 U	22	100 U	20 U
Cobalt	100 U	100 U	100 U	20 U	20 U	100 U	20 U
Copper	100 U	100 U	100 U	20 U	20 U	100 U	20 U
Iron	27000	200000	200000	40 U	38000	97000	18000
Lead	100 U	100 U	100 U	20 U	20 U	100 U	20 U
Magnesium	140000	39000	39000	1900	8100	170000	2300
Manganese	46000	13000	13000	28	3500	17000	720
Nickel	100 U	100 U	100 U	20 U	20 U	100 U	20 U
Selenium	200 U	200 U	200 U	40 U	40 U	200 U	40 U
Silver	50 U	50 U	50 U	10 U	10 U	50 U	10 U
Thallium	100 U	100 U	100 U	20 U	20 U	100 U	20 U
Vanadium	100 U	100 U	100 U	20 U	20 U	100 U	20 U
Zinc	200 U	200 U	200 U	40 U	40 U	200 U	40 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	AB71173	AB71174	AB71175	AB71176	AB71177	AB71178	AB71180
Field Sample ID	MW-115A-111317A	MW-115B-111317A	MW-115B-111317D	MW-3B-111317A	MW-203B-111317A	MW-203A-111317A	MW-104B-111317A
Sample Location	MW-115A	MW-115B	MW-115B	MW-03B	MW-203B	MW-203A	MW-104B
Sample Date	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17	11/13/17
General Chemistry (mg/L)							
Bromide	5 U	2 U	2 U	0.1 U	2 U	5 U	2 U
Chloride	3500	1600	1900	14	230	6200	17
Fluoride	5 U	8.3	11	0.34	2 U	5	2 U
Sulfate	1900	1600	1900	72	380	3200	290
General Chemistry (ug/L)							
Nitrate	23 UJ	23 UJ	23 UJ	350	23 UJ	23 UJ	23 UJ
Nitrite	12	78	80	12 U	91	41	45

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

Data Review Qualification Actions

Case: E044S

SDG: 17110021

Analyte	Samples	Evaluation Criteria	Action Needed	Comments
Nitrate	MW-115A, MW-115B	hold time	UJ	
Nitrate	MW-115A, MW-115B, MW-115B(FD), MW-203B, MW-203A, MW-104B	Not detected due to the color of the samples interfering with cadmium column	UJ	
1,2,4-trichlorobenzene	MW-115A; and dup	field duplicate	J	>30% RPD
Trichloroethylene	MW-3B	MSD	J	MSD > QC RPD
Tetrachloroethene	All	PE sample	R	Not detected

PES SCORING EVALUATION REPORT

PES AM0522 Rev: 2 EPA Sample No.: AM0522 Report Date: 03/30/2018

Lab Name: USEPA New England Laboratory Lab Code: NERL
Contract: NA Case No.: MA No.:
SDG No.: Analytical Method: ICP-AES Matrix: Water
Lab Sample ID: AB71262 Date Received: 11/15/2017 Percent Solids:
Units: ug/L (mg/L for Hardne

Analysis Method: Non-CLP - Score by ISM02.x Metals Analysis ICP
Scoring Method: ISM02.x Metals Analysis ICP
Comments: USEPA NERL Method

CAS No.	Analyte	Laboratory Results		PES Evaluation	
		Concentration	Q		
7429-90-5	Aluminum	29000		PASS	Within Limits
7440-36-0	Antimony	140		PASS	Within Limits
7440-38-2	Arsenic	33		PASS	Within Limits
7440-39-3	Barium	510		PASS	Within Limits
7440-41-7	Beryllium	25		PASS	Within Limits
7440-43-9	Cadmium	72		PASS	Within Limits
7440-70-2	Calcium	8100		PASS	Within Limits
7440-47-3	Chromium	260		PASS	Within Limits
7440-48-4	Cobalt	620		PASS	Within Limits
7440-50-8	Copper	750		PASS	Within Limits
7439-89-6	Iron	74000		PASS	Within Limits
7439-92-1	Lead	97		PASS	Within Limits
7439-95-4	Magnesium	9600		PASS	Within Limits
7439-96-5	Manganese	70		PASS	Within Limits
7440-02-0	Nickel	210		PASS	Within Limits
7440-09-7	Potassium	0		N.E.	Scorer Request
7782-49-2	Selenium	94		PASS	Within Limits
7440-22-4	Silver	60		PASS	Within Limits
7440-23-5	Sodium	0		N.E.	Scorer Request
7440-28-0	Thallium	80		PASS	Within Limits
7440-62-2	Vanadium	650		PASS	Within Limits
7440-66-6	Zinc	490		PASS	Within Limits
****	END Main Analytes	**********	****	****	**********
****	END All Analytes	**********	****	****	**********

PES SCORING EVALUATION REPORT

PES MS03731 Rev: 1 EPA Sample No.: MS03731 Report Date: 03/30/2018

Lab Name: USEPA New England Laboratory Lab Code: NERL
Contract: NA Case No.: MA No.:
SDG No.: Analytical Method: ICP-MS Matrix: Water
Lab Sample ID: AB71263 Date Received: 11/15/2017 Percent Solids:
Units: ug/L

Analysis Method: Non-CLP - Score by ISM02.x Metals Analysis ICP-MS
Scoring Method: ISM02.x Metals Analysis ICP-MS
Comments:

CAS No.	Analyte	Laboratory Results		PES Evaluation	
		Concentration	Q		
7429-90-5	Aluminum	400		PASS	Within Limits
7440-36-0	Antimony	0		N.E.	Scorer Request
7440-39-3	Barium	36		PASS	Within Limits
7440-41-7	Beryllium	0		N.E.	Scorer Request
7440-43-9	Cadmium	0		N.E.	Scorer Request
7440-70-2	Calcium	570		PASS	Within Limits
7440-47-3	Chromium	0		N.E.	Scorer Request
7440-48-4	Cobalt	0		N.E.	Scorer Request
7440-50-8	Copper	24		PASS	Within Limits
7439-89-6	Iron	350		PASS	Within Limits
7439-92-1	Lead	0		N.E.	Scorer Request
7439-95-4	Magnesium	520		PASS	Within Limits
7439-96-5	Manganese	0		N.E.	Scorer Request
7440-02-0	Nickel	0		N.E.	Scorer Request
7440-09-7	Potassium	0		N.E.	Scorer Request
7782-49-2	Selenium	0		N.E.	Scorer Request
7440-22-4	Silver	0		N.E.	Scorer Request
7440-28-0	Thallium	0		N.E.	Scorer Request
7440-62-2	Vanadium	0		N.E.	Scorer Request
7440-66-6	Zinc	0		N.E.	Scorer Request
****	END Main Analytes	**********	****	****	**********
****	END All Analytes	**********	****	****	**********

PES SCORING EVALUATION REPORT

PES VL01082 Rev: 1 EPA Sample No.: VL01082 Report Date: 03/30/2018

Lab Name: USEPA New England Laboratory
Lab Code: NERL
Contract:
Case No.:
MA No.:
SDG No.:
Analytical Method: VOA
Level: Not Given
Matrix: Water
Lab Sample ID: AB71260
Lab File ID:
Date Received: 11/15/2017
Date Extracted:
Date Analyzed: 11/20/2017
GC Column:
ID (mm):
GC Column:
ID (mm):
Soil Aliquot (VOA, uL):
Sample Wt./Vol. (g/mL): 5
Percent Solids:
Heated Purge: (Y/N) Unknown
Extract Volume (uL):
Extract Conc: (Y/N) N/A
Extraction Type: N/A
Purge Volume (mL):
Injection Vol. (uL):
Cleanup Types: N/A
Cleanup Factor:
Dilution Factor:
Units: ug/L
pH:
Analysis Method: Non CLP Score by SOM02.x
Scoring Method: SOM02.x mod
Comments:

CAS No.	Analyte	Laboratory Results		PES Evaluation	
		Concentration	Q		
75-71-8	Dichlorodifluoromethane	25		PASS	Within Limits
74-87-3	Chloromethane	47		PASS	Within Limits
74-83-9	Bromomethane	28		PASS	Within Limits
75-69-4	Trichlorofluoromethane	34		PASS	Within Limits
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	44		PASS	Within Limits
67-64-1	Acetone	0		N.E.	Scorer Request
79-20-9	Methyl Acetate	0		N.E.	Scorer Request
75-09-2	Methylene Chloride	27		PASS	Within Limits
1634-04-4	Methyl tert-Butyl Ether	97		PASS	Within Limits
78-93-3	2-Butanone	54		PASS	Within Limits
110-82-7	Cyclohexane	0		N.E.	Scorer Request
107-06-2	1,2-Dichloroethane	84		PASS	Within Limits
79-01-6	Trichloroethene	43		PASS	Within Limits
108-87-2	Methylcyclohexane	0		N.E.	Scorer Request
108-10-1	4-Methyl-2-pentanone	130		PASS	Within Limits
108-88-3	Toluene	74		PASS	Within Limits
127-18-4	Tetrachloroethene	16		PASS	Warning Low
591-78-6	2-Hexanone	72		PASS	Within Limits
108-90-7	Chlorobenzene	29		PASS	Within Limits
100-41-4	Ethylbenzene	34		PASS	Within Limits
100-42-5	Styrene	78		PASS	Within Limits
98-82-8	Isopropylbenzene	63		PASS	Within Limits
106-46-7	1,4-Dichlorobenzene	22		PASS	Within Limits
95-50-1	1,2-Dichlorobenzene	22		PASS	Within Limits
120-82-1	1,2,4-Trichlorobenzene	22		PASS	Within Limits
87-61-6	1,2,3-Trichlorobenzene	67		PASS	Within Limits
95-47-6	o-Xylene	48		PASS	Within Limits
179601-23-1	m,p-Xylene	99		PASS	Within Limits
123-91-1	1,4-Dioxane	0		N.E.	Scorer Request
108-70-3	1,3,5-Trichlorobenzene	0		N.E.	Scorer Request
108-86-1	Bromobenzene	60		PASS	TIC Found
****	END Main Analytes	**********	****	****	**********
****	END All Analytes	**********	****	****	**********

PES SCORING EVALUATION REPORT

PES VL00717 Rev: 1 EPA Sample No.: VL00717 Report Date: 03/30/2018

Lab Name: USEPA New England Laboratory
Lab Code: N/A
Contract: N/A
Case No.: NR
MA No.: N/A
SDG No.: NR
Analytical Method: VOA
Level: Low
Matrix: Water
Lab Sample ID: AB71261
Lab File ID: NR
Date Received: 11/15/2017
Date Extracted: 11/20/2017
Date Analyzed: 11/20/2017
GC Column: NR
ID (mm): NR
GC Column: NR
ID (mm): NR
Soil Aliquot (VOA, uL): N/A
Sample Wt./Vol. (g/mL): 5 mL
Percent Solids: N/A
Heated Purge: (Y/N) No
Extract Volume (uL): N/A
Extract Conc: (Y/N) N/A
Extraction Type: PT
Purge Volume (mL): 5 mL
Injection Vol. (uL): N/A
Cleanup Types: N/A
Cleanup Factor: N/A
Dilution Factor: 1.0
Units: ug/L
pH: N/A
Analysis Method: Non CLP Score by SOM02.x
Scoring Method: SOM02.x
Comments: Scored by APTIM Personnel

CAS No.	Analyte	Laboratory Results		PES Evaluation	
		Concentration	Q		
75-71-8	Dichlorodifluoromethane	37		PASS	Within Limits
74-87-3	Chloromethane	31		PASS	Within Limits
75-01-4	Vinyl Chloride	51		PASS	Within Limits
74-83-9	Bromomethane	18		PASS	Within Limits
75-00-3	Chloroethane	31		PASS	Within Limits
75-69-4	Trichlorofluoromethane	51		PASS	Within Limits
75-35-4	1,1-Dichloroethene	70		PASS	Within Limits
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	22		PASS	Within Limits
75-09-2	Methylene Chloride	46		PASS	Within Limits
156-60-5	trans-1,2-Dichloroethene	22		PASS	Within Limits
75-34-3	1,1-Dichloroethane	70		PASS	Within Limits
156-59-2	cis-1,2-Dichloroethene	43		PASS	Within Limits
67-66-3	Chloroform	63		PASS	Within Limits
74-97-5	Bromochloromethane	44		PASS	Within Limits
71-55-6	1,1,1-Trichloroethane	21		PASS	Within Limits
56-23-5	Carbon Tetrachloride	64		PASS	Within Limits
71-43-2	Benzene	49		PASS	Within Limits
107-06-2	1,2-Dichloroethane	73		PASS	Within Limits
79-01-6	Trichloroethene	82		PASS	Within Limits
78-87-5	1,2-Dichloropropane	43		PASS	Within Limits
75-27-4	Bromodichloromethane	20		PASS	Within Limits
10061-01-5	cis-1,3-Dichloropropene	26		PASS	Within Limits
10061-02-6	trans-1,3-Dichloropropene	57		PASS	Within Limits
79-00-5	1,1,2-Trichloroethane	26		PASS	Within Limits
127-18-4	Tetrachloroethene	50		FAIL	Action Low
124-48-1	Dibromochloromethane	43		PASS	Within Limits
106-93-4	1,2-Dibromoethane	30		PASS	Within Limits
75-25-2	Bromoform	55		PASS	Within Limits
79-34-5	1,1,2,2-Tetrachloroethane	36		PASS	Within Limits
96-12-8	1,2-Dibromo-3-chloropropane	43		PASS	Within Limits
630-20-6	1,1,1,2-Tetrachloroethane	54		PASS	TIC Found
95-63-6	1,2,4-Trimethylbenzene	51		PASS	TIC Found
****	END Main Analytes	**********	****	****	**********
****	END All Analytes	**********	****	****	**********

Generic Data Review Checklist

Project: Nyanza OU2
Project #: 80113
Case#: E044S
Date: 3/21/18
Methods: VOCs (8260), Metals (3010A), Anions (300.0)
Laboratory: OEME
SDG: 17110021
Reviewer: Alyssa Epstein

1. **Case Narrative and Data Package Completeness (COC and Analyte List Review)**
   EPA4381-EPA4389 (collected 11/13/2017 – received 11/14/2017) – 8 samples (includes FD) + TB
   EPA4387 (MW-202) run only for VOCs

2. **Holding Time and Sample Preservation Compliance**
   No analytical times are recorded, only days on reports.
   Lab identified MW-115A, MW-115B out of HT for nitrate. Lab estimated (J).

3. **Lab and Field Blanks**
   TB01-111317A – acetone at 5.8 ug/L, 2-butanone (MEK) at 1.7 ug/L – field samples ND for acetone and MEK.

4. **Laboratory Control Samples**
   Lab fortified blanks for VOCs and anions– in control

5. **Field Duplicate Precision**
   Metals and anions- in control.
   1,2,4-trichlorobenzene >30% difference – J results in field duplicate pair only. Remainder of VOCs are in control.

6. **Laboratory Duplicate Precision**
   VOCs – in control.
   Anions – in control.
   Metals – in control.

7. **Matrix Spikes**
   VOCs – MSD Trichloroethylene RPD 22.2, QC Limit 22 – out of control - J results in parent sample only
   Metals- N/A
   Anions – AB71176 (MW-3B-111317A) – chloride and sulfate R flag (conc >4x spike)

8. **Surrogate Spikes**
   VOCs– in control

9. **Internal Standards**
   Not evaluated

10. **Performance Evaluation Samples**
    "Action low" score for tetrachloroethene. Qualify J-/R.

11. **Reporting Limits**
    VOCs: MW-115A, MW-115B and FD 100x; MW-202, MW-203A, MW-203B 50x; MW-3B 10x. Reporting limits are elevated due to high concentrations of target analytes.
    Metals: MW-115A, MW-115B and FD, MW-203A 5x dilution due to high levels of target analytes. Reporting limits per QAPP not met for As, Sb, Be, Tl, and V, and ICP-MS analysis not performed.
    Anions: MW-203A 100x; MW-115A 50x; MW-115B and FD, MW-203B, MW-104B 20x;

12. **Calibration Issues**
    Not evaluated

13. **Other**
    N/A

Nyanza OU2 - E044S 17110021
Field Duplicates

	AB71174		AB71175		
	EP3108		EP3118		>30%
	MW-115B		MW-115B Dup		RPD
VOCs					
Chlorobenzene	1400		1400		0.00%
Trichloroethylene	2000		1900		5.13%
1,2-Dichlorobenzene	1600		1500		6.45%
1,4-Dichlorobenzene	290		280		3.51%
cis-1,2-Dichloroethylene	410		390		5.00%
1,2,4-Trichlorobenzene	180		130		32.26%
ANIONS					
Fluoride	8.3		11		-27.98%
Chloride	1600		1900		-17.14%
Sulfate	1600		1900		-17.14%
Nitrite	78		80		-2.53%
METALS					
Aluminum	1200		1100		8.70%
Calcium	100000		100000		0.00%
Iron	200000		200000		0.00%
Magnesium	39000		39000		0.00%
Manganese	13000		13000		0.00%

PN 17110021

USEPA CLP Generic COC (LAB COPY)

CHAIN OF CUSTODY RECORD

No: 1-111317-170539-0057

Contact Name:
Contact Phone:
Case #: E044S

Lab Address: 11 Technology Drive
Lab Phone: 617-918-8340

Lab: New England Regional Laboratory
Lab Contact: Dan Boudreau
Lab_City: North Chelmsford

Sample Identifier	CLP Sample No.	Matrix/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
MW-115A-111317A	EP4381	Ground Water/ Chris Falco	Grab	VOC(28), Metals(28), Anions(28)	A (HCl), B (HNO3 pH<2), C (4 C) (6)	MW-115A	11/13/2017 11:00	
MW-115B-111317A	EP4382	Ground Water/ Allie Goldberg	Grab	VOC(28), Metals(28), Anions(28)	A (HCl), B (HNO3 pH<2), C (4 C) (6)	MW-115B	11/13/2017 11:05	
MW-115B-111317D	EP4383	Ground Water/ Allie Goldberg	Grab	VOC(28), Metals(28), Anions(28)	A (HCl), B (HNO3 pH<2), C (4 C) (6)	MW-115B	11/13/2017 15:40	
MW-3B-111317A	EP4384	Ground Water/ Erik Johnson	Grab	VOC(28), Metals(28), Anions(28)	A (HCl), B (HNO3 pH<2), C (4 C) (18)	MW-3B	11/13/2017 12:00	
MW-203B-111317A	EP4385	Ground Water/ Allie Goldberg	Grab	VOC(28), Metals(28), Anions(28)	A (HCl), B (HNO3 pH<2), C (4 C) (6)	MW-203B	11/13/2017 13:10	
MW-203A-111317A	EP4386	Ground Water/ Chris Falco	Grab	VOC(28), Metals(28), Anions(28)	A (HCl), B (HNO3 pH<2), C (4 C) (6)	MW-203A	11/13/2017 13:50	
MW-202-111317A	EP4387	Ground Water/ Allie Goldberg	Grab	VOC(28)	A (HCl) (4)	MW-202	11/13/2017 14:50	
MW-104B-111317A	EP4388	Ground Water/ Erik Johnson	Grab	VOC(28), Metals(28), Anions(28)	A (HCl), B (HNO3 pH<2), C (4 C) (6)	MW-104B	11/13/2017 15:35	
TB01-111317A	EP4389	Ground Water/ Erik Johnson	Grab	VOC(28)	A (HCl) (4)	Trip Blank	11/13/2017 16:00	

Shipment for Case Complete? N

Samples Transferred From Chain of Custody #

Sample(s) to be used for Lab QC: MW-3B-111317A Tag A, MW-3B-111317A Tag B, MW-3B-111317A Tag C

Analysis Key: VOC=Volatiles, Metals=Metals excluding Hg, Anions=Anions (NO2,NO3,Cl,SO4)

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
		11/14/17 13:56	ESAT	11/14/17 13:56	5°C

17110021 $TNL
17110021 $VOAMW
17110021 $ICA
17110021 $METW_PE

Nobis
Engineering a Sustainable Future

March 27, 2018
Nobis File No. 80113

Ms. Lynne Jennings
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No. EP-S1-06-03
Task Order No. 0113-RI-CO-0115
Case No. E044S
Laboratory Report No.: 17110025
Region I OEME Laboratory, North Chelmsford, Massachusetts
Nyanza Chemical Waste Dump, OU2 Superfund Site
Ashland, Massachusetts
CERCLIS No.: MAD990685422

Tier 1 Modified Data Review

VOCs, Metals, and Anions:
4/Aqueous: MW-104A-111317A, MW-112A-111417A, MW-305B-111417A, MW-112B-111417A
4/Performance Evaluation Samples (Laboratory report no. 17110031): VL01082, VL00717, AM0522, MS03731

VOCs:
5/Aqueous: MW-404B-111417A, MW-305A-111417A, MADEP-MW-1-111417A, MW-06B-111417A, MW-201-111417A
1/Trip Blank: TB02-111317A

Dear Ms. Jennings:

Nobis Engineering, Inc. (Nobis) performed a Tier 1 Modified data review on the analytical data for the samples listed above. The samples were collected by Nobis at the Nyanza Chemical Waste Dump, OU2 Superfund Site located in Ashland, Massachusetts. The samples were analyzed by OEME using in-house procedures for volatile organic compounds (VOCs) [EIASOP-VOAGCMS9], metals [EIASOP-OPTIMAS0], anions [EIASOP-INGIC13], and nitrogen (nitrate and nitrite) [EIASOP-INGNO2NO30].

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (January 2017); USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review (September 2016); and the Quality Assurance Project Plan (QAPP) for the Nyanza Chemical Waste Dump, OU2 Superfund Site (December 2017).

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

The data were evaluated based on the following parameters:

*	•	Overall Evaluation of Data and Potential Usability Issues
*	•	Data Completeness
*	•	Preservation and Technical Holding Times
	•	Blanks
*	•	Surrogate Compounds
*	•	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
*	•	Laboratory Duplicates
*	•	Laboratory Control Samples (LCS)
NA	•	Field Duplicates
	•	Performance Evaluation Sample
	•	Reported Quantitation Limits

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues
The objectives of the groundwater sampling at the site are to provide a comprehensive evaluation of the shallow and deep groundwater contaminants at the site and to evaluate the feasibility of implementing monitored natural attenuation (MNA) as a remedial alternative for the site.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

VOCs:
Results were qualified due to contamination in the trip blank. Reporting limits for some samples were elevated, since high concentrations of target analytes required dilutions.

Results for tetrachloroethene were rejected due to an “action low” score for one PE sample.

Metals:
Results did not require qualification. It is noted that according to the QAPP, antimony, arsenic, beryllium, thallium, and vanadium were to be analyzed by ICP-MS to meet project action limits, and the listed reporting limits do not indicate that an ICP-MS analysis was run.

Anions:
Results did not require qualification. The lab indicated that nitrate results was not reported for three samples due to the sample color interfering with the cadmium column.

Please contact Lori Cox at (603) 513-1010 or lcox@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Lori A. L. Cox

Lori Cox
Data Validator

Tables: Data Summary Table - Tier 1 Mod Data Review
Data Qualifier Actions

Enclosure: PE Scores
Data Review Checklists
COC

DATA SUMMARY TABLE

Lab Sample ID	AB71209	AB71210	AB71211	AB71212	AB71213	AB71214	AB71215	AB71216	AB71217	AB71218
Field Sample ID	TB02-111317A	MW-104A-111417A	MW-112A-111417A	MW-305B-111417A	MW-404B-111417A	MW-112B-111417A	MW-305A-111417A	MADEP-MW-1-111417A	MW-06B-111417A	MW-201-111417A
Sample Location	Unknown	MW-104A	MW-112A	MW-305B	MW-404B	MW-112B	MW-305A	MADEP-MW-1	MW-06B	MW-201
Sample Date	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17
Volatiles (ug/L)										
1,1,1,2-Tetrachloroethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,1,1-Trichloroethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,1,2,2-Tetrachloroethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,1,2-Trichloroethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,1-Dichloroethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,1-Dichloroethene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,1-Dichloropropene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,2,3-Trichlorobenzene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	25
1,2,3-Trichloropropane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,2,4-Trichlorobenzene	1 U	50 U	1 U	1 U	1 U	1.4	50 U	1 U	15	120
1,2,4-Trimethylbenzene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,2-Dibromo-3-chloropropane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,2-Dibromoethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,2-Dichlorobenzene	1 U	1700	7.3	1 U	1 U	9	660	1.3	410	430
1,2-Dichloroethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,2-Dichloropropane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,3,5-Trimethylbenzene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,3-Dichlorobenzene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	8.2
1,3-Dichloropropane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
1,4-Dichlorobenzene	1 U	180	1.3	1 U	1 U	1.8	140	1 U	54	77
2,2-Dichloropropane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
2-Butanone	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
2-Chlorotoluene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
2-Hexanone	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
4-Chlorotoluene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
4-Isopropyltoluene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
4-Methyl-2-pentanone	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Acetone	3.6	50 U	1 U	1 U	1 U	1 U	50 U	3.6 U	5 U	5 U
Acrylonitrile	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Benzene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	12	6.1
Bromobenzene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Bromochloromethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Bromodichloromethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Bromoform	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Bromomethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Carbon disulfide	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Carbon tetrachloride	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Chlorobenzene	1 U	50 U	2.4	1 U	1 U	2.3	280	1 U	170	360
Chloroethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Chloroform	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	AB71209	AB71210	AB71211	AB71212	AB71213	AB71214	AB71215	AB71216	AB71217	AB71218
Field Sample ID	TB02-111317A	MW-104A-111417A	MW-112A-111417A	MW-305B-111417A	MW-404B-111417A	MW-112B-111417A	MW-305A-111417A	MADEP-MW-1-111417A	MW-06B-111417A	MW-201-111417A
Sample Location	Unknown	MW-104A	MW-112A	MW-305B	MW-404B	MW-112B	MW-305A	MADEP-MW-1	MW-06B	MW-201
Sample Date	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17	11/14/17
Chloromethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
cis-1,2-Dichloroethene	1 U	130	2.4	1 U	1 U	1 U	99	1 U	170	160
cis-1,3-Dichloropropene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Dibromochloromethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Dibromomethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Dichlorodifluoromethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Diethyl ether	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Ethylbenzene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Hexachlorobutadiene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Isopropylbenzene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
m,p-Xylene	2 U	100 U	2 U	2 U	2 U	2 U	100 U	2 U	10 U	10 U
Methyl tert-butyl ether	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5.5	5 U
Methylene chloride	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Naphthalene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
n-Butylbenzene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
n-Propylbenzene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
o-Xylene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	6.1	5 U
sec-Butylbenzene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Styrene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
tert-Butylbenzene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Tetrachloroethene	R	R	R	R	R	R	R	R	R	R
Tetrahydrofuran	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Toluene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
trans-1,2-Dichloroethene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
trans-1,3-Dichloropropene	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Trichloroethene	1 U	340	3.6	1 U	1 U	1 U	850	1 U	7.3	170
Trichlorofluoromethane	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Vinyl acetate	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U
Vinyl chloride	1 U	50 U	1 U	1 U	1 U	1 U	50 U	1 U	5 U	5 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

Nyanza Chemical Waste Dump
SDG E044S_17110025
Metals in Groundwater

DATA SUMMARY TABLE

Lab Sample ID	AB71210	AB71211	AB71212	AB71214
Field Sample ID	MW-104A-111417A	MW-112A-111417A	MW-305B-111417A	MW-112B-111417A
Sample Location	MW-104A	MW-112A	MW-305B	MW-112B
Sample Date	11/14/17	11/14/17	11/14/17	11/14/17
Metals (ug/L)				
Aluminum	110 U	110 U	160	110 U
Antimony	20 U	20 U	20 U	20 U
Arsenic	20 U	20 U	20 U	24
Barium	37	20 U	41	34
Beryllium	8 U	8 U	8 U	8 U
Cadmium	10 U	10 U	10 U	10 U
Calcium	170000	18000	6700	15000
Chromium	20 U	20 U	20 U	20 U
Cobalt	20 U	20 U	20 U	20 U
Copper	20 U	20 U	20 U	20 U
Iron	210	5600	40 U	23000
Lead	20 U	20 U	20 U	20 U
Magnesium	25000	2700	700	1500
Manganese	1300	1300	130	430
Nickel	20 U	24	20 U	20 U
Selenium	40 U	40 U	40 U	40 U
Silver	10 U	10 U	10 U	10 U
Thallium	20 U	20 U	20 U	20 U
Vanadium	40 U	20 U	20 U	20 U
Zinc	20 U	40 U	40 U	40 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	AB71210	AB71211	AB71212	AB71214
Field Sample ID	MW-104A-111417A	MW-112A-111417A	MW-305B-111417A	MW-112B-111417A
Sample Location	MW-104A	MW-112A	MW-305B	MW-112B
Sample Date	11/14/17	11/14/17	11/14/17	11/14/17
General Chemistry (mg/L)				
Bromide	1 U	1 U	1 U	1 U
Chloride	170	190	61	190
Fluoride	1 U	1 U	1 U	1 U
Sulfate	270	84	42	26
General Chemistry (ug/L)				
Nitrate	NA	NA	240	NA
Nitrite	44	15	12 U	43

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

Data Review Qualification Actions

Case: E044S
SDG: 17110025

Analyte	Samples	Evaluation Criteria	Action Needed	Comments	EDMS or DV
VOCs					
Acetone	MADEP-MW-1-111417A	Trip blank	U at 3.4 µg/L	Detected in trip blank at 3.6 µg/L and in sample at 3.4 µg/L.	DV
Tetrachloroethene	All	PE Sample	J/R	"Warning low" and "Action low" scores	DV
Metals					
No qualifications required.					
Anions					
No qualifications required.					

PES SCORING EVALUATION REPORT

PES AM0522 Rev: 2 EPA Sample No.: AM0522 Report Date: 03/30/2018

Lab Name: USEPA New England Laboratory Lab Code: NERL
Contract: NA Case No.: MA No.:
SDG No.: Analytical Method: ICP-AES Matrix: Water
Lab Sample ID: AB71262 Date Received: 11/15/2017 Percent Solids:
Units: ug/L (mg/L for Hardne

Analysis Method: Non-CLP - Score by ISM02.x Metals Analysis ICP
Scoring Method: ISM02.x Metals Analysis ICP
Comments: USEPA NERL Method

CAS No.	Analyte	Laboratory Results		PES Evaluation	
		Concentration	Q		
7429-90-5	Aluminum	29000		PASS	Within Limits
7440-36-0	Antimony	140		PASS	Within Limits
7440-38-2	Arsenic	33		PASS	Within Limits
7440-39-3	Barium	510		PASS	Within Limits
7440-41-7	Beryllium	25		PASS	Within Limits
7440-43-9	Cadmium	72		PASS	Within Limits
7440-70-2	Calcium	8100		PASS	Within Limits
7440-47-3	Chromium	260		PASS	Within Limits
7440-48-4	Cobalt	620		PASS	Within Limits
7440-50-8	Copper	750		PASS	Within Limits
7439-89-6	Iron	74000		PASS	Within Limits
7439-92-1	Lead	97		PASS	Within Limits
7439-95-4	Magnesium	9600		PASS	Within Limits
7439-96-5	Manganese	70		PASS	Within Limits
7440-02-0	Nickel	210		PASS	Within Limits
7440-09-7	Potassium	0		N.E.	Scorer Request
7782-49-2	Selenium	94		PASS	Within Limits
7440-22-4	Silver	60		PASS	Within Limits
7440-23-5	Sodium	0		N.E.	Scorer Request
7440-28-0	Thallium	80		PASS	Within Limits
7440-62-2	Vanadium	650		PASS	Within Limits
7440-66-6	Zinc	490		PASS	Within Limits
****	END Main Analytes	**********	****	****	**********
****	END All Analytes	**********	****	****	**********

PES SCORING EVALUATION REPORT

PES MS03731 Rev: 1 EPA Sample No.: MS03731 Report Date: 03/30/2018

Lab Name: USEPA New England Laboratory Lab Code: NERL
Contract: NA Case No.: MA No.:
SDG No.: Analytical Method: ICP-MS Matrix: Water
Lab Sample ID: AB71263 Date Received: 11/15/2017 Percent Solids:
Units: ug/L

Analysis Method: Non-CLP - Score by ISM02.x Metals Analysis ICP-MS
Scoring Method: ISM02.x Metals Analysis ICP-MS
Comments:

CAS No.	Analyte	Laboratory Results		PES Evaluation	
		Concentration	Q		
7429-90-5	Aluminum	400		PASS	Within Limits
7440-36-0	Antimony	0		N.E.	Scorer Request
7440-39-3	Barium	36		PASS	Within Limits
7440-41-7	Beryllium	0		N.E.	Scorer Request
7440-43-9	Cadmium	0		N.E.	Scorer Request
7440-70-2	Calcium	570		PASS	Within Limits
7440-47-3	Chromium	0		N.E.	Scorer Request
7440-48-4	Cobalt	0		N.E.	Scorer Request
7440-50-8	Copper	24		PASS	Within Limits
7439-89-6	Iron	350		PASS	Within Limits
7439-92-1	Lead	0		N.E.	Scorer Request
7439-95-4	Magnesium	520		PASS	Within Limits
7439-96-5	Manganese	0		N.E.	Scorer Request
7440-02-0	Nickel	0		N.E.	Scorer Request
7440-09-7	Potassium	0		N.E.	Scorer Request
7782-49-2	Selenium	0		N.E.	Scorer Request
7440-22-4	Silver	0		N.E.	Scorer Request
7440-28-0	Thallium	0		N.E.	Scorer Request
7440-62-2	Vanadium	0		N.E.	Scorer Request
7440-66-6	Zinc	0		N.E.	Scorer Request
****	END Main Analytes	**********	****	****	**********
****	END All Analytes	**********	****	****	**********

PES SCORING EVALUATION REPORT

PES VL01082 Rev: 1 EPA Sample No.: VL01082 Report Date: 03/30/2018

Lab Name: USEPA New England Laboratory
Lab Code: NERL
Contract:
Case No.:
MA No.:
SDG No.:
Analytical Method: VOA
Level: Not Given
Matrix: Water
Lab Sample ID: AB71260
Lab File ID:
Date Received: 11/15/2017
Date Extracted:
Date Analyzed: 11/20/2017
GC Column:
ID (mm):
GC Column:
ID (mm):
Soil Aliquot (VOA, uL):
Sample Wt./Vol. (g/mL): 5
Percent Solids:
Heated Purge: (Y/N) Unknown
Extract Volume (uL):
Extract Conc: (Y/N) N/A
Extraction Type: N/A
Purge Volume (mL):
Injection Vol. (uL):
Cleanup Types: N/A
Cleanup Factor:
Dilution Factor:
Units: ug/L
pH:
Analysis Method: Non CLP Score by SOM02.x
Scoring Method: SOM02.x mod
Comments:

CAS No.	Analyte	Laboratory Results		PES Evaluation	
		Concentration	Q		
75-71-8	Dichlorodifluoromethane	25		PASS	Within Limits
74-87-3	Chloromethane	47		PASS	Within Limits
74-83-9	Bromomethane	28		PASS	Within Limits
75-69-4	Trichlorofluoromethane	34		PASS	Within Limits
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	44		PASS	Within Limits
67-64-1	Acetone	0		N.E.	Scorer Request
79-20-9	Methyl Acetate	0		N.E.	Scorer Request
75-09-2	Methylene Chloride	27		PASS	Within Limits
1634-04-4	Methyl tert-Butyl Ether	97		PASS	Within Limits
78-93-3	2-Butanone	54		PASS	Within Limits
110-82-7	Cyclohexane	0		N.E.	Scorer Request
107-06-2	1,2-Dichloroethane	84		PASS	Within Limits
79-01-6	Trichloroethene	43		PASS	Within Limits
108-87-2	Methylcyclohexane	0		N.E.	Scorer Request
108-10-1	4-Methyl-2-pentanone	130		PASS	Within Limits
108-88-3	Toluene	74		PASS	Within Limits
127-18-4	Tetrachloroethene	16		PASS	Warning Low
591-78-6	2-Hexanone	72		PASS	Within Limits
108-90-7	Chlorobenzene	29		PASS	Within Limits
100-41-4	Ethylbenzene	34		PASS	Within Limits
100-42-5	Styrene	78		PASS	Within Limits
98-82-8	Isopropylbenzene	63		PASS	Within Limits
106-46-7	1,4-Dichlorobenzene	22		PASS	Within Limits
95-50-1	1,2-Dichlorobenzene	22		PASS	Within Limits
120-82-1	1,2,4-Trichlorobenzene	22		PASS	Within Limits
87-61-6	1,2,3-Trichlorobenzene	67		PASS	Within Limits
95-47-6	o-Xylene	48		PASS	Within Limits
179601-23-1	m,p-Xylene	99		PASS	Within Limits
123-91-1	1,4-Dioxane	0		N.E.	Scorer Request
108-70-3	1,3,5-Trichlorobenzene	0		N.E.	Scorer Request
108-86-1	Bromobenzene	60		PASS	TIC Found
****	END Main Analytes	**********	****	****	**********
****	END All Analytes	**********	****	****	**********

PES SCORING EVALUATION REPORT

PES VL00717 Rev: 1 EPA Sample No.: VL00717 Report Date: 03/30/2018

Lab Name: USEPA New England Laboratory
Lab Code: N/A
Contract: N/A
Case No.: NR
MA No.: N/A
SDG No.: NR
Analytical Method: VOA
Level: Low
Matrix: Water
Lab Sample ID: AB71261
Lab File ID: NR
Date Received: 11/15/2017
Date Extracted: 11/20/2017
Date Analyzed: 11/20/2017
GC Column: NR
ID (mm): NR
GC Column: NR
ID (mm): NR
Soil Aliquot (VOA, uL): N/A
Sample Wt./Vol. (g/mL): 5 mL
Percent Solids: N/A
Heated Purge: (Y/N) No
Extract Volume (uL): N/A
Extract Conc: (Y/N) N/A
Extraction Type: PT
Purge Volume (mL): 5 mL
Injection Vol. (uL): N/A
Cleanup Types: N/A
Cleanup Factor: N/A
Dilution Factor: 1.0
Units: ug/L
pH: N/A
Analysis Method: Non CLP Score by SOM02.x
Scoring Method: SOM02.x
Comments: Scored by APTIM Personnel

CAS No.	Analyte	Laboratory Results		PES Evaluation	
		Concentration	Q		
75-71-8	Dichlorodifluoromethane	37		PASS	Within Limits
74-87-3	Chloromethane	31		PASS	Within Limits
75-01-4	Vinyl Chloride	51		PASS	Within Limits
74-83-9	Bromomethane	18		PASS	Within Limits
75-00-3	Chloroethane	31		PASS	Within Limits
75-69-4	Trichlorofluoromethane	51		PASS	Within Limits
75-35-4	1,1-Dichloroethene	70		PASS	Within Limits
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	22		PASS	Within Limits
75-09-2	Methylene Chloride	46		PASS	Within Limits
156-60-5	trans-1,2-Dichloroethene	22		PASS	Within Limits
75-34-3	1,1-Dichloroethane	70		PASS	Within Limits
156-59-2	cis-1,2-Dichloroethene	43		PASS	Within Limits
67-66-3	Chloroform	63		PASS	Within Limits
74-97-5	Bromochloromethane	44		PASS	Within Limits
71-55-6	1,1,1-Trichloroethane	21		PASS	Within Limits
56-23-5	Carbon Tetrachloride	64		PASS	Within Limits
71-43-2	Benzene	49		PASS	Within Limits
107-06-2	1,2-Dichloroethane	73		PASS	Within Limits
79-01-6	Trichloroethene	82		PASS	Within Limits
78-87-5	1,2-Dichloropropane	43		PASS	Within Limits
75-27-4	Bromodichloromethane	20		PASS	Within Limits
10061-01-5	cis-1,3-Dichloropropene	26		PASS	Within Limits
10061-02-6	trans-1,3-Dichloropropene	57		PASS	Within Limits
79-00-5	1,1,2-Trichloroethane	26		PASS	Within Limits
127-18-4	Tetrachloroethene	50		FAIL	Action Low
124-48-1	Dibromochloromethane	43		PASS	Within Limits
106-93-4	1,2-Dibromoethane	30		PASS	Within Limits
75-25-2	Bromoform	55		PASS	Within Limits
79-34-5	1,1,2,2-Tetrachloroethane	36		PASS	Within Limits
96-12-8	1,2-Dibromo-3-chloropropane	43		PASS	Within Limits
630-20-6	1,1,1,2-Tetrachloroethane	54		PASS	TIC Found
95-63-6	1,2,4-Trimethylbenzene	51		PASS	TIC Found
****	END Main Analytes	**********	****	****	**********
****	END All Analytes	**********	****	****	**********

Generic Data Review Checklist

Project: Nyanza FS – OU2
Project #: 80113
Case#: E044S
Date: 03/20/2018
Methods: EPA Region I SOP EIASOP-VOAGCMS9 (VOC by GC/MS)
Laboratory: EPA OEME
SDG: 17110025
Reviewer: Lori Cox

1. **Case Narrative and Data Package Completeness (COC and Analyte List Review)**
   Nine samples were submitted for analysis of volatile organic compounds.

2. **Holding Time and Sample Preservation Compliance**
   Samples were collected on 11/14/2017 and analyzed on 11/17/2017.The receiving temperature was 2 degrees C. According to the laboratory, sample receipt, preparation, and analysis were done following the SOPs.

3. **Lab and Field Blanks**
   Acetone was detected in the trip blank at 3.6 µg/L. Target analytes were not detected in the laboratory blanks.

   Acetone was detected in MADEP-MW-1-111417A at 3.4 µg/L and will be qualified undetected at 3.4 µg/L in accordance with the National Functional Guidelines.

4. **Laboratory Control Samples**
   Recoveries for the laboratory fortified blank and duplicate were within criteria. The percent RPD was also within criteria for each analyte.

5. **Field Duplicate Precision**
   A field duplicate was not submitted.

6. **Laboratory Duplicate Precision**
   The percent RPD was within criteria for each analyte.

7. **Matrix Spikes**
   A matrix spike and spike duplicate was performed on sample MW-104A-0111417A, and recoveries and relative percent differences were within criteria.

8. **Surrogate Spikes**
   Recoveries for all samples were within criteria.

9. **Internal Standards**
   Internal standard information was not provided, and the laboratory did not note any issues with internal standards.

10. **Performance Evaluation Samples**
    Two PE samples were analyzed in SDG 17110031. Tetrachloroethene received a "warning low" score for sample VL01082 and an "action low" score for sample VL00717. Detects for tetrachloroethene will be estimated (J), and non-detects will be rejected (R).

11. **Reporting Limits**
    Reporting limits are elevated for MW-104A-111417A, MW-305A-111417A, MW-06B-111417A, and MW-201-111417A because of the dilutions required as a result of high concentrations of target analytes.

12. **Calibration Issues**
    Calibration data was not included in the report, and the laboratory did not note any issues with calibration.

13. **Other**
    None

Generic Data Review Checklist

Project: Nyanza FS – OU2
Project #: 80113
Case#: E044S
Date: 03/20/2018
Methods: EPA Region I SOP EIASOP-OPTIMAS0 (Metals by ICP)
Laboratory: EPA OEME
SDG: 17110025
Reviewer: Lori Cox

1. **Case Narrative and Data Package Completeness (COC and Analyte List Review)**
   Four samples were submitted for analysis of metals. Per the case narrative samples were analyzed with SDG nos. 17110021 and 17110031. Applicable laboratory duplicate results were included in SDG 17110021 and laboratory blank and lab fortified blank results were included in SDG 17110031.

2. **Holding Time and Sample Preservation Compliance**
   Samples were collected on 11/14/2017, prepared on 11/21/2017, and analyzed on 12/5/2017.The receiving temperature was 2 degrees C. According to the laboratory, sample receipt, preparation and analysis were done following the SOPs.

3. **Lab and Field Blanks**
   Field blanks were not submitted. Target analytes were not detected in the laboratory blank analyzed in SDG 17110031.

4. **Laboratory Control Samples**
   Recoveries for the laboratory fortified blank analyzed in SDG 17110031 were within criteria.

5. **Field Duplicate Precision**
   A field duplicate was not submitted.

6. **Laboratory Duplicate Precision**
   The percent RPDs for the lab duplicate analyzed in SDG 17110021 were within criteria.

7. **Matrix Spikes**
   A matrix spike was performed on sample MW-104A-0111417A, and recoveries were within criteria.

8. **Surrogate Spikes**
   N/A

9. **Internal Standards**
   N/A

10. **Performance Evaluation Samples**
    A PE sample (MS03731) was submitted with SDG 17110031. Need results.

11. **Reporting Limits**
    Reporting limits meet criteria with the exception of those for antimony, arsenic, beryllium, cadmium, lead, thallium, and vanadium. Reporting limits for these analytes are above the MCP GW-1 standard, which is the Project Action Limit.

12. **Calibration Issues**
    Calibration data was not included in the report, and the laboratory did not note any issues with calibration.

13. **Other**
    None

Generic Data Review Checklist

Project: Nyanza FS – OU2
Project #: 80113
Case#: E044S
Date: 03/20/2018
Methods: EPA 300.0 (Anions by ion chromatography)
Laboratory: EPA OEME
SDG: 17110025
Reviewer: Lori Cox

1. **Case Narrative and Data Package Completeness (COC and Analyte List Review)**
   Four samples were submitted for analysis of fluoride, chloride, bromide, and sulfate. Samples were analyzed at 10x dilution. Per the QAPP, fluoride and bromide were not required.

2. **Holding Time and Sample Preservation Compliance**
   Samples were collected on 11/14/2017 and analyzed on 11/16/2017.The receiving temperature was 2 degrees C. According to the laboratory, sample receipt, preparation and analysis were done following the SOPs.

3. **Lab and Field Blanks**
   Field blanks were not submitted for analysis of anions. Analytes were not detected in the laboratory blank. The reporting limit for all analytes is 0.10 mg/L.

4. **Laboratory Control Samples**
   Recoveries for the laboratory fortified blank were within criteria.

5. **Field Duplicate Precision**
   A field duplicate was not submitted.

6. **Laboratory Duplicate Precision**
   The percent RPD for the lab duplicate was within criteria.

7. **Matrix Spikes**
   A matrix spike was performed on sample MW-104A-0111417A, and recoveries for bromide, fluoride, and sulfate were within criteria. Recovery for chloride was not calculated, because concentration in the parent sample was greater than 4 times the spike concentration.

8. **Surrogate Spikes**
   N/A

9. **Internal Standards**
   N/A

10. **Performance Evaluation Samples**
    N/A

11. **Reporting Limits**
    Reporting limits are 1 mg/L due to dilution. There are no project action limits for anions.

12. **Calibration Issues**
    Calibration data was not included in the report, and the laboratory did not note any issues with calibration.

13. **Other**
    None

Generic Data Review Checklist

Project: Nyanza FS – OU2
Project #: 80113
Case#: E044S
Date: 03/20/2018
Methods: EPA Region I SOP INGNO2NO30 (Nitrogen by Lachat)
Laboratory: EPA OEME
SDG: 17110025
Reviewer: Lori Cox

1. **Case Narrative and Data Package Completeness (COC and Analyte List Review)**
   Four samples submitted for analysis of nitrate and nitrite. Nitrate was not reported for MW-104A-111417A, MW-112A-111417A, and MW-112B-111417A due to cadmium column interference.

2. **Holding Time and Sample Preservation Compliance**
   Samples were collected on 11/14/2017 and analyzed on 11/15/2017.The receiving temperature was 2 degrees C. According to the laboratory, sample receipt, preparation and analysis were done following the SOPs.

3. **Lab and Field Blanks**
   Field blanks were not submitted for analysis of nitrate and nitrite. Nitrite and nitrate were not detected in the laboratory blank. The reporting limits were 12 µg/L for nitrite and 23 µg/L for nitrate.

4. **Laboratory Control Samples**
   Recoveries for the laboratory fortified blank were within criteria.

5. **Field Duplicate Precision**
   A field duplicate was not submitted.

6. **Laboratory Duplicate Precision**
   The percent RPD for the lab duplicate was within criteria.

7. **Matrix Spikes**
   A matrix spike was performed on sample MW-305B-0111417A, and recoveries for nitrate and nitrite were within criteria.

8. **Surrogate Spikes**
   N/A

9. **Internal Standards**
   N/A

10. **Performance Evaluation Samples**
    N/A

11. **Reporting Limits**
    Reporting limits are less than the 1 mg/L specified in the QAPP. There are no project action limits for anions.

12. **Calibration Issues**
    Calibration data was not included in the report, and the laboratory did not note any issues with calibration.

13. **Other**
    None

PN. 17110025

USEPA CLP Generic COC (LAB COPY)

CHAIN OF CUSTODY RECORD

No: 1-111417-165145-0059

Contact Name:
Contact Phone:
Case #: E044S

Lab Address: 11 Technology Drive
Lab Phone: 617-918-8340

Lab: New England Regional Laboratory
Lab Contact: Dan Boudreau
Lab_City: North Chelmsford

Sample Identifier	CLP Sample No.	Matrix/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
TB02-111317A	EP4390	Ground Water/ Erik Johnson	Grab	VOC(28)	A (HCl) (2)	Trip Blank	11/14/2017 16:00	
MW-104A-111417A	EP4391	Ground Water/ Erik Johnson	Grab	VOC(28), Metals(28), Anions(28)	A (HCl), B (HNO3 pH<2), C (4 C) (6)	MW-104A	11/14/2017 10:40	
MW-112A-111417A	EP4392	Ground Water/ Allie Goldberg	Grab	VOC(28), Metals(28), Anions(28)	A (HCl), B (HNO3 pH<2), C (4 C) (6)	MW-112A	11/14/2017 10:45	
MW-305B-111417A	EP4393	Ground Water/ Chris Falco	Grab	VOC(28), Metals(28), Anions(28)	A (HCl), B (HNO3 pH<2), C (4 C) (6)	MW-305B	11/14/2017 10:35	
MW-404B-111417A	EP4394	Ground Water/ Erik Johnson	Grab	VOC(28)	A (HCl) (4)	MW-404B	11/14/2017 12:30	
MW-112B-111417A	EP4395	Ground Water/ Allie Goldberg	Grab	VOC(28), Metals(28), Anions(28)	A (HCl), B (HNO3 pH<2), C (4 C) (6)	MW-112B	11/14/2017 12:45	
MW-305A-111417A	EP4396	Ground Water/ Chris Falco	Grab	VOC(28)	A (HCl) (4)	MW-305A	11/14/2017 13:20	
MADEP-MW-1-111417A	EP4397	Ground Water/ Erik Johnson	Grab	VOC(28)	A (HCl) (4)	MADEP-MW-1	11/14/2017 14:15	
MW-06B-111417A	EP4398	Ground Water/ Allie Goldberg	Grab	VOC(28)	A (HCl) (4)	MW-06B	11/14/2017 14:45	
MW-201-111417A	EP4399	Ground Water/ Chris Falco	Grab	VOC(28)	A (HCl) (4)	MW-201	11/14/2017 14:45	

Shipment for Case Complete? N

Samples Transferred From Chain of Custody #

Special Instructions:

Analysis Key: VOC=Volatiles, Metals=Metals excluding Hg, Anions=Anions (NO2,NO3,Cl,SO4)

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
		11/15/17 11 23	ESAT	11/15/17 11:23	2 °C

17110025 $ICA
17110025 $TNL
17110025 $VOAMW
17110025 $METW_PE

April 5, 2018
Nobis File No. 80113

Ms. Lynne Jennings
EPA-New England Region I
5 Post Office Square
Suite 100, Mailcode OSRR07-4
Boston, MA 02109-3912

Re: Contract No. EP-S1-06-03
Task Order No. 0113-RI-CO-0115
Case No. E044S
Laboratory Report Nos.: 17110031
Region I OEME Laboratory, North Chelmsford, Massachusetts
Nyanza Chemical Waste Dump, OU2 Superfund Site
Ashland, Massachusetts
CERCLIS No.: MAD990685422

Tier 1 Modified Data Review

VOCs:

14/Aqueous: MW-304A-11615A, MW-304A-111517D, MW-304B-11615A, MW-405A-111517A, MW-302-111517A, MW-110-111517A, MW-405B-111517A, MW-04C-111517A, MW-04B-111517A, MW-40MAIN-111715A, MW-113B-111617A, MW-06A-111617A, B/MW-5-111617A, RW-01-111617A
1/Field Duplicate: MW-304A-11615A/MW-304A-111517D
1/Trip Blank: TB03-111517A
2/PE Samples: VL01082, VL00717

Metals:

2/PE Samples: AM0522, MS03731

Dear Ms. Jennings:

Nobis Engineering, Inc. (Nobis) performed a Tier 1 Modified data review on the analytical data for the samples listed above. The samples were collected by Nobis at the Nyanza Chemical Waste Dump, OU2 Superfund Site located in Ashland, Massachusetts. The samples were analyzed by OEME using in-house procedures for volatile organic compounds (VOCs) [EIASOP-VOAGCMS9], metals [EIASOP-OPTIMAS0], anions [EIASOP-INGIC13], and nitrogen (nitrate and nitrite) [EIASOP-INGNO2NO30].

The Tier 1 Modified data review was performed in accordance with the EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures (April 2013); USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (January 2017); USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data

Nobis Engineering, Inc.
585 Middlesex Street
Lowell, MA 01851
T (978) 683-0891

Review (September 2016); and the Quality Assurance Project Plan (QAPP) for the Nyanza Chemical Waste Dump, OU2 Superfund Site (December 2017).

The data were evaluated based on the following parameters:

*	•	Overall Evaluation of Data and Potential Usability Issues
*	•	Data Completeness
*	•	Preservation and Technical Holding Times
*	•	Blanks
*	•	Surrogate Compounds
*	•	Matrix Spike/Matrix Spike Duplicate (MS/MSD)
*	•	Laboratory Duplicates
*	•	Laboratory Control Samples (LCS)
*	•	Field Duplicates
	•	Reported Quantitation Limits
	•	Performance Evaluation Samples (PES)

* All criteria were met for this parameter.
NA – Not applicable.

Overall Evaluation of Data and Potential Usability Issues
The objectives of the groundwater sampling at the site are to provide a comprehensive evaluation of the shallow and deep groundwater contaminants at the site and to evaluate the feasibility of implementing monitored natural attenuation (MNA) as a remedial alternative for the site.

The data meet the project quality criteria and can be used without restriction except as summarized below. The attachments provide details and supporting documentation.

VOCs:
PE sample VL00717 failed with an “action low” score for tetrachloroethene. Tetrachloroethene was not detected in the samples analyzed; therefore, these results were rejected.

Metals:
No significant data quality issues were identified.

Please contact Lori Cox at (603) 513-1010 or lcox@nobiseng.com should you have any questions or comments regarding this information.

Sincerely,

NOBIS ENGINEERING, INC.

Alyssa Epstein
Project Scientist

Lori Cox
Data Validator

Tables: Data Summary Table - Tier 1 Mod Data Review
Data Qualifier Actions

Enclosure: PE Scores
Data Review Checklist
COC

DATA SUMMARY TABLE

Lab Sample ID	AB71250	AB71251	AB71252	AB71253	AB71254	AB71255	AB71256	AB71257	AB71258	AB71259	AB71264
Field Sample ID	TB03-111517A	MW-304A-111617A	MW-304A-111517D	MW-304B-111517A	MW-405A-111517A	MW-302-111517A	MW-110-111517A	MW-405B-111517A	MW-04C-111517A	MW-04B-111517A	MW-40MAIN-111715A
Sample Location	Unknown	MW-304A	MW-304A	MW-304B	MW-405A	MW-302	MW-110	MW-405B	MW-04C	MW-04B	MW-40MAIN
Sample Date	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17
Volatiles (ug/L)											
1,1,1,2-Tetrachloroethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,1,1-Trichloroethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,1-Dichloroethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,1-Dichloroethene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,1-Dichloropropene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	1 U	50 U	50 U	5 U	5 U	10 U	9	100 U	1 U	1 U	1 U
1,2,3-Trichloropropane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	1 U	50 U	50 U	12	5 U	10	37	120	1 U	1 U	1 U
1,2,4-Trimethylbenzene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,2-Dibromoethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,2-Dichlorobenzene	1 U	1200	1100	190	12	370	49	1600	1 U	1 U	1 U
1,2-Dichloroethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,2-Dichloropropane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,3-Dichlorobenzene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,3-Dichloropropane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
1,4-Dichlorobenzene	1 U	230	210	37	5 U	53	9	300	1 U	1 U	1 U
2,2-Dichloropropane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
2-Butanone	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
2-Chlorotoluene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
2-Hexanone	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
4-Chlorotoluene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
4-Isopropyltoluene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
4-Methyl-2-pentanone	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Acetone	3.4	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Acrylonitrile	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Benzene	1 U	50 U	50 U	5 U	5 U	26	5 U	100 U	1 U	1 U	1 U
Bromobenzene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Bromochloromethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Bromodichloromethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Bromoform	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Bromomethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Carbon disulfide	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Carbon tetrachloride	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Chlorobenzene	1 U	1100	1000	99	31	340	27	2300	1 U	1 U	1 U
Chloroethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	AB71250	AB71251	AB71252	AB71253	AB71254	AB71255	AB71256	AB71257	AB71258	AB71259	AB71264
Field Sample ID	TB03-111517A	MW-304A-111617A	MW-304A-111517D	MW-304B-111517A	MW-405A-111517A	MW-302-111517A	MW-110-111517A	MW-405B-111517A	MW-04C-111517A	MW-04B-111517A	MW-40MAIN-111715A
Sample Location	Unknown	MW-304A	MW-304A	MW-304B	MW-405A	MW-302	MW-110	MW-405B	MW-04C	MW-04B	MW-40MAIN
Sample Date	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17	11/15/17
Chloroform	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Chloromethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1 U	660	610	130	19	190	43	2300	1.2	1 U	3.3
cis-1,3-Dichloropropene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Dibromochloromethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Dibromomethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Dichlorodifluoromethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Diethyl ether	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Ethylbenzene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Hexachlorobutadiene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Isopropylbenzene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
m,p-Xylene	2 U	100 U	100 U	10 U	10 U	20 U	10 U	200 U	2 U	2 U	2 U
Methyl tert-butyl ether	1 U	50 U	50 U	5 U	5 U	21	5 U	100 U	1 U	1 U	1 U
Methylene chloride	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Naphthalene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
n-Butylbenzene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
n-Propylbenzene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
o-Xylene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
sec-Butylbenzene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Styrene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
tert-Butylbenzene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Tetrachloroethene	R	R	R	R	R	R	R	R	R	R	R
Tetrahydrofuran	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Toluene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Trichloroethene	1 U	1800	1800	90	35	130	16	100 U	14	8.3	4.1
Trichlorofluoromethane	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Vinyl acetate	1 U	50 U	50 U	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U
Vinyl chloride	1 U	190	180	5 U	5 U	10 U	5 U	100 U	1 U	1 U	1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	AB71265	AB71266	AB71267	AB71268
Field Sample ID	MW-113B-111617A	MW-06A-111617A	B/MW-5-111617A	RW-01-111617A
Sample Location	MW-113B	MW-06A	MW/B-5	RW-1
Sample Date	11/16/17	11/16/17	11/16/17	11/16/17
Volatiles (ug/L)				
1,1,1,2-Tetrachloroethane	10 U	1 U	50 U	1 U
1,1,1-Trichloroethane	10 U	1 U	50 U	1 U
1,1,2,2-Tetrachloroethane	10 U	1 U	50 U	1 U
1,1,2-Trichloro-1,2,2-	10 U	1 U	50 U	1 U
1,1,2-Trichloroethane	10 U	1 U	50 U	1 U
1,1-Dichloroethane	10 U	1 U	50 U	1 U
1,1-Dichloroethene	10 U	1 U	50 U	1 U
1,1-Dichloropropene	10 U	1 U	50 U	1 U
1,2,3-Trichlorobenzene	10 U	1 U	50 U	1 U
1,2,3-Trichloropropane	10 U	1 U	50 U	1 U
1,2,4-Trichlorobenzene	10 U	2.6	320	1 U
1,2,4-Trimethylbenzene	10 U	1 U	50 U	1 U
1,2-Dibromo-3-chloropropane	10 U	1 U	50 U	1 U
1,2-Dibromoethane	10 U	1 U	50 U	1 U
1,2-Dichlorobenzene	150	4.9	35000	1 U
1,2-Dichloroethane	10 U	1 U	50 U	1 U
1,2-Dichloropropane	10 U	1 U	50 U	1 U
1,3,5-Trimethylbenzene	10 U	1 U	50 U	1 U
1,3-Dichlorobenzene	10 U	1 U	1400	1 U
1,3-Dichloropropane	10 U	1 U	50 U	1 U
1,4-Dichlorobenzene	32	2.2	8200	1 U
2,2-Dichloropropane	10 U	1 U	50 U	1 U
2-Butanone	10 U	1 U	50 U	1 U
2-Chlorotoluene	10 U	1 U	50 U	1 U
2-Hexanone	10 U	1 U	50 U	1 U
4-Chlorotoluene	10 U	1 U	50 U	1 U
4-Isopropyltoluene	10 U	1 U	50 U	1 U
4-Methyl-2-pentanone	10 U	1 U	50 U	1 U
Acetone	10 U	1 U	50 U	1 U
Acrylonitrile	10 U	1 U	50 U	1 U
Benzene	10 U	1 U	65	1 U
Bromobenzene	10 U	1 U	50 U	1 U
Bromochloromethane	10 U	1 U	50 U	1 U
Bromodichloromethane	10 U	1 U	50 U	1 U
Bromoform	10 U	1 U	50 U	1 U
Bromomethane	10 U	1 U	50 U	1 U
Carbon disulfide	10 U	1 U	50 U	1 U
Carbon tetrachloride	10 U	1 U	50 U	1 U
Chlorobenzene	90	9.7	24000	1 U
Chloroethane	10 U	1 U	50 U	1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

DATA SUMMARY TABLE

Lab Sample ID	AB71265	AB71266	AB71267	AB71268
Field Sample ID	MW-113B-111617A	MW-06A-111617A	B/MW-5-111617A	RW-01-111617A
Sample Location	MW-113B	MW-06A	MW/B-5	RW-1
Sample Date	11/16/17	11/16/17	11/16/17	11/16/17
Chloroform	10 U	1 U	50 U	1 U
Chloromethane	10 U	1 U	50 U	1 U
cis-1,2-Dichloroethene	89	12	55	1 U
cis-1,3-Dichloropropene	10 U	1 U	50 U	1 U
Dibromochloromethane	10 U	1 U	50 U	1 U
Dibromomethane	10 U	1 U	50 U	1 U
Dichlorodifluoromethane	10 U	1 U	50 U	1 U
Diethyl ether	10 U	1 U	50 U	1 U
Ethylbenzene	10 U	1 U	50 U	1 U
Hexachlorobutadiene	10 U	1 U	50 U	1 U
Isopropylbenzene	10 U	1 U	50 U	1 U
m,p-Xylene	20 U	2 U	100 U	2 U
Methyl tert-butyl ether	10 U	1 U	50 U	1 U
Methylene chloride	10 U	1 U	50 U	1 U
Naphthalene	10 U	1 U	50 U	1 U
n-Butylbenzene	10 U	1 U	50 U	1 U
n-Propylbenzene	10 U	1 U	50 U	1 U
o-Xylene	10 U	1 U	50 U	1 U
sec-Butylbenzene	10 U	1 U	50 U	1 U
Styrene	10 U	1 U	50 U	1 U
tert-Butylbenzene	10 U	1 U	50 U	1 U
Tetrachloroethene	R	R	R	R
Tetrahydrofuran	10 U	1 U	50 U	1 U
Toluene	10 U	1 U	50 U	1 U
trans-1,2-Dichloroethene	10 U	1 U	50 U	1 U
trans-1,3-Dichloropropene	10 U	1 U	50 U	1 U
Trichloroethene	200	2.9	24000	1.5
Trichlorofluoromethane	10 U	1 U	50 U	1 U
Vinyl acetate	10 U	1 U	50 U	1 U
Vinyl chloride	10 U	1 U	50 U	1 U

U – not detected; J – estimated value; UJ – not detected, reporting limit estimated; R – rejected

Data Review Qualification Actions

Case: E044S
SDG: 17110031

Analyte	Samples	Evaluation Criteria	Action Needed	Comments
Tetrachloroethene	MW-304A, MW-304A (FD), MW-304B, MW-405A, MW-302, MW-110, MW-405B, MW-04C, MW-04B, MW-40MAIN, MW-113B, MW-06A, B/MW-5, RW-01	PE Score	R	Tetrachloroethene failed PE score, ND data is rejected

PES SCORING EVALUATION REPORT

PES AM0522 Rev: 2 EPA Sample No.: AM0522 Report Date: 03/30/2018

Lab Name: USEPA New England Laboratory Lab Code: NERL
Contract: NA Case No.: MA No.:
SDG No.: Analytical Method: ICP-AES Matrix: Water
Lab Sample ID: AB71262 Date Received: 11/15/2017 Percent Solids:
Units: ug/L (mg/L for Hardne

Analysis Method: Non-CLP - Score by ISM02.x Metals Analysis ICP
Scoring Method: ISM02.x Metals Analysis ICP
Comments: USEPA NERL Method

CAS No.	Analyte	Laboratory Results		PES Evaluation	
		Concentration	Q		
7429-90-5	Aluminum	29000		PASS	Within Limits
7440-36-0	Antimony	140		PASS	Within Limits
7440-38-2	Arsenic	33		PASS	Within Limits
7440-39-3	Barium	510		PASS	Within Limits
7440-41-7	Beryllium	25		PASS	Within Limits
7440-43-9	Cadmium	72		PASS	Within Limits
7440-70-2	Calcium	8100		PASS	Within Limits
7440-47-3	Chromium	260		PASS	Within Limits
7440-48-4	Cobalt	620		PASS	Within Limits
7440-50-8	Copper	750		PASS	Within Limits
7439-89-6	Iron	74000		PASS	Within Limits
7439-92-1	Lead	97		PASS	Within Limits
7439-95-4	Magnesium	9600		PASS	Within Limits
7439-96-5	Manganese	70		PASS	Within Limits
7440-02-0	Nickel	210		PASS	Within Limits
7440-09-7	Potassium	0		N.E.	Scorer Request
7782-49-2	Selenium	94		PASS	Within Limits
7440-22-4	Silver	60		PASS	Within Limits
7440-23-5	Sodium	0		N.E.	Scorer Request
7440-28-0	Thallium	80		PASS	Within Limits
7440-62-2	Vanadium	650		PASS	Within Limits
7440-66-6	Zinc	490		PASS	Within Limits
****	END Main Analytes	**********	****	****	**********
****	END All Analytes	**********	****	****	**********

PES SCORING EVALUATION REPORT

PES MS03731 Rev: 1 EPA Sample No.: MS03731 Report Date: 03/30/2018

Lab Name: USEPA New England Laboratory Lab Code: NERL
Contract: NA Case No.: MA No.:
SDG No.: Analytical Method: ICP-MS Matrix: Water
Lab Sample ID: AB71263 Date Received: 11/15/2017 Percent Solids:
Units: ug/L

Analysis Method: Non-CLP - Score by ISM02.x Metals Analysis ICP-MS
Scoring Method: ISM02.x Metals Analysis ICP-MS
Comments:

CAS No.	Analyte	Laboratory Results		PES Evaluation	
		Concentration	Q		
7429-90-5	Aluminum	400		PASS	Within Limits
7440-36-0	Antimony	0		N.E.	Scorer Request
7440-39-3	Barium	36		PASS	Within Limits
7440-41-7	Beryllium	0		N.E.	Scorer Request
7440-43-9	Cadmium	0		N.E.	Scorer Request
7440-70-2	Calcium	570		PASS	Within Limits
7440-47-3	Chromium	0		N.E.	Scorer Request
7440-48-4	Cobalt	0		N.E.	Scorer Request
7440-50-8	Copper	24		PASS	Within Limits
7439-89-6	Iron	350		PASS	Within Limits
7439-92-1	Lead	0		N.E.	Scorer Request
7439-95-4	Magnesium	520		PASS	Within Limits
7439-96-5	Manganese	0		N.E.	Scorer Request
7440-02-0	Nickel	0		N.E.	Scorer Request
7440-09-7	Potassium	0		N.E.	Scorer Request
7782-49-2	Selenium	0		N.E.	Scorer Request
7440-22-4	Silver	0		N.E.	Scorer Request
7440-28-0	Thallium	0		N.E.	Scorer Request
7440-62-2	Vanadium	0		N.E.	Scorer Request
7440-66-6	Zinc	0		N.E.	Scorer Request
****	END Main Analytes	**********	****	****	**********
****	END All Analytes	**********	****	****	**********

PES SCORING EVALUATION REPORT

PES VL01082 Rev: 1 EPA Sample No.: VL01082 Report Date: 03/30/2018

Lab Name: USEPA New England Laboratory
Lab Code: NERL
Contract:
Case No.:
MA No.:
SDG No.:
Analytical Method: VOA
Level: Not Given
Matrix: Water
Lab Sample ID: AB71260
Lab File ID:
Date Received: 11/15/2017
Date Extracted:
Date Analyzed: 11/20/2017
GC Column:
ID (mm):
GC Column:
ID (mm):
Soil Aliquot (VOA, uL):
Sample Wt./Vol. (g/mL): 5
Percent Solids:
Heated Purge: (Y/N) Unknown
Extract Volume (uL):
Extract Conc: (Y/N) N/A
Extraction Type: N/A
Purge Volume (mL):
Injection Vol. (uL):
Cleanup Types: N/A
Cleanup Factor:
Dilution Factor:
Units: ug/L
pH:
Analysis Method: Non CLP Score by SOM02.x
Scoring Method: SOM02.x mod
Comments:

CAS No.	Analyte	Laboratory Results		PES Evaluation	
		Concentration	Q		
75-71-8	Dichlorodifluoromethane	25		PASS	Within Limits
74-87-3	Chloromethane	47		PASS	Within Limits
74-83-9	Bromomethane	28		PASS	Within Limits
75-69-4	Trichlorofluoromethane	34		PASS	Within Limits
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	44		PASS	Within Limits
67-64-1	Acetone	0		N.E.	Scorer Request
79-20-9	Methyl Acetate	0		N.E.	Scorer Request
75-09-2	Methylene Chloride	27		PASS	Within Limits
1634-04-4	Methyl tert-Butyl Ether	97		PASS	Within Limits
78-93-3	2-Butanone	54		PASS	Within Limits
110-82-7	Cyclohexane	0		N.E.	Scorer Request
107-06-2	1,2-Dichloroethane	84		PASS	Within Limits
79-01-6	Trichloroethene	43		PASS	Within Limits
108-87-2	Methylcyclohexane	0		N.E.	Scorer Request
108-10-1	4-Methyl-2-pentanone	130		PASS	Within Limits
108-88-3	Toluene	74		PASS	Within Limits
127-18-4	Tetrachloroethene	16		PASS	Warning Low
591-78-6	2-Hexanone	72		PASS	Within Limits
108-90-7	Chlorobenzene	29		PASS	Within Limits
100-41-4	Ethylbenzene	34		PASS	Within Limits
100-42-5	Styrene	78		PASS	Within Limits
98-82-8	Isopropylbenzene	63		PASS	Within Limits
106-46-7	1,4-Dichlorobenzene	22		PASS	Within Limits
95-50-1	1,2-Dichlorobenzene	22		PASS	Within Limits
120-82-1	1,2,4-Trichlorobenzene	22		PASS	Within Limits
87-61-6	1,2,3-Trichlorobenzene	67		PASS	Within Limits
95-47-6	o-Xylene	48		PASS	Within Limits
179601-23-1	m,p-Xylene	99		PASS	Within Limits
123-91-1	1,4-Dioxane	0		N.E.	Scorer Request
108-70-3	1,3,5-Trichlorobenzene	0		N.E.	Scorer Request
108-86-1	Bromobenzene	60		PASS	TIC Found
****	END Main Analytes	**********	****	****	**********
****	END All Analytes	**********	****	****	**********

PES SCORING EVALUATION REPORT

PES VL00717 Rev: 1 EPA Sample No.: VL00717 Report Date: 03/30/2018

Lab Name: USEPA New England Laboratory
Lab Code: N/A
Contract: N/A
Case No.: NR
MA No.: N/A
SDG No.: NR
Analytical Method: VOA
Level: Low
Matrix: Water
Lab Sample ID: AB71261
Lab File ID: NR
Date Received: 11/15/2017
Date Extracted: 11/20/2017
Date Analyzed: 11/20/2017
GC Column: NR
ID (mm): NR
GC Column: NR
ID (mm): NR
Soil Aliquot (VOA, uL): N/A
Sample Wt./Vol. (g/mL): 5 mL
Percent Solids: N/A
Heated Purge: (Y/N) No
Extract Volume (uL): N/A
Extract Conc: (Y/N) N/A
Extraction Type: PT
Purge Volume (mL): 5 mL
Injection Vol. (uL): N/A
Cleanup Types: N/A
Cleanup Factor: N/A
Dilution Factor: 1.0
Units: ug/L
pH: N/A
Analysis Method: Non CLP Score by SOM02.x
Scoring Method: SOM02.x
Comments: Scored by APTIM Personnel

CAS No.	Analyte	Laboratory Results		PES Evaluation	
		Concentration	Q		
75-71-8	Dichlorodifluoromethane	37		PASS	Within Limits
74-87-3	Chloromethane	31		PASS	Within Limits
75-01-4	Vinyl Chloride	51		PASS	Within Limits
74-83-9	Bromomethane	18		PASS	Within Limits
75-00-3	Chloroethane	31		PASS	Within Limits
75-69-4	Trichlorofluoromethane	51		PASS	Within Limits
75-35-4	1,1-Dichloroethene	70		PASS	Within Limits
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	22		PASS	Within Limits
75-09-2	Methylene Chloride	46		PASS	Within Limits
156-60-5	trans-1,2-Dichloroethene	22		PASS	Within Limits
75-34-3	1,1-Dichloroethane	70		PASS	Within Limits
156-59-2	cis-1,2-Dichloroethene	43		PASS	Within Limits
67-66-3	Chloroform	63		PASS	Within Limits
74-97-5	Bromochloromethane	44		PASS	Within Limits
71-55-6	1,1,1-Trichloroethane	21		PASS	Within Limits
56-23-5	Carbon Tetrachloride	64		PASS	Within Limits
71-43-2	Benzene	49		PASS	Within Limits
107-06-2	1,2-Dichloroethane	73		PASS	Within Limits
79-01-6	Trichloroethene	82		PASS	Within Limits
78-87-5	1,2-Dichloropropane	43		PASS	Within Limits
75-27-4	Bromodichloromethane	20		PASS	Within Limits
10061-01-5	cis-1,3-Dichloropropene	26		PASS	Within Limits
10061-02-6	trans-1,3-Dichloropropene	57		PASS	Within Limits
79-00-5	1,1,2-Trichloroethane	26		PASS	Within Limits
127-18-4	Tetrachloroethene	50		FAIL	Action Low
124-48-1	Dibromochloromethane	43		PASS	Within Limits
106-93-4	1,2-Dibromoethane	30		PASS	Within Limits
75-25-2	Bromoform	55		PASS	Within Limits
79-34-5	1,1,2,2-Tetrachloroethane	36		PASS	Within Limits
96-12-8	1,2-Dibromo-3-chloropropane	43		PASS	Within Limits
630-20-6	1,1,1,2-Tetrachloroethane	54		PASS	TIC Found
95-63-6	1,2,4-Trimethylbenzene	51		PASS	TIC Found
****	END Main Analytes	**********	****	****	**********
****	END All Analytes	**********	****	****	**********

Generic Data Review Checklist

Project: Nyanza OU2
Project #: 80113
Case#: E044S
Date: 3/29/18
Methods: VOCs (8260), Metals (3010A)
Laboratory: OEME
SDG: 17110031
Reviewer: Alyssa Epstein

1. **Case Narrative and Data Package Completeness (COC and Analyte List Review)**
   EP4400-EP4418 (collected November 15 and 16 2017 – received November 17, 2017) – 14 samples (includes FD) + TB analyzed for VOCs + 2 VOC PE samples and 2 Metals PE samples

2. **Holding Time and Sample Preservation Compliance**
   Samples were collected on November 15 and 16, 2017 and analyzed on November 17, 2017. The receiving temperature was 3 degrees C. According to the laboratory, sample receipt, preparation and analysis were done following the SOPs.

3. **Lab and Field Blanks**
   TB03-111517A – acetone at 3.4 ug/L– field samples ND for acetone

4. **Laboratory Control Samples**
   Recoveries for the laboratory fortified blank were within criteria.

5. **Field Duplicate Precision**
   The percent RPD for the field duplicate was within criteria.

6. **Laboratory Duplicate Precision**
   The percent RPD for the lab duplicate was within criteria.

7. **Matrix Spikes**
   In control

8. **Surrogate Spikes**
   In control

9. **Internal Standards**
   Not evaluated

10. **Performance Evaluation Samples**
    Tetrachloroethene failed due to action low in PE sample VL00717. Positive detects will be estimated J- and non detects will be rejected due to the possibility of false negatives.

11. **Reporting Limits**
    VOCs: MW-304B, MW-405A, MW-110 5x; MW-302, MW-113B 10x; MW-304A, B/MW-5 50x; MW-405B 100x. Reporting limits are elevated due to high concentrations of target analytes.

12. **Calibration Issues**
    Not evaluated

13. **Other**
    N/A

Nyanza OU2 - E044S 17110031
Field Duplicates

	AB71251		AB71175		
	EP4402		EP4401		>30%
	MW-304A		MW-304A Dup		RPD
VOCs					
Vinyl Chloride	190		180		5.41%
cis-1,2-Dichloroethylene	660		610		7.87%
Chlorobenzene	1100		1000		9.52%
Trichloroethylene	1800		1800		0.00%
1,4-dichlorobenzene	230		210		9.09%
1,2-dichlorobenzene	1200		1100		8.70%

PN 17110031

USEPA CLP Generic COC (LAB COPY)

Contact Name:

Contact Phone:

Case #: E044S

CHAIN OF CUSTODY RECORD

Lab Address: 11 Technology Drive

Lab Phone: 617-918-8340

No: 1-111617-100018-0061

Lab: New England Regional Laboratory

Lab Contact: Dan Boudreau

Lab_City: North Chelmsford

Sample Identifier	CLP Sample No.	Matrix/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
TB03-111517A	EP4400	Blank/ Gary Glennon	Grab	VOC(28)	A (HCl) (2)	Trip Blank	11/15/2017 17:15	
MW-304A-111617A	EP4401	Ground Water/ Erik Johnson	Grab	VOC(28)	A (HCl) (4)	MW-304A	11/15/2017 11:05	
MW-304A-111517D	EP4402	Ground Water/ Erik Johnson	Grab	VOC(28)	A (HCl) (4)	MW-304A	11/15/2017 16:00	
MW-304B-111517A	EP4403	Ground Water/ Erik Johnson	Grab	VOC(28)	A (HCl) (4)	MW-304B	11/15/2017 12:05	
MW-405A-111517A	EP4404	Ground Water/ Allie Goldberg	Grab	VOC(28)	A (HCl) (4)	MW-405A	11/15/2017 10:55	
MW-302-111517A	EP4405	Ground Water/ Chris Falco	Grab	VOC(28)	A (HCl) (4)	MW-302	11/15/2017 10:50	
MW-110-111517A	EP4406	Ground Water/ Erik Johnson	Grab	VOC(28)	A (HCl) (4)	MW-110	11/15/2017 13:10	
MW-405B-111517A	EP4407	Ground Water/ Allie Goldberg	Grab	VOC(28)	A (HCl) (4)	MW-405B	11/15/2017 12:30	
MW-04C-111517A	EP4408	Ground Water/ Chris Falco	Grab	VOC(28)	A (HCl) (12)	MW-04C	11/15/2017 13:45	
MW-04B-111517A	EP4409	Ground Water/ Chris Falco	Grab	VOC(28)	A (HCl) (4)	MW-04B	11/15/2017 14:40	
VL01082	EP4410	PE Water/ Gary Glennon	NA	VOC(28)	A (4 C) (1)	PE Sample	11/15/2017 16:01	

Shipment for Case Complete? N

Samples Transferred From Chain of Custody #

Sample(s) to be used for Lab QC: MW-04C-111517A Tag A - Special Instructions: NYANZA

Analysis Key: VOC=Volatiles

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
		11/17/17 10:28	ESAT	11/17/17 10:28	3°C

17110031 $VOAMW
17110031 $METW_PE

USEPA CLP Generic COC (LAB COPY)

CHAIN OF CUSTODY RECORD

No: 1-111617-100018-0061

Contact Name:
Contact Phone:
Case #: E044S

Lab Address: 11 Technology Drive
Lab Phone: 617-918-8340

Lab: New England Regional Laboratory
Lab Contact: Dan Boudreau
Lab_City: North Chelmsford

Sample Identifier	CLP Sample No.	Matrix/Sampler	Coll. Method	Analysis/Turnaround (Days)	Tag/Preservative/Bottles	Location	Collection Date/Time	For Lab Use Only
VL00717	EP4411	PE Water/ Gary Glennon	NA	VOC(28)	A (4 C) (1)	PE Sample	11/15/2017 16:02	
AM0522	EP4412	PE Water/ Gary Glennon	NA	Metals(28)	A (4 C) (1)	PE Sample	11/15/2017 16:03	
MS03731	EP4413	PE Water/ Gary Glennon	NA	Metals(28)	A (4 C) (1)	PE Sample	11/15/2017 16:04	
MW-40MAIN-111715A	EP4414	Ground Water/ Allie Goldberg	Grab	VOC(28)	A (HCl) (4)	MW-40MAIN	11/15/2017 15:10	
MW-113B-111617A	EP4415	Ground Water/ Allie Goldberg	Grab	VOC(28)	A (HCl) (4)	MW-113B	11/16/2017 11:15	
MW-06A-111617A	EP4416	Ground Water/ Chris Falco	Grab	VOC(28)	A (HCl) (4)	MW-06A	11/16/2017 11:43	
B/MW-5-111617A	EP4417	Ground Water/ Allie Goldberg	Grab	VOC(28)	A (HCl) (4)	B/MW-5	11/16/2017 12:25	
RW-01-111617A	EP4418	Ground Water/ Chris Falco	Grab	VOC(28)	A (HCl) (4)	RW-01	11/16/2017 12:46	

Shipment for Case Complete? N

Samples Transferred From Chain of Custody #

Special Instructions: NYANZA

Analysis Key: VOC=Volatiles, Metals=Metals excluding Hg

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
		11/17/17 10:28	EST	11/17/17 10:28	3° C

17110031 $VOAMW
17110031 $METW_PE

APPENDIX E

GROUNDWATER STATISTICS TOOL
NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE – OU2
ASHLAND, MASSACHUSETTS

1.0 INTRODUCTION

Nobis Engineering, Inc. (Nobis) performed a statistical evaluation of groundwater results for the Nyanza Chemical Waste Dump Superfund Site (the Site) in Ashland, Massachusetts. The evaluation was performed to support the evaluation of the monitored natural attenuation remedy for the Site. The samples used for the analysis were those collected by Nobis from 2012 to 2017.

The statistical tool is an excel-based tool using *Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well* (EPA, 2014a). This memorandum includes a discussion of the statistical tool, selection of monitoring wells and analyses, and the results.

2.0 STATISTICAL TOOL SUMMARY

The statistical tool is intended to provide trend analysis in individual wells to help determine overall concentration trends, and to extrapolate downward trends (if applicable) to determine the potential time to attain remedial goals (EPA, 2014b). EPA guidance (EPA, 2014a) recommends that a minimum of four data points be used to determine statistical trends. Non-detect data may be used, but variances in detection limits may cause error. Once a trend is calculated, the upper confidence limit (UCL) on the trend line should be calculated to determine the variability in the data set. The UCL on the trend line can then be compared to the applicable remedial goal. EPA recommends using the 95% UCL as the recommended confidence limit.

3.0 PARAMETERS SELECTED FOR EVALUATION

The primary contaminants of concern are chlorinated ethenes (primarily trichloroethene [TCE] and daughter products) and chlorobenzenes (primarily 1,2-dichlorobenzene [DCB] and 1,4-DCB), based on exceedances of Massachusetts Department of Environmental Protection (MassDEP) groundwater standards. Nobis selected four indicator contaminants for initial evaluation. 1,2-DCB and TCE represent non-degraded endpoints (1,4-DCB has more exceedances because its screening level is lower, but the 1,2-DCB concentrations are generally higher and therefore have more detections overall). Cis-1,2-DCE represents a degradation product (again, cis-1,2-DCE

does not have has many exceedances as vinyl chloride, but the concentrations are generally higher). Chlorobenzene can be a degradation product of DCBs, but is also present in the DNAPL.

For this evaluation, duplicate results were averaged. If a duplicate pair included a non-detect and a detected result, Nobis used the detected result with no averaging. The statistical tool adjusts non-detect values using the reporting limit; therefore, non-detects were entered as the reporting limit (not half the reporting limit).

For the purpose of evaluation, the results were assumed to be within the remediation monitoring phase, or the first phase intended for the groundwater statistical tool. Many of the source area wells are far above the applicable target cleanup levels, but the statistics were run as a test of the statistics. The only qualifier added for each input concentration was “ND” for non-detect values.

4.0 WELLS SELECTED FOR EVALUATION

Nobis selected wells for evaluation based on the number of sampling rounds available and the number of detections. Wells were used if they had at least four detected results for at least one of the primary analytes of interest (TCE and 1,2-DCB). Wells without sufficient detections of degradation products were included; however, Nobis did not run the statistics for those degradation products. The tool requires a minimum of four detected results to complete statistical calculations.

5.0 RESULTS

Table 1 summarizes the statistical tool results and Attachment A provides the final output screens for each test. The calculated results (mean, 95% UCL, and 95% UCL calculated for the most recent sampling event) were compared to the GW-2 criteria. Note that the GW-2 criterion for 1,2-DCB was extremely high relative to the analytical results (8,000 µg/L). In order to improve the visibility of the graphs, the previous GW-2 standard of 2,000 µg/L was used instead (the program does not permit alteration of the graph scale). The screening tool also indicates which locations have increasing concentrations, decreasing concentrations, or no trend (statistically insignificant). All outliers were retained in the evaluation.

Most of the results (82 out of 116 tests completed) were determined to have statistically insignificant trends. Exceptions are listed below:

- Increase in concentration over the monitored time: MW/B-5 (TCE), MW-09B (cis-1,2-DCE), MW-115B (cis-1,2-DCE), MW-201 (cis-1,2-DCE), MW-202 (cis-1,2-DCE), MW-203B (cis-1,2-DCE), MW-304A (cis-1,2-DCE), RMW-405B (cis-1,2-DCE),

- Decrease in concentration over the monitored time: MW/B-5 (cis-1,2-DCE), MW-104A (cis-1,2-DCE), MW-202 (1,2-DCB, chlorobenzene, and TCE), MW-203A (1,2-DCB and cis-1,2-DCE), MW-203B (1,2-DCB, TCE), MW-302 (1,2-DCB and TCE), RMW-405B (1,2-DCB), and MW-505B (cis-1,2-DCE and TCE)

- Unable to calculate trends because the trendline indicated negative values: MW-203A (TCE), RMW-405A (chlorobenzene), RMW-405B (TCE), RMW-1 (1,2-DCB, chlorobenzene, cis-1,2-DCE, and TCE).

The trendlines for the other results were evaluated qualitatively to determine the general trend of concentrations. The slope trends are color coded in Table 1.

6.0 REFERENCES

U.S. Environmental Protection Agency (EPA), 2014a. Recommended Approach for Evaluating Completion of Groundwater Restoration Remedial Actions at a Groundwater Monitoring Well. OSWER 9283.1-44, August 2014.

EPA, 2014b. Groundwater Statistics Tool User's Guide. September 2014.

Appendix E
Table 1 - Statistical Tool Results
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Well ID	Location Type	Chemical of Concern	Cleanup Level	Concentration Mean	95% UCL	95% UCL at last sampling event	UCL Calculation Method	Statistical Slope Trend	Qualitative Slope Trend	Change from 2015?	Trend Calculation Method
MW-03B	BR - cross gradient	1,2-DCB	8,000	5	10	13	KM Chebyshev UCL	no trend	no trend	No	Ordinary Least Squares
		Chlorobenzene	200	3	7	9	KM Chebyshev UCL	no trend	no trend	No	Theil-Sen/Mann-Kendall
		cis-1,2-DCE	20	13	**27**	**36**	KM Chebyshev UCL	no trend	increasing	No	Ordinary Least Squares
		TCE	5	**350**	**500**	**1,000**	Student's t UCL	no trend	increasing	No	Ordinary Least Squares
MW-04B	OB - cross gradient	cis-1,2-DCE	20	unable to calculate - fewer than 4 detected data points							
		TCE	5	**38**	**61**	**77**	Student's t UCL	no trend	decreasing	NA	Ordinary Least Squares
MW-04C	BR - cross gradient	cis-1,2-DCE	20	4.1	9.0	9.4	KM Chebyshev UCL	no trend	decreasing	NA	Ordinary Least Squares
		TCE	5	**46**	**77**	**139**	Student's t UCL	no trend	decreasing	Yes	Ordinary Least Squares
MW/B-5	BR/OB - WAC	1,2-DCB	8,000	**31,000**	**41,000**	**48,300**	Chebyshev UCL	no trend	increasing	No	Ordinary Least Squares
		Chlorobenzene	200	**22,000**	**26,000**	**33,700**	Student's t UCL	no trend	no trend	No	Ordinary Least Squares
		cis-1,2-DCE	20	**260**	**790**	**5**	Chebyshev UCL	decreasing	--	Yes	Theil-Sen/Mann-Kendall
		TCE	5	**18,000**	**23,000**	**34,600**	Student's t UCL	increasing	--	Yes	Ordinary Least Squares
MW-06A	OB - down gradient south plume edge	1,2-DCB	8,000	32	46	79	Student's t UCL	no trend	decreasing	Yes	Ordinary Least Squares
		Chlorobenzene	200	61	83	123	Student's t UCL	no trend	decreasing	Yes	Ordinary Least Squares
		cis-1,2-DCE	20	**48**	**62**	**83**	Student's t UCL	no trend	decreasing	Yes	Ordinary Least Squares
		TCE	5	**15**	**19**	**25**	Student's t UCL	no trend	decreasing	Yes	Ordinary Least Squares
MW-09B	BR - cross gradient	1,2-DCB	8,000	86	120	133	Student's t UCL	increasing		NA	Ordinary Least Squares
		Chlorobenzene	200	unable to calculate - fewer than 4 detected data points							
		cis-1,2-DCE	20	**23**	**31**	**34**	Student's t UCL	Increasing	--	NA	Ordinary Least Squares
		TCE	5	**12**	**20**	**38**	Student's t UCL	no trend	increasing	NA	Ordinary Least Squares
MW/B-11	BR - Nyacol	1,2-DCB	8,000	**49,000**	**98,000**	**179,000**	Student's t UCL	no trend	decreasing	NA	Ordinary Least Squares
		Chlorobenzene	200	**26,000**	**51,000**	**78,800**	Student's t UCL	no trend	decreasing	NA	Ordinary Least Squares
		cis-1,2-DCE	20	**350**	**5,070**	**1,040**	Student's t UCL	no trend	increasing	NA	Ordinary Least Squares
		TCE	5	**6,500**	**26,100**	**39,900**	Chebyshev UCL	no trend	decreasing	NA	Ordinary Least Squares
MW-104A	BR - down gradient of landfill	1,2-DCB	8,000	2,200	3,640	3,640	Student's t UCL	no trend	decreasing	No	Ordinary Least Squares
		Chlorobenzene	200	37	66	52	KM Chebyshev UCL	no trend	decreasing	No	Ordinary Least Squares
		cis-1,2-DCE	20	**390**	**610**	**330**	Student's t UCL	decreasing	--	No	Theil-Sen/Mann-Kendall
		TCE	5	**1,100**	**1,800**	**2,050**	Student's t UCL	no trend	decreasing	No	Ordinary Least Squares
MW-104B	OB - down gradient of landfill	1,2-DCB	8,000	7	11	12	Student's t UCL	no trend	no trend	No	Ordinary Least Squares
		Chlorobenzene	200	unable to calculate - fewer than 4 detected data points							
		cis-1,2-DCE	20	**47**	**73**	**112**	Student's t UCL	no trend	decreasing	Yes	Ordinary Least Squares
		TCE	5	**16**	**25**	**45**	Student's t UCL	no trend	decreasing	Yes	Ordinary Least Squares
MW-110	BR - down gradient south plume edge	1,2-DCB	8,000	41	70	98	KM Chebyshev UCL	no trend	increasing	Yes	Ordinary Least Squares
		Chlorobenzene	200	36	77	111	Chebyshev UCL	no trend	increasing	Yes	Ordinary Least Squares
		cis-1,2-DCE	20	**72**	**174**	**253**	Chebyshev UCL	no trend	increasing	No	Ordinary Least Squares
		TCE	5	**18**	**41**	**77**	Chebyshev UCL	no trend	increasing	No	Theil-Sen/Mann-Kendall
MW-112A	BR - west of down gradient plume	1,2-DCB	8,000	72	168	132	Chebyshev UCL	no trend	decreasing	NA	Theil-Sen/Mann-Kendall
		Chlorobenzene	200	33	58	57	Student's t UCL	no trend	decreasing	NA	Theil-Sen/Mann-Kendall
		cis-1,2-DCE	20	**85**	**180**	**262**	Student's t UCL	no trend	decreasing	NA	Ordinary Least Squares
		TCE	5	**87**	**170**	**235**	Student's t UCL	no trend	decreasing	NA	Ordinary Least Squares
MW-112B	OB - west of down gradient plume	1,2-DCB	8,000	20	29	35	Student's t UCL	no trend	no trend	NA	Ordinary Least Squares
		Chlorobenzene	200	6	9	12	Student's t UCL	no trend	decreasing	NA	Ordinary Least Squares
MW-113A	BR - WAC	1,2-DCB	8,000	**55,000**	**83,000**	**135,000**	Student's t UCL	no trend	increasing	NA	Ordinary Least Squares
		Chlorobenzene	200	**37,000**	**59,000**	**105,000**	Student's t UCL	no trend	increasing	NA	Ordinary Least Squares
		cis-1,2-DCE	20	**73**	**150**	**26.8**	Student's t UCL	no trend	decreasing	NA	Ordinary Least Squares
		TCE	5	**36,000**	**65,000**	**127,000**	Student's t UCL	no trend	increasing	NA	Ordinary Least Squares

Appendix E
Table 1 - Statistical Tool Results
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Well ID	Location Type	Chemical of Concern	Cleanup Level	Concentration Mean	95% UCL	95% UCL at last sampling event	UCL Calculation Method	Statistical Slope Trend	Qualitative Slope Trend	Change from 2015?	Trend Calculation Method
MW-113B	OB - WAC	1,2-DCB	8,000	210	260	322	Student's t UCL	no trend	decreasing	Yes	Ordinary Least Squares
		Chlorobenzene	200	87	100	152	Student's t UCL	no trend	increasing	No	Ordinary Least Squares
		cis-1,2-DCE	20	**88**	**100**	**150**	Student's t UCL	no trend	increasing	No	Ordinary Least Squares
		TCE	5	**330**	**410**	**476**	Student's t UCL	no trend	decreasing	No	Ordinary Least Squares
MW-115A	BR - down gradient south plume	1,2-DCB	8,000	1,100	1,800	2,000	KM Chebyshev UCL	no trend	increasing	No	Ordinary Least Squares
		Chlorobenzene	200	**2,100**	**3,300**	**4,500**	KM Chebyshev UCL	no trend	increasing	Yes	Ordinary Least Squares
		cis-1,2-DCE	20	**150**	**260**	**303**	KM Chebyshev UCL	no trend	no trend	No	Ordinary Least Squares
		TCE	5	**2,000**	**3,200**	**3,900**	KM Chebyshev UCL	no trend	increasing	No	Ordinary Least Squares
MW-115B	OB - down gradient south plume	1,2-DCB	8,000	1,700	1,800	2,060	Student's t UCL	no trend	no trend	No	Ordinary Least Squares
		Chlorobenzene	200	**1,500**	**1,700**	**2,050**	Chebyshev UCL	no trend	no trend	Yes	Theil-Sen/Mann-Kendall
		cis-1,2-DCE	20	**330**	**360**	**487**	Student's t UCL	increasing	--	No	Ordinary Least Squares
		TCE	5	**2,400**	**2,800**	**3,340**	Chebyshev UCL	no trend	no trend	No	Theil-Sen/Mann-Kendall
MW-201	OB - down gradient north plume	1,2-DCB	8,000	410	460	586	Student's t UCL	no trend	no trend	No	Ordinary Least Squares
		Chlorobenzene	200	**340**	**390**	**508**	Student's t UCL	no trend	no trend	No	Ordinary Least Squares
		cis-1,2-DCE	20	**130**	**160**	**242**	Student's t UCL	increasing	--	Yes	Ordinary Least Squares
		TCE	5	**190**	**220**	**283**	Student's t UCL	no trend	no trend	Yes	Ordinary Least Squares
MW-202	OB - down gradient north plume	1,2-DCB	8,000	2,200	2,500	2,260	Student's t UCL	decreasing	--	Yes	Ordinary Least Squares
		Chlorobenzene	200	**2,200**	**2,500**	**2,200**	Student's t UCL	decreasing	--	Yes	Ordinary Least Squares
		cis-1,2-DCE	20	**480**	**570**	**702**	Student's t UCL	increasing	--	No	Ordinary Least Squares
		TCE	5	**1,200**	**1,500**	**862**	Student's t UCL	decreasing	--	No	Ordinary Least Squares
MW-203A	BR - down gradient north plume	1,2-DCB	8,000	2,300	2,600	1,900	Student's t UCL	decreasing	--	No	Theil-Sen/Mann-Kendall
		Chlorobenzene	200	**6,700**	**7,200**	**8,680**	Student's t UCL	no trend	increasing	Yes	Ordinary Least Squares
		cis-1,2-DCE	20	**180**	**380**	**239**	KM Chebyshev UCL	decreasing	--	Yes	Ordinary Least Squares
		TCE	5	unable to calculate - negative values predicted				decreasing	--	Yes	
MW-203B	OB - down gradient north plume	1,2-DCB	8,000	**2,000**	**2,200**	**1,950**	Chebyshev UCL	decreasing		Yes	Ordinary Least Squares
		Chlorobenzene	200	**1,900**	**2,100**	**2,930**	Student's t UCL	no trend	decreasing	Yes	Theil-Sen/Mann-Kendall
		cis-1,2-DCE	20	**540**	**610**	**870**	Student's t UCL	increasing	--	No	Ordinary Least Squares
		TCE	5	**780**	**920**	**675**	Student's t UCL	decreasing	--	No	Ordinary Least Squares
MW-204A	BR - cross gradient	1,2-DCB	8,000	59	91	178	Student's t UCL	no trend	no trend	NA	Ordinary Least Squares
		Chlorobenzene	200	28	42	71	Student's t UCL	no trend	decreasing	NA	Ordinary Least Squares
		cis-1,2-DCE	20	**27**	**46**	**96**	Student's t UCL	no trend	increasing	NA	Theil-Sen/Mann-Kendall
		TCE	5	**200**	**390**	**881**	Student's t UCL	no trend	decreasing	NA	Ordinary Least Squares
MW-302	OB - cross gradient	1,2-DCB	8,000	560	630	494	Student's t UCL	decreasing	--	No	Ordinary Least Squares
		Chlorobenzene	200	**410**	**440**	**481**	Student's t UCL	no trend	decreasing	Yes	Ordinary Least Squares
		cis-1,2-DCE	20	**220**	**250**	**332**	Student's t UCL	no trend	increasing	Yes	Ordinary Least Squares
		TCE	5	**310**	**370**	**326**	Student's t UCL	decreasing	--	Yes	Ordinary Least Squares

Appendix E
Table 1 - Statistical Tool Results
Nyanza Chemical Waste Dump Superfund Site
Ashland, Massachusetts

Well ID	Location Type	Chemical of Concern	Cleanup Level	Concentration Mean	95% UCL	95% UCL at last sampling event	UCL Calculation Method	Statistical Slope Trend	Qualitative Slope Trend	Change from 2015?	Trend Calculation Method
MW-304A	BR - down gradient north plume	1,2-DCB	8,000	1,200	2,000	1,320	KM Chebyshev UCL	no trend	decreasing	No	Theil-Sen/Mann-Kendall
		Chlorobenzene	200	**1,200**	**1,700**	**1,310**	Chebyshev UCL	no trend	no trend	Yes	Theil-Sen/Mann-Kendall
		cis-1,2-DCE	20	**560**	**670**	**1,060**	Student's t UCL	Increasing	--	Yes	Ordinary Least Squares
		TCE	5	**1,900**	**2,200**	**3,270**	Student's t UCL	no trend	increasing	Yes	Ordinary Least Squares
MW-304B	OB - down gradient north plume	1,2-DCB	8,000	240	290	399	Student's t UCL	no trend	no trend	No	Ordinary Least Squares
		Chlorobenzene	200	120	140	196	Student's t UCL	no trend	increasing	No	Ordinary Least Squares
		cis-1,2-DCE	20	**170**	**200**	**280**	Student's t UCL	no trend	decreasing	Yes	Ordinary Least Squares
		TCE	5	**120**	**140**	**187**	Student's t UCL	no trend	decreasing	Yes	Ordinary Least Squares
RMW-305A	BR - cross gradient	1,2-DCB	8,000	770	840	963	Student's t UCL	no trend	decreasing	No	Ordinary Least Squares
		Chlorobenzene	200	**300**	**380**	**430**	Chebyshev UCL	no trend	increasing	No	Ordinary Least Squares
		cis-1,2-DCE	20	**110**	**130**	**221**	Student's t UCL	no trend	increasing	No	Ordinary Least Squares
		TCE	5	**940**	**1,000**	**1,070**	Student's t UCL	no trend	decreasing	No	Ordinary Least Squares
MW-402	BR - down gradient of landfill	1,2-DCB	8,000	500	780	830	Student's t UCL	no trend	decreasing	NA	Ordinary Least Squares
		Chlorobenzene	200	unable to calculate - fewer than 4 detected data points							
		cis-1,2-DCE	20	**500**	**540**	**582**	Student's t UCL	no trend	decreasing	NA	Ordinary Least Squares
		TCE	5	**10,000**	**14,000**	**23,600**	Student's t UCL	no trend	decreasing	NA	Ordinary Least Squares
RMW-405A	BR - down gradient edge	1,2-DCB	8,000	47	110	90	KM Chebyshev UCL	no trend	decreasing	No	Ordinary Least Squares
		Chlorobenzene	200	unable to calculate - negative values predicted				decreasing	--	Yes	
		cis-1,2-DCE	20	**27**	**47**	**53**	KM Chebyshev UCL	no trend	decreasing	No	Ordinary Least Squares
		TCE	5	**74**	**150**	**138**	KM Chebyshev UCL	no trend	decreasing	Yes	Ordinary Least Squares
RMW-405B	OB - down gradient edge	1,2-DCB	8,000	1,800	2,000	1,920	Chebyshev UCL	decreasing	--	Yes	Ordinary Least Squares
		Chlorobenzene	200	**2,500**	**2,700**	**2,550**	Chebyshev UCL	no trend	decreasing	No	Ordinary Least Squares
		cis-1,2-DCE	20	**1,700**	**2,600**	**3,530**	Chebyshev UCL	increasing	--	No	Ordinary Least Squares
		TCE	5	unable to calculate - negative values predicted				decreasing	--	No	
MW-503B	BR - down gradient of landfill	1,2-DCB	8,000	29	100	118	KM Chebyshev UCL	no trend	no trend	NA	Theil-Sen/Mann-Kendall
		Chlorobenzene	200	7	21	22	KM Chebyshev UCL	no trend	no trend	NA	Theil-Sen/Mann-Kendall
		cis-1,2-DCE	20	**56**	**190**	**213**	KM Chebyshev UCL	no trend	decreasing	NA	Theil-Sen/Mann-Kendall
		TCE	5	**2,000**	**6,600**	**8,380**	Chebyshev UCL	no trend	increasing	NA	Ordinary Least Squares
MW-505B	BR - down gradient of landfill	cis-1,2-DCE	20	1.3	2	0.7	KM Chebyshev UCL	decreasing	--	NA	Theil-Sen/Mann-Kendall
		TCE	5	9	16	7	Chebyshev UCL	decreasing	--	NA	Theil-Sen/Mann-Kendall
RW-1	BR/OB - WAC	1,2-DCB	8,000	unable to calculate - negative values predicted				decreasing	--	Yes	
		Chlorobenzene	200	unable to calculate - negative values predicted				decreasing	--	Yes	
		cis-1,2-DCE	20	unable to calculate - negative values predicted				decreasing	--	Yes	
		TCE	5	unable to calculate - negative values predicted				decreasing	--	Yes	

Notes:

All units in µg/L (micrograms per liter)

Bold = result above target screening level (GW-2). Note that a lower standard was set for 1,2-DCB (2,000 µg/L) for graph clarity.

Only trend data including 2017 samples shown.

Abbreviations:

OB = overburden, BR = bedrock

1,2-DCB = dichlorobenzene, cis-1,2-DCE = dichloroethene, and TCE = trichloroethene

UCL = upper concentration limit

'= increasing concentrations (statistically significant)

'= increasing concentrations (not statistically significant)

'= decreasing concentrations (not statistically significant)

'= decreasing concentrations (statistically significant)

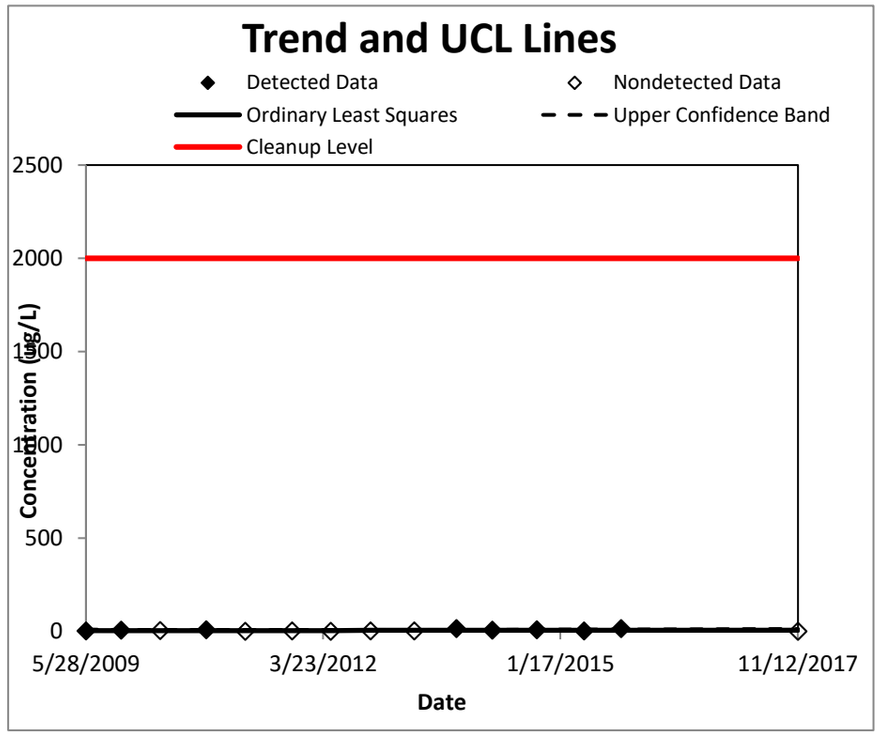
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-3B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	15
Number of detected results	8
Number of non-detected results	7
Detection frequency	53%
Number at or below cleanup level	15
Are any potential outliers present?	No
Mean of concentration	5.3
Standard deviation of concentration	4.3



95% Upper Confidence Limit (UCL)	10
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	13.2
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing

Message: None.

Data, including imputed values

Date (Date)	1,2-DCB Concentration (ug/L)	Data Qualifier	Imputed value*
39961	2.6		2.6
40114	6.71		6.71
40283	5.56	ND	5.299
40484	8.82		8.82
40653	5.43	ND	0.527
40856	5.75	ND	1.907
41024	5.21	ND	0.194
41197	5.15	ND	2.492
41387	5.43	ND	1.56
41569	14		14
41725	6.2		6.2
41919	7.7		7.7
42123	2		2
42284	15		15
43052	5	ND	0.645

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	47612.125

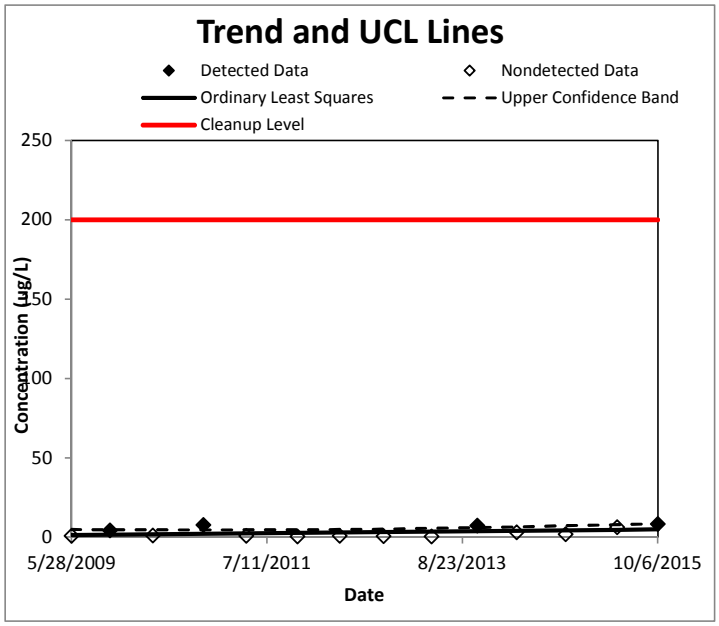
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/5/2016
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-03B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	14
Number of detected results	4
Number of non-detected results	10
Detection frequency	29%
Number at or below cleanup level	14
Are any potential outliers present?	No
Mean of concentration	2.7
Standard deviation of concentration	3.1



95% Upper Confidence Limit (UCL)	7.2
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	8.39
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

Data, including imputed values

Date (Date)	Chlorobenzene Concentration (ug/L)	Data Qualifier	Imputed value*
39961	1	ND	0.674
40114	4.1		4.1
40283	1	ND	0.893
40484	7.7		7.7
40653	1	ND	0.67
40856	1	ND	0.316
41024	1	ND	0.784
41197	1	ND	0.611
41387	0.5	ND	0.373
41569	7.3		7.3
41725	8	ND	2.999
41919	8	ND	1.684
42123	8	ND	6.201
42284	8.2		8.2

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	34913.09766

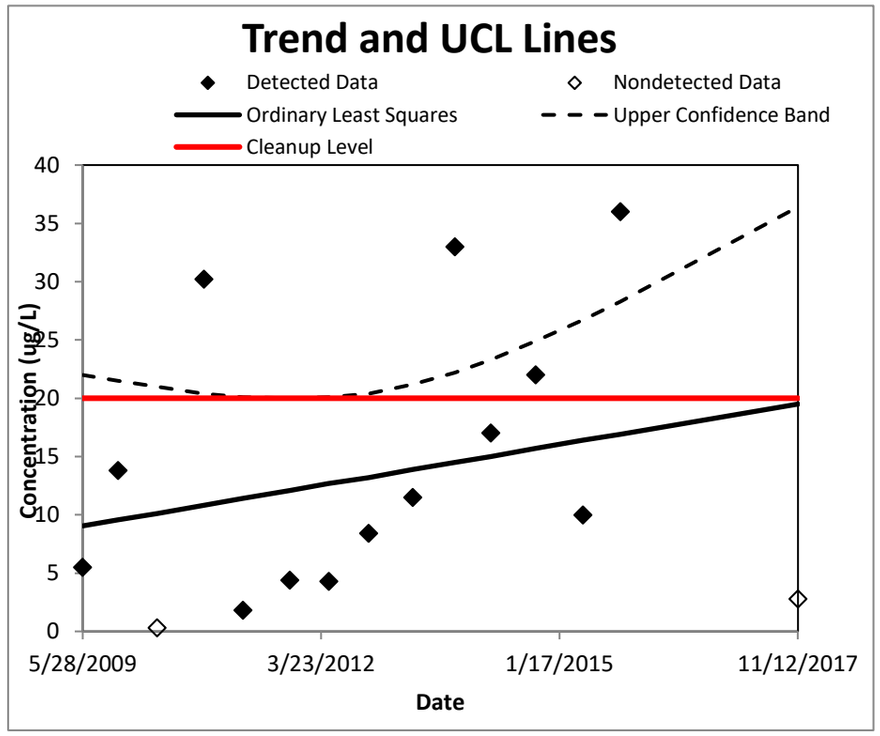
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-3B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	15
Number of detected results	13
Number of non-detected results	2
Detection frequency	87%
Number at or below cleanup level	11
Are any potential outliers present?	No
Mean of concentration	13
Standard deviation of concentration	11



95% Upper Confidence Limit (UCL)	27
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	36.4
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing

Message: None.

Data, including imputed values

Date (Date)	cis-1,2-DCE Concentration (ug/L)	Data Qualifier	Imputed value*
39961	5.5		5.5
40114	13.8		13.8
40283	1	ND	0.293
40484	30.2		30.2
40653	1.8		1.8
40856	4.4		4.4
41024	4.3		4.3
41197	8.4		8.4
41387	11.5		11.5
41569	33		33
41725	17		17
41919	22		22
42123	10		10
42284	36		36
43052	5	ND	2.782

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	48331.34375

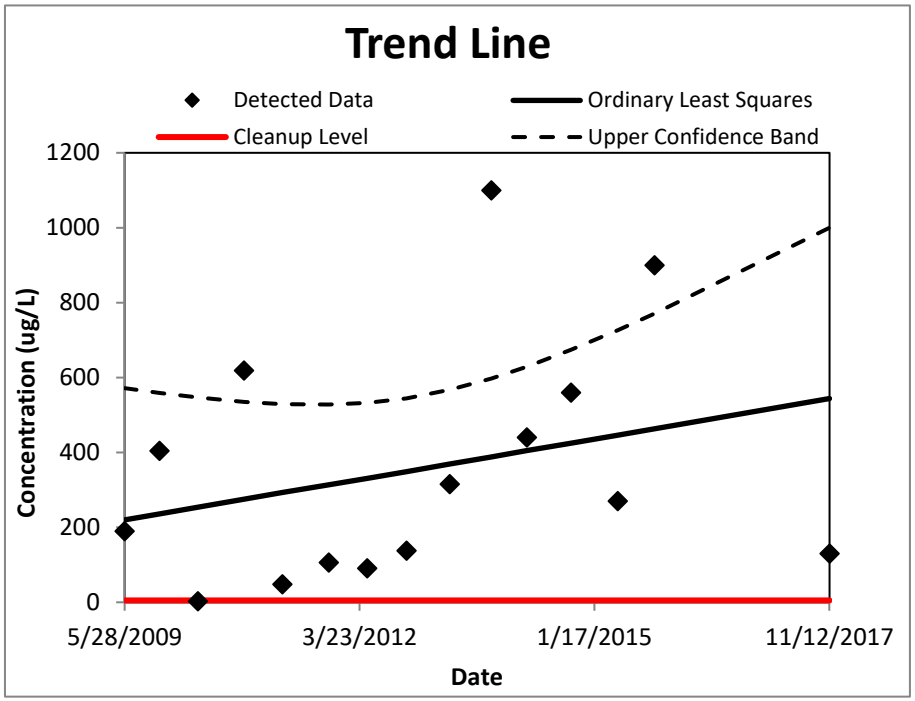
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-3B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	15
Number < cleanup level	1
Are any potential outliers present?	No
Mean of concentration	350
Standard deviation of concentration	320
t-value for UCL calculation	1.761



95% Upper Confidence Limit (UCL)	500
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	1000
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

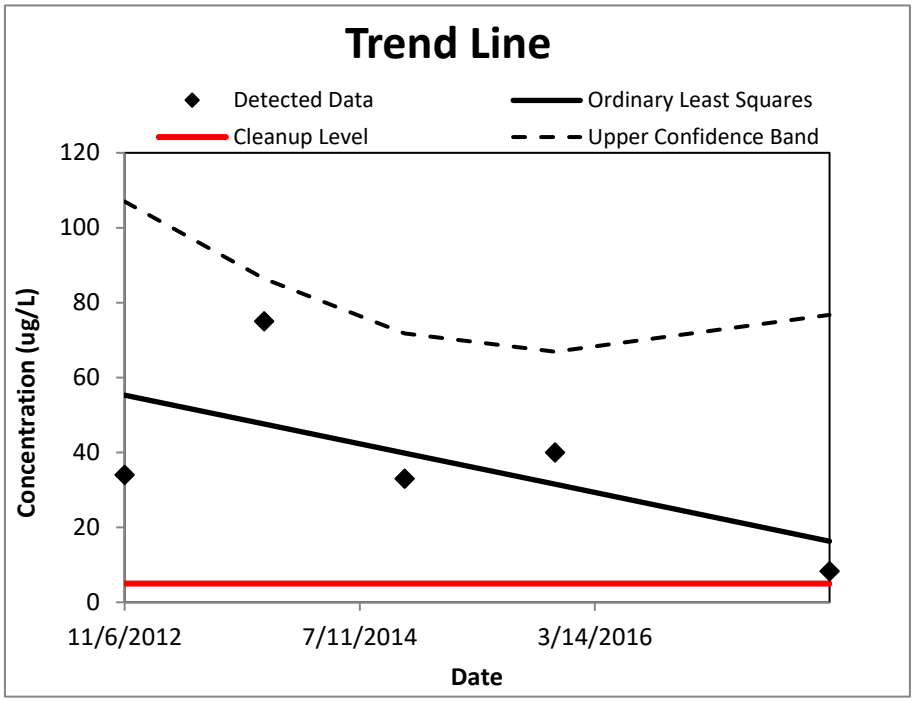
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-4B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	38
Standard deviation of concentration	24
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	61
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	76.7
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

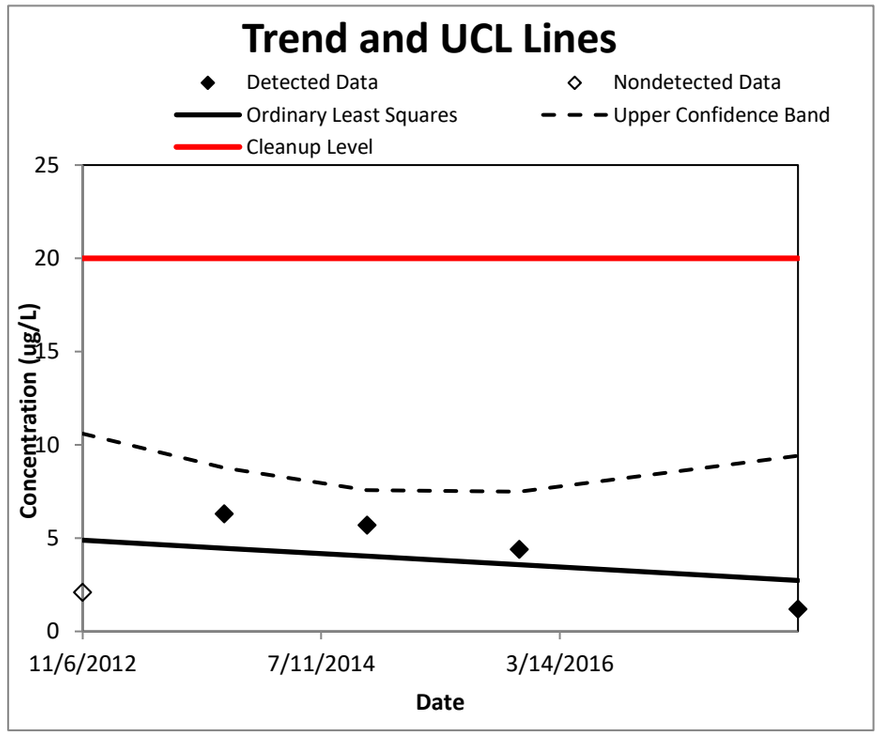
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-4C
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number of detected results	4
Number of non-detected results	1
Detection frequency	80%
Number at or below cleanup level	5
Are any potential outliers present?	No
Mean of concentration	4.1
Standard deviation of concentration	2



95% Upper Confidence Limit (UCL)	9
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	9.42
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing

Message: None.

Data, including imputed values

Date (Date)	cis-1,2-DCE Concentration (ug/L)	Data Qualifier	Imputed value*
41219	5	ND	2.093
41582	6.3		6.3
41948	5.7		5.7
42339	4.4		4.4
43054	1.2		1.2

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	49565.08594

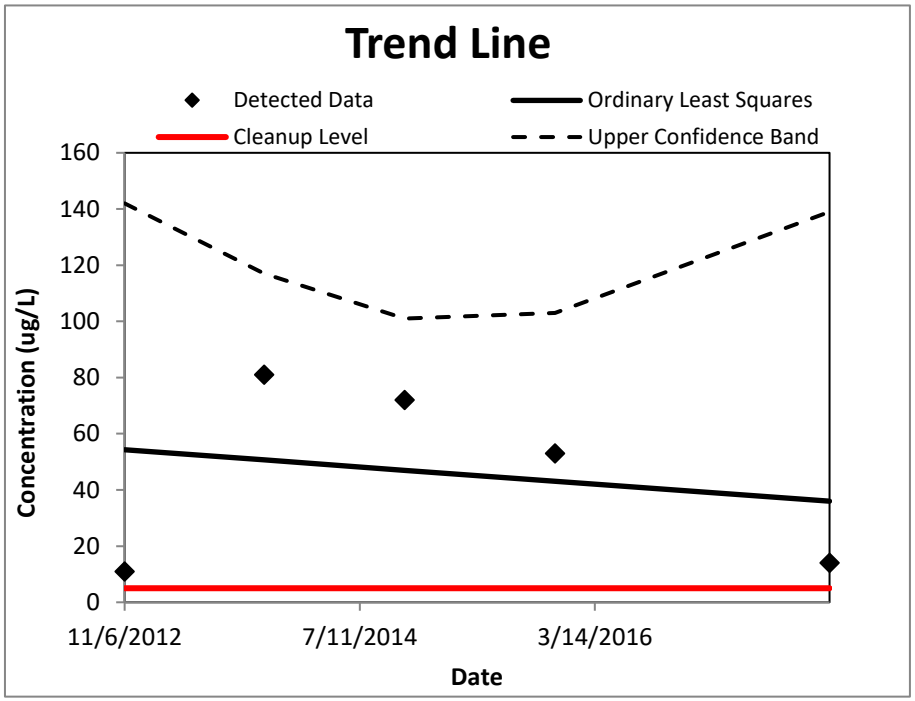
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-4C
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	46
Standard deviation of concentration	32
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	77
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	139
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

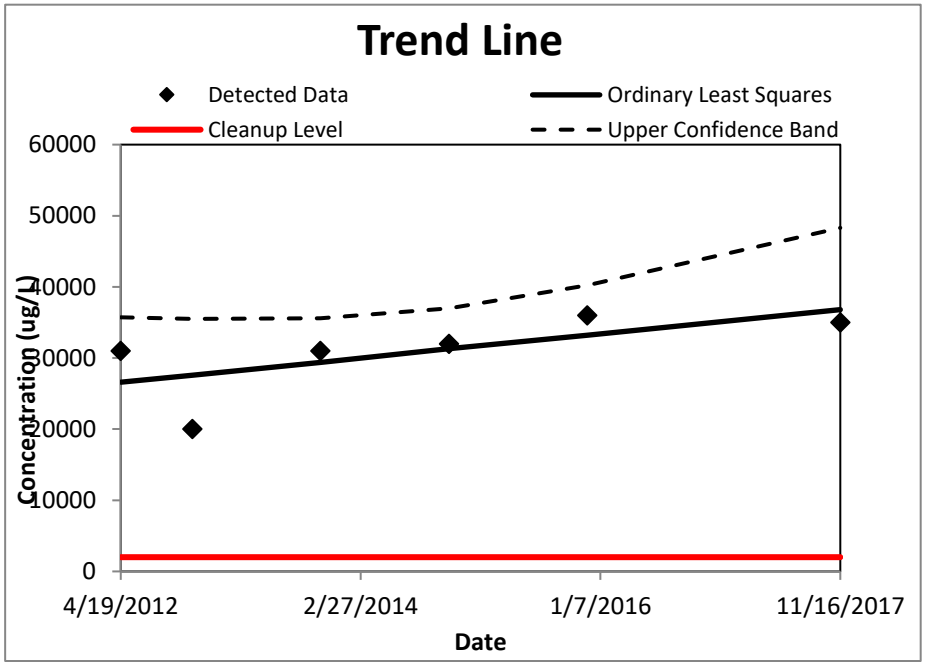
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW/B-5
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	6
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	31000
Standard deviation of concentration	5700



95% Upper Confidence Limit (UCL)	41000
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	48300
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	0
Message: None.	

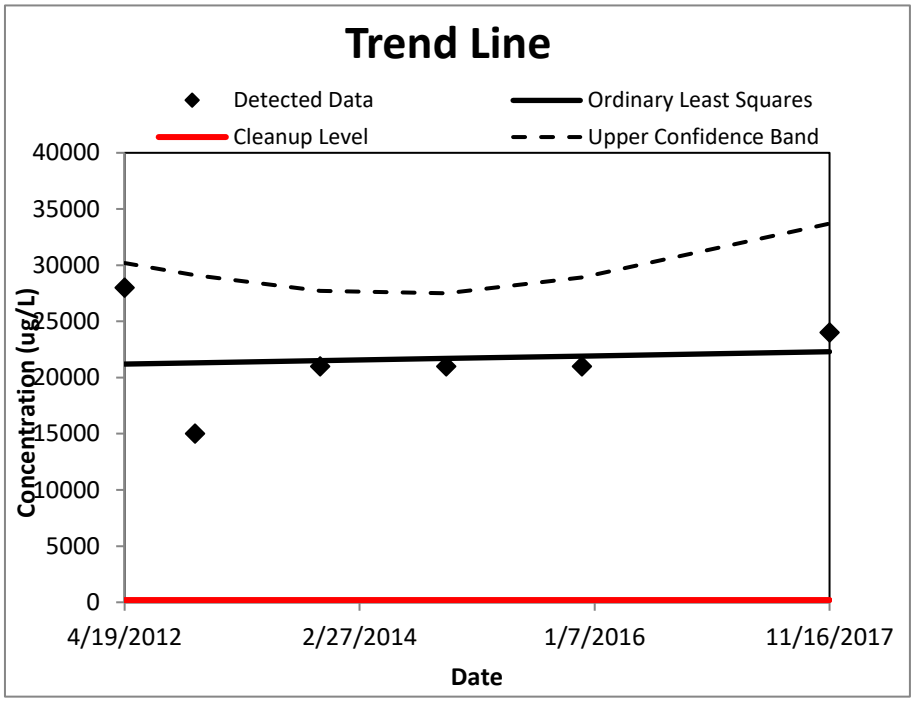
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW/B-5
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	6
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	22000
Standard deviation of concentration	4300
t-value for UCL calculation	2.015



95% Upper Confidence Limit (UCL)	26000
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	33700
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

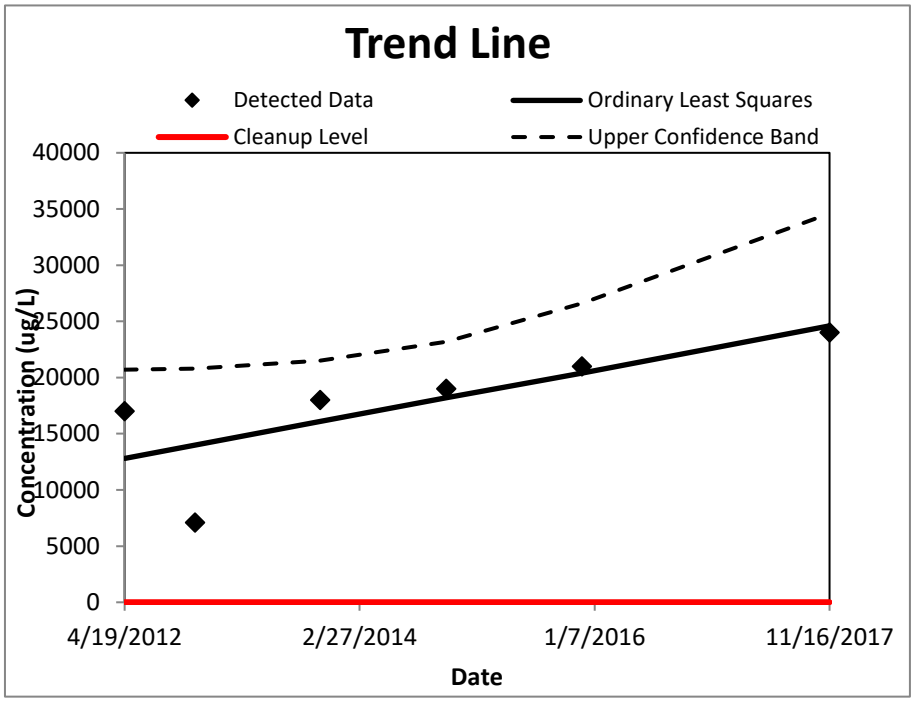
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW/B-5
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	6
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	18000
Standard deviation of concentration	5700
t-value for UCL calculation	2.015



95% Upper Confidence Limit (UCL)	23000
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	34600
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**No**

When is the concentration predicted to exceed the MCL?	MCL is already exceeded
Message: None.	

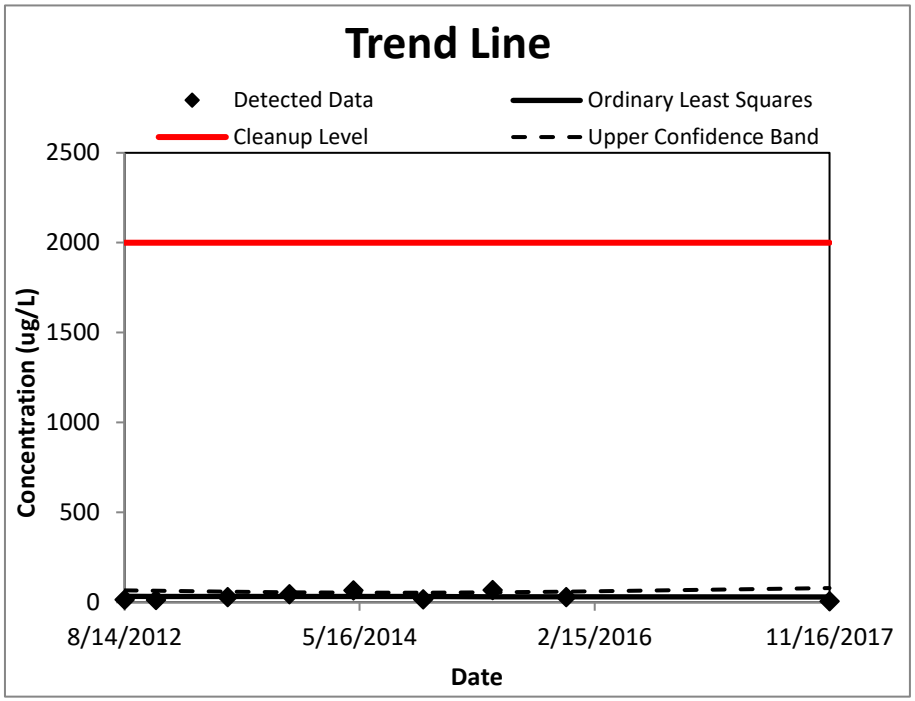
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-06A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	9
Are any potential outliers present?	No
Mean of concentration	32
Standard deviation of concentration	23
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	46
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	79
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

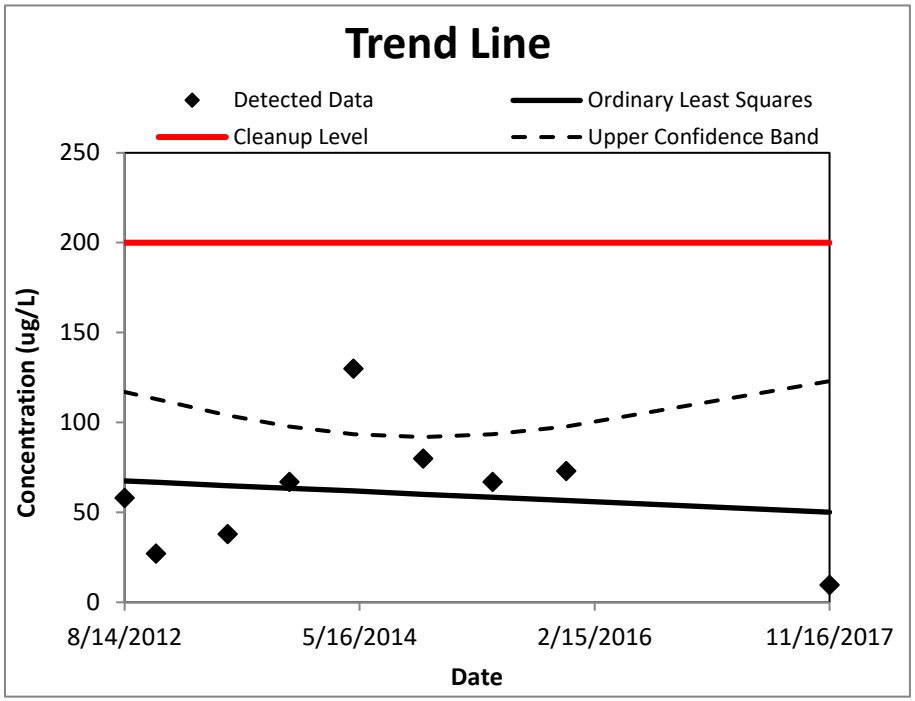
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-06A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	9
Are any potential outliers present?	No
Mean of concentration	61
Standard deviation of concentration	35
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	83
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	123
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

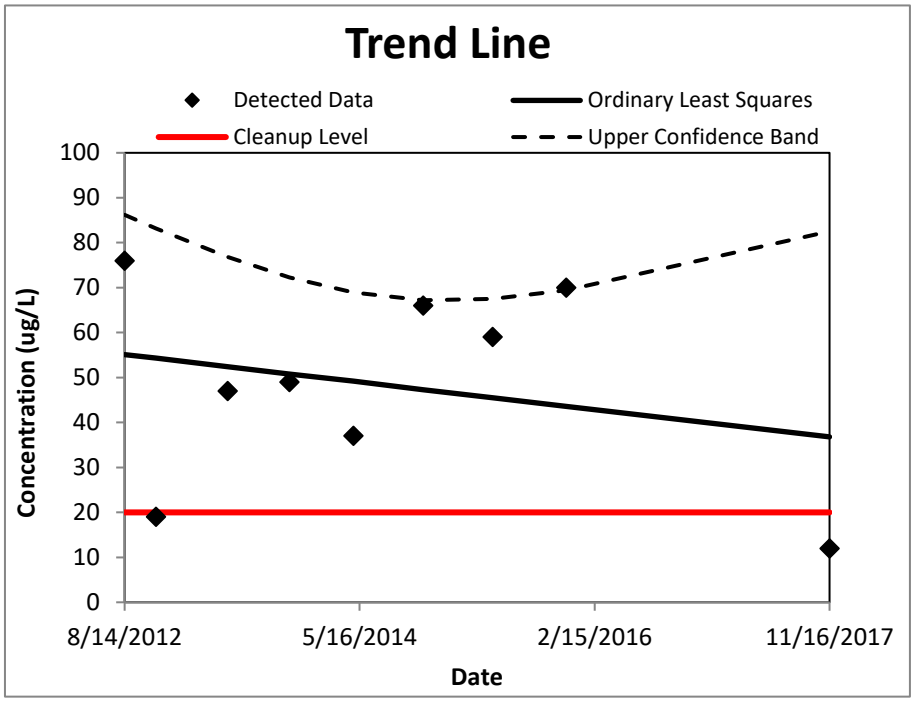
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-06A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	2
Are any potential outliers present?	No
Mean of concentration	48
Standard deviation of concentration	22
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	62
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	82.5
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

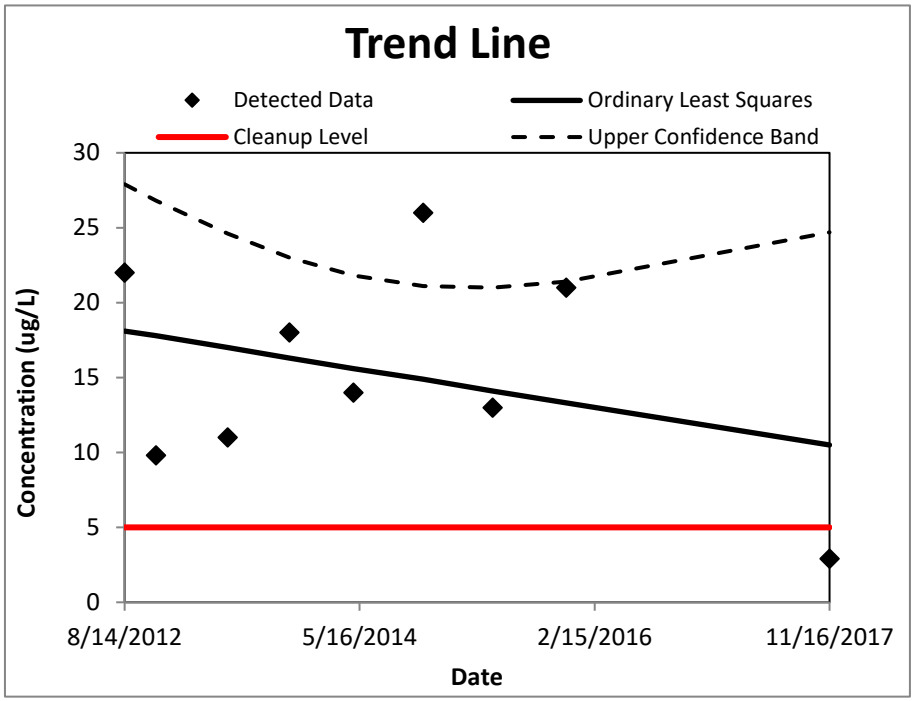
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-06A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	1
Are any potential outliers present?	No
Mean of concentration	15
Standard deviation of concentration	7.1
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	19
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	24.7
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

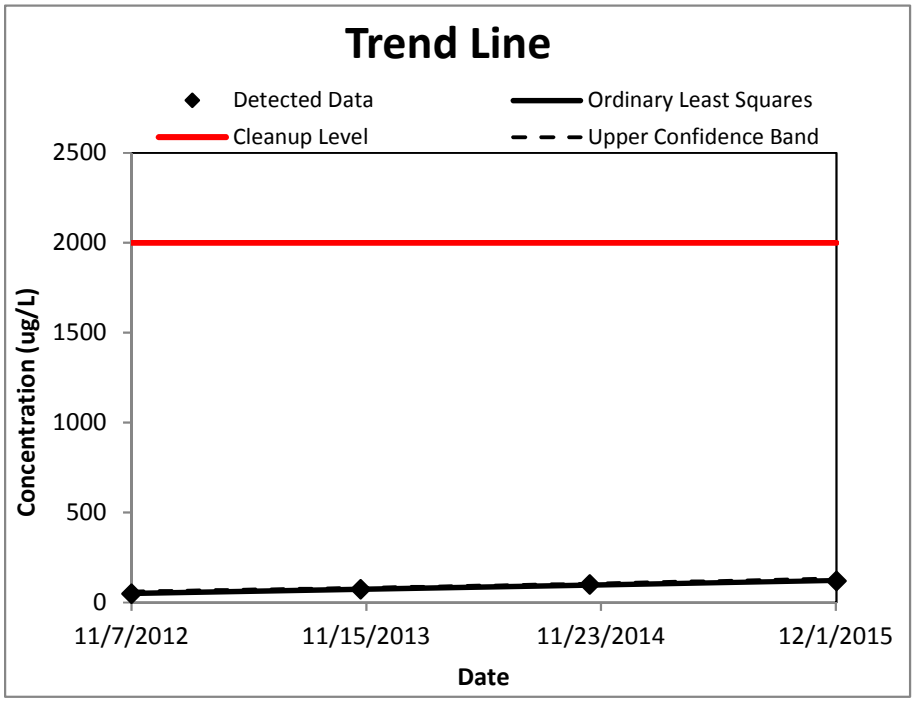
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/5/2016
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-09B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	4
Are any potential outliers present?	No
Mean of concentration	86
Standard deviation of concentration	31
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	120
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	133
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**No**

When is the concentration predicted to exceed the MCL?	71000
Message: None.	

Draft version - Do not distrubute

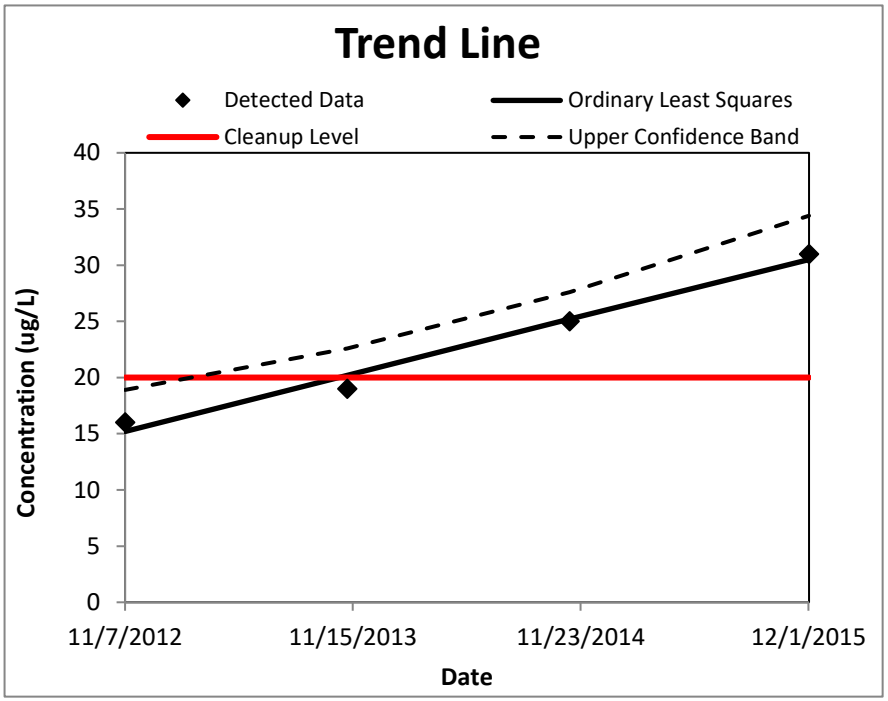
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/5/2016
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-09B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	2
Are any potential outliers present?	No
Mean of concentration	23
Standard deviation of concentration	6.7
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	31
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	34.4
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**No**

When is the concentration predicted to exceed the MCL?	MCL is already exceeded
Message: None.	

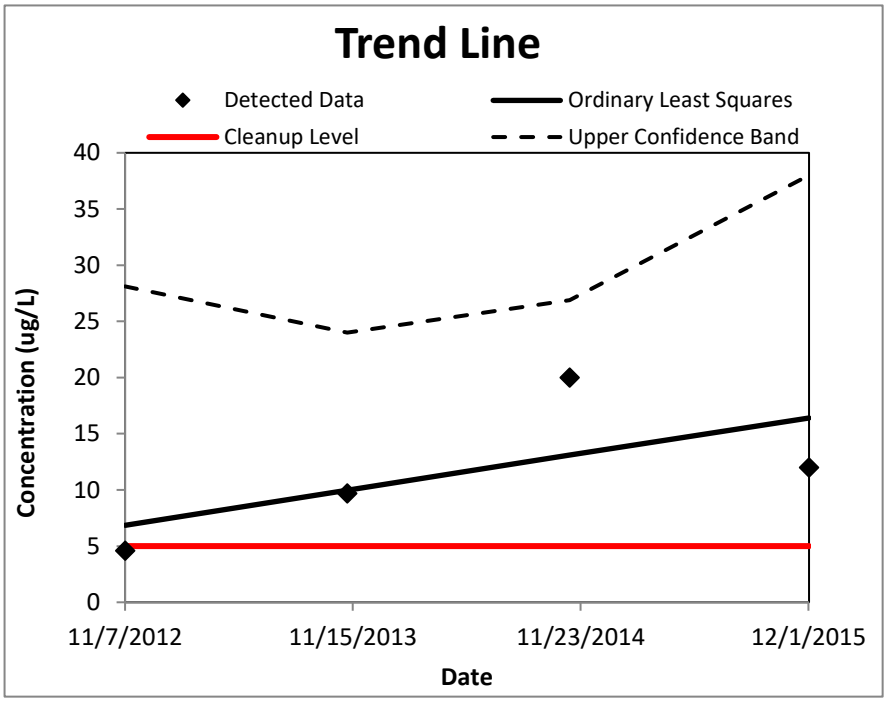
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/5/2016
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-09B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	1
Are any potential outliers present?	No
Mean of concentration	12
Standard deviation of concentration	6.4
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	20
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	38
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

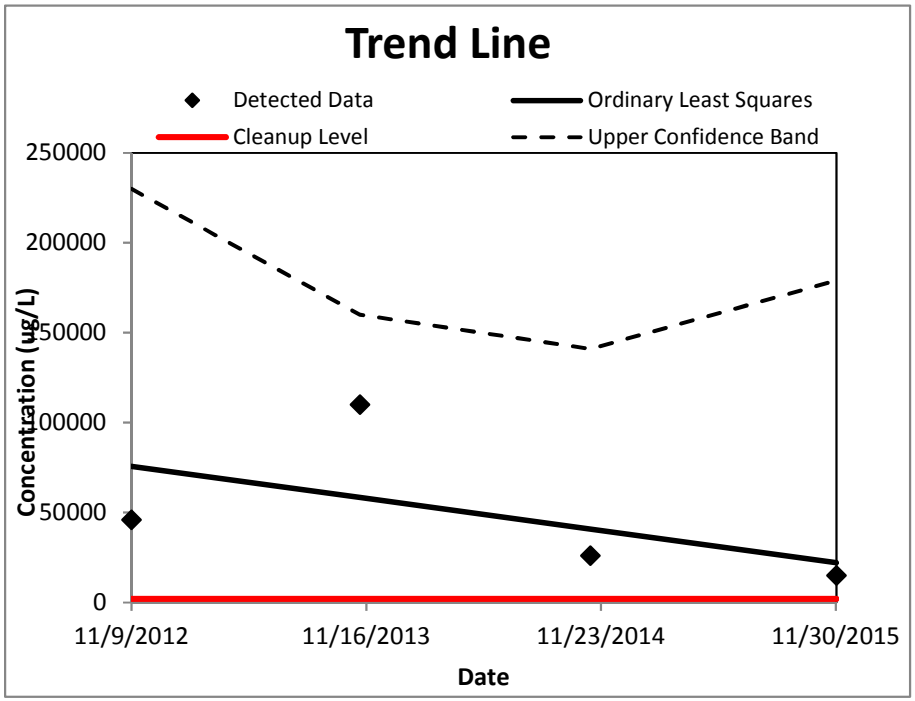
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/4/2016
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW/B-11
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	49000
Standard deviation of concentration	42000
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	98000
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	179000
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

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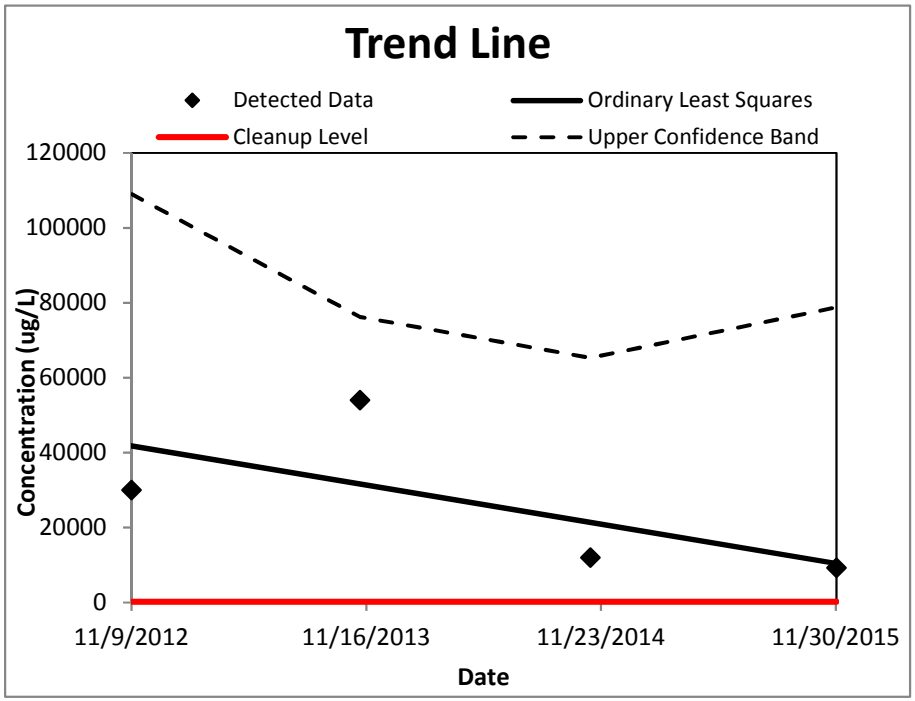
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/4/2016
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW/B-11
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	26000
Standard deviation of concentration	21000
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	51000
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	78800
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

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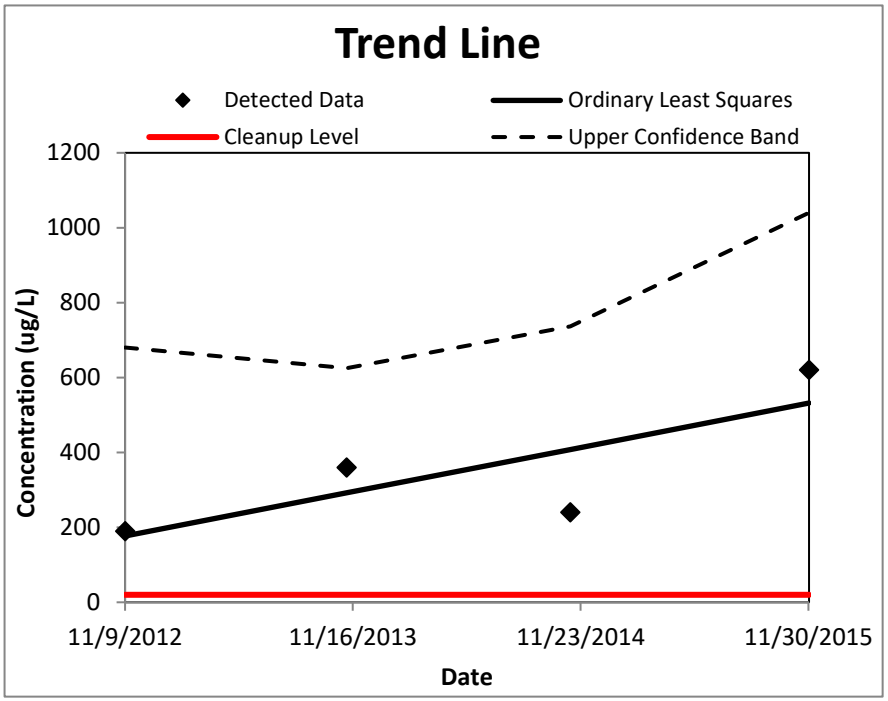
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/4/2016
Person performing analysis	J. Lambert

Chemical of Concern	Cis-1,2-DCE
Well Name/Number	MW/B-11
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	350
Standard deviation of concentration	190
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	570
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	1040
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

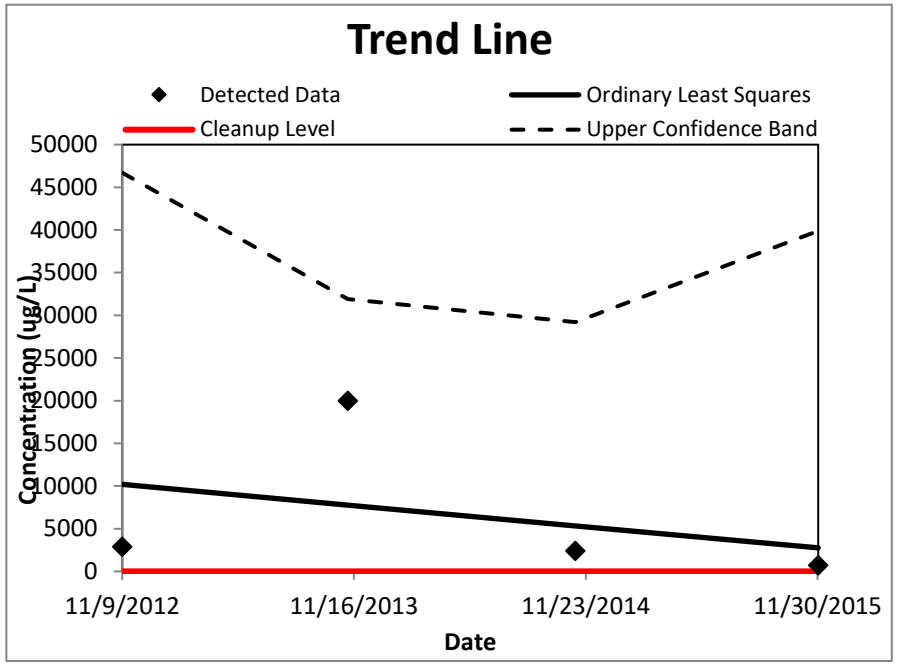
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/4/2016
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW/B-11
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	6500
Standard deviation of concentration	9000



95% Upper Confidence Limit (UCL)	26100
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	39900
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	0
Message: None.	

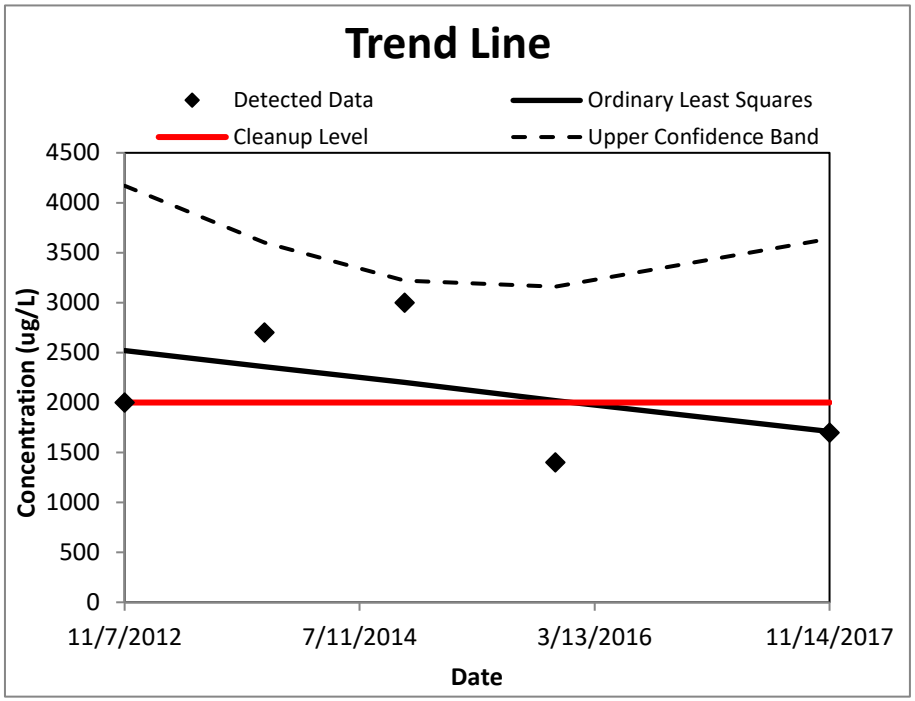
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-104A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	2
Are any potential outliers present?	No
Mean of concentration	2200
Standard deviation of concentration	670
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	2800
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	3640
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

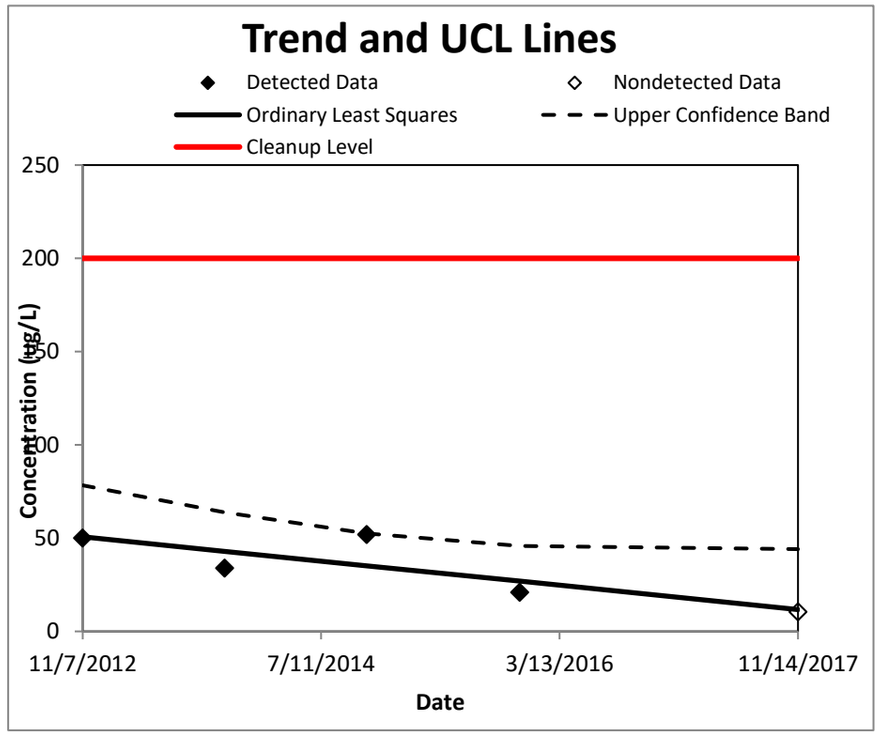
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	e
Well Name/Number	MW-104A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number of detected results	4
Number of non-detected results	1
Detection frequency	80%
Number at or below cleanup level	5
Are any potential outliers present?	No
Mean of concentration	36
Standard deviation of concentration	13



95% Upper Confidence Limit (UCL)	66
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	44.1
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing

Message: None.

Data, including imputed values

Date (Date)	Chlorobenzene Concentration (ug/L)	Data Qualifier	Imputed value*
41220	50		50
41584	34		34
41948	52		52
42340	21		21
43053	25	ND	10.406

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	53578.19922

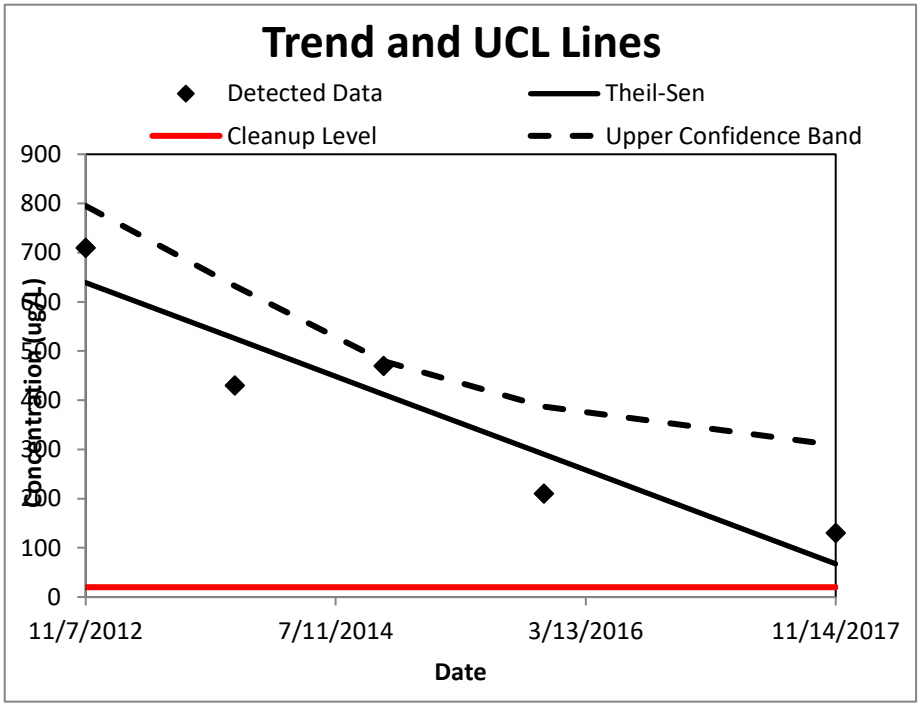
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	Cis-1,2-DCE
Well Name/Number	MW-104A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	390
Standard deviation of concentration	230
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	610
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	309
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

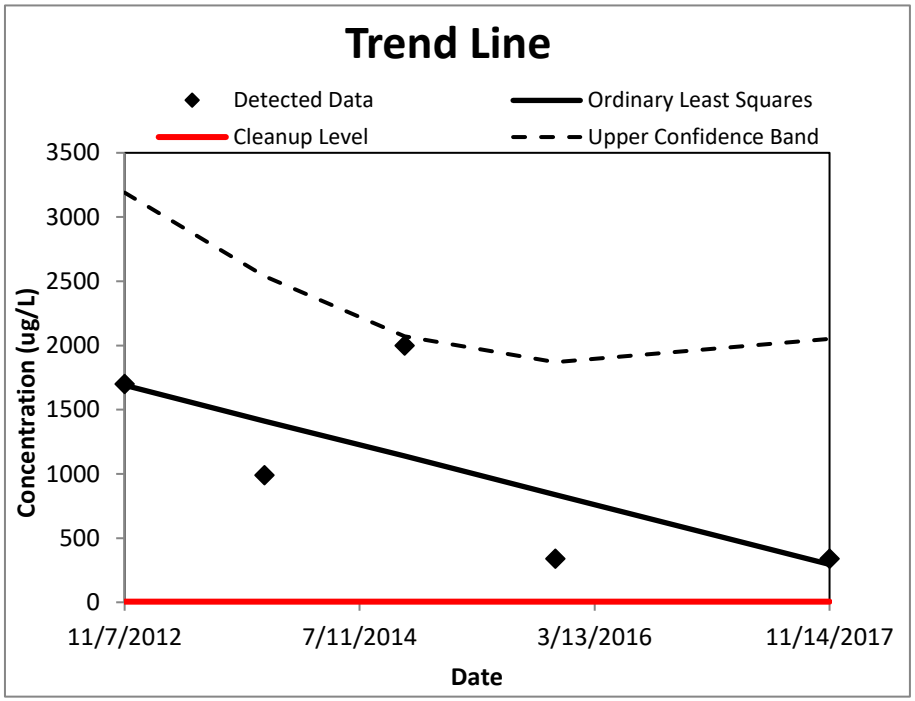
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-104A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	1100
Standard deviation of concentration	760
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	1800
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	2050
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

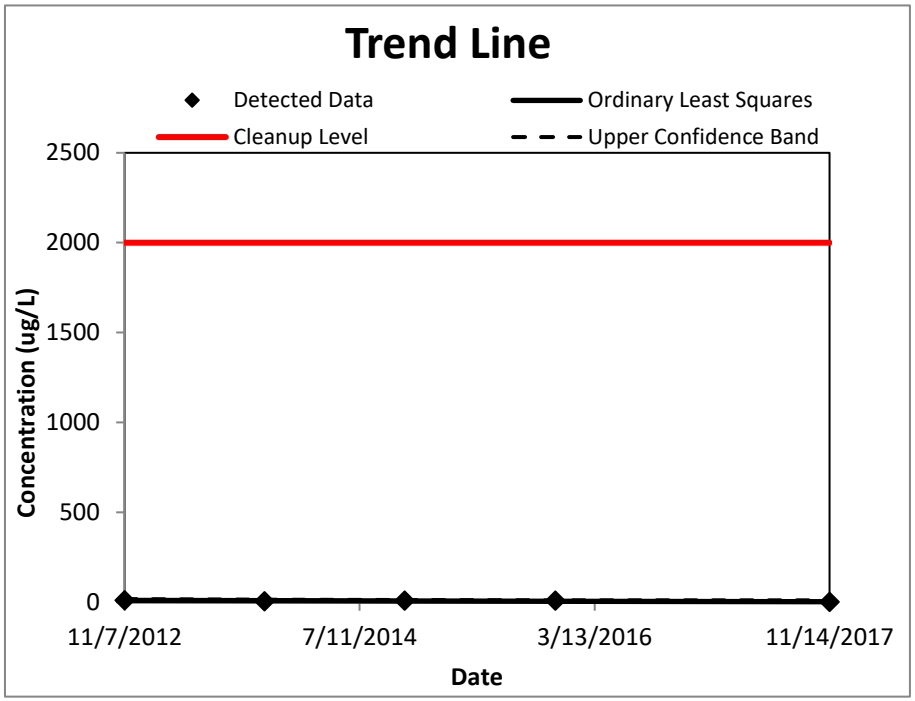
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-104B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	5
Are any potential outliers present?	No
Mean of concentration	7.3
Standard deviation of concentration	3.9
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	11
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	11.7
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

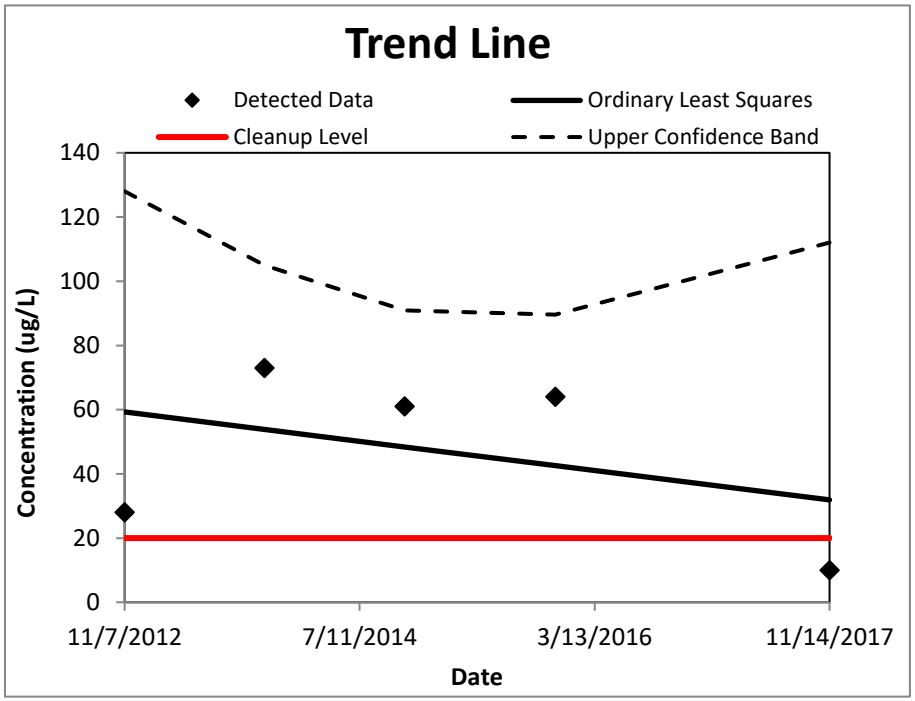
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-104B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	1
Are any potential outliers present?	No
Mean of concentration	47
Standard deviation of concentration	27
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	73
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	112
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

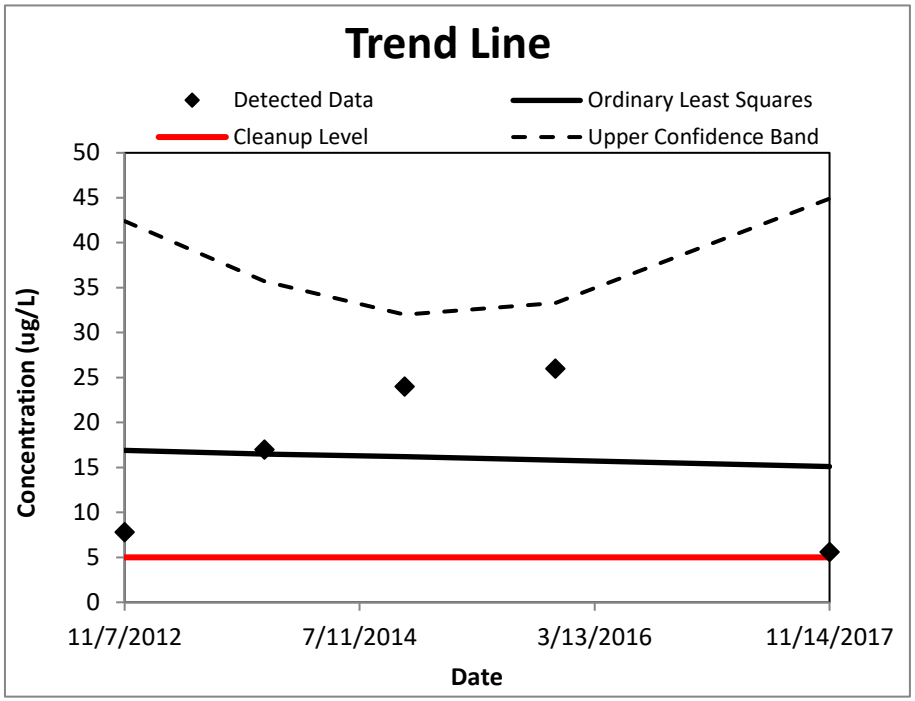
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-104B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	16
Standard deviation of concentration	9.2
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	25
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	44.9
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

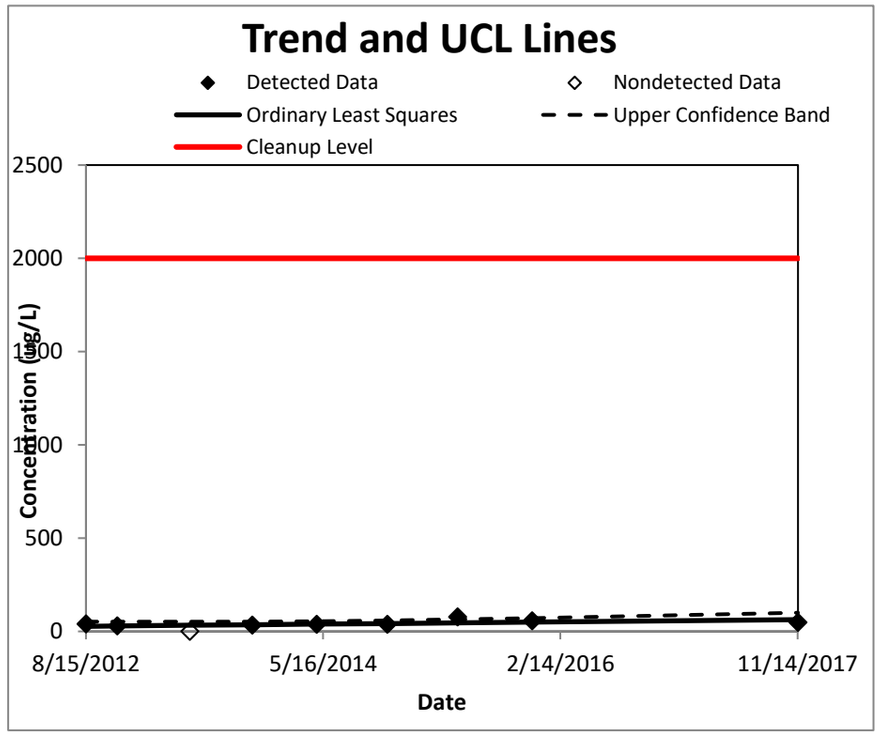
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-110
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number of detected results	8
Number of non-detected results	1
Detection frequency	89%
Number at or below cleanup level	9
Are any potential outliers present?	No
Mean of concentration	41
Standard deviation of concentration	19



95% Upper Confidence Limit (UCL)	70
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	100
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing

Message: None.

Data, including imputed values

Date (Date)	1,2-DCB Concentration (ug/L)	Data Qualifier	Imputed value*
41136	40		40
41220	29		29
41416	5	ND	1.202
41584	33		33
41758	37		37
41948	39		39
42137	78		78
42338	56		56
43054	49		49

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	47533.64453

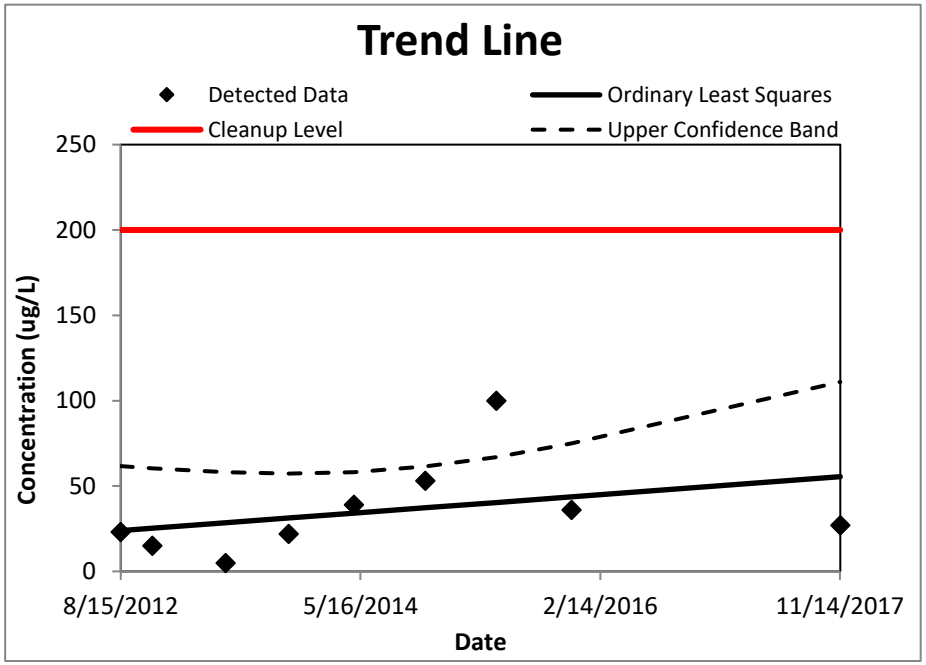
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-110
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	9
Are any potential outliers present?	No
Mean of concentration	36
Standard deviation of concentration	28



95% Upper Confidence Limit (UCL)	77
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	111
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	0
Message: None.	

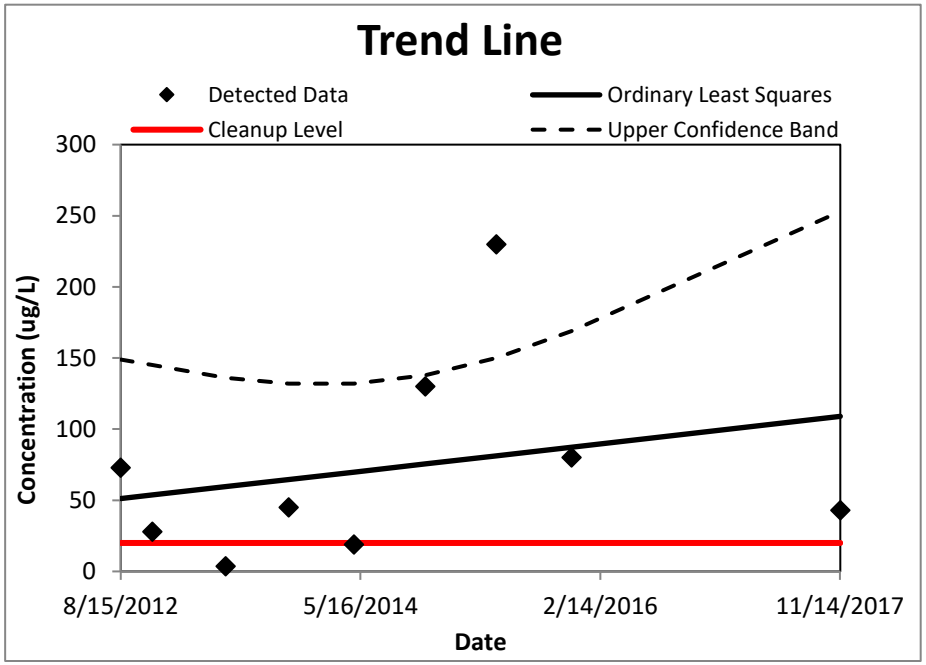
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-110
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	2
Are any potential outliers present?	No
Mean of concentration	72
Standard deviation of concentration	70



95% Upper Confidence Limit (UCL)	174
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	253
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	0
Message: None.	

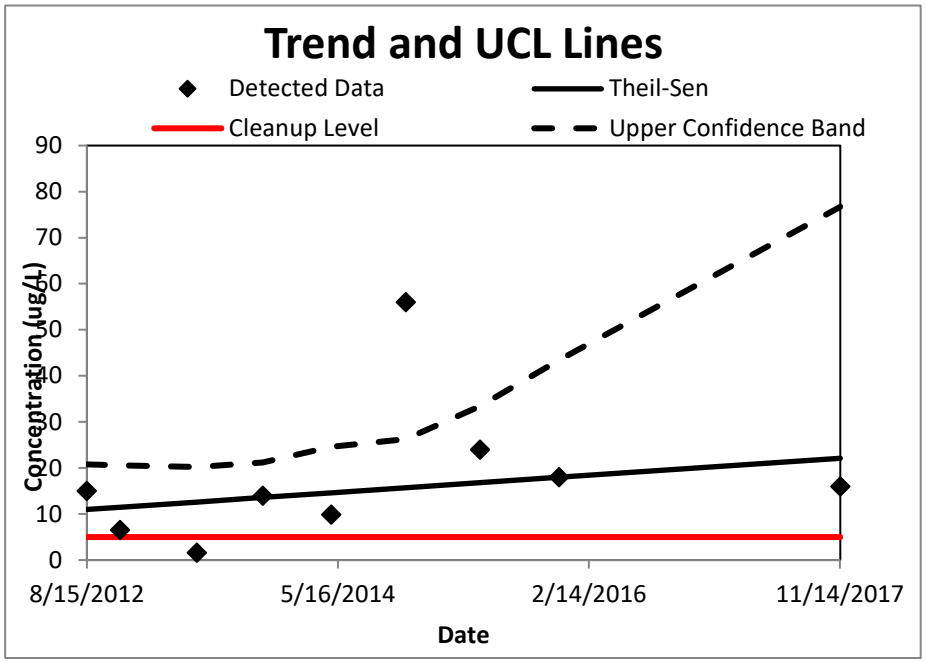
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-110
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	1
Are any potential outliers present?	Yes
Mean of concentration	18
Standard deviation of concentration	16



95% Upper Confidence Limit (UCL)	41
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	76.7
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	56976.42188
Message: None.	

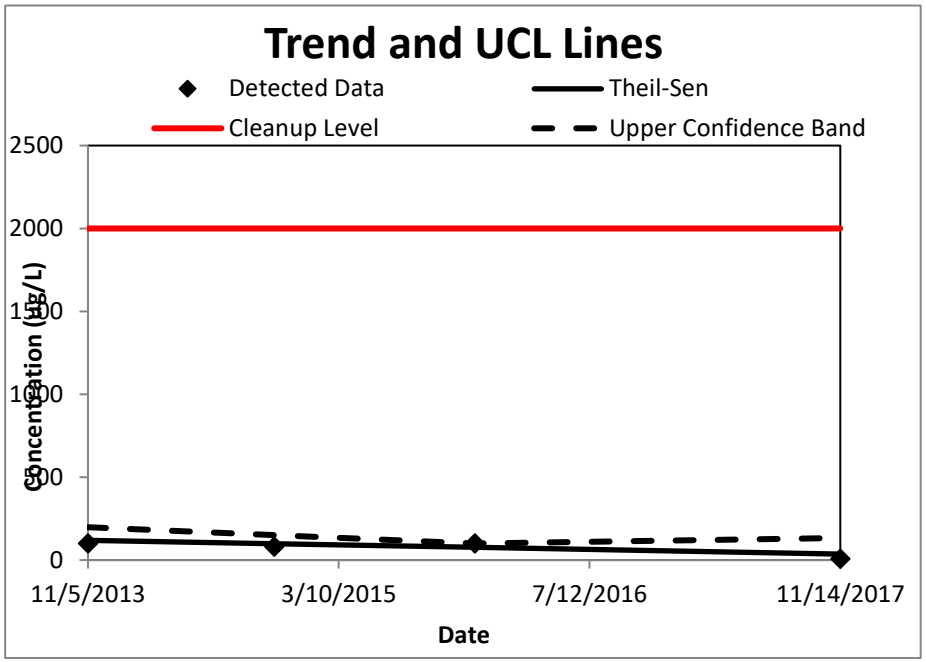
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-112A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	4
Are any potential outliers present?	No
Mean of concentration	72
Standard deviation of concentration	44



95% Upper Confidence Limit (UCL)	168
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	133
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	57902.17969
Message: None.	

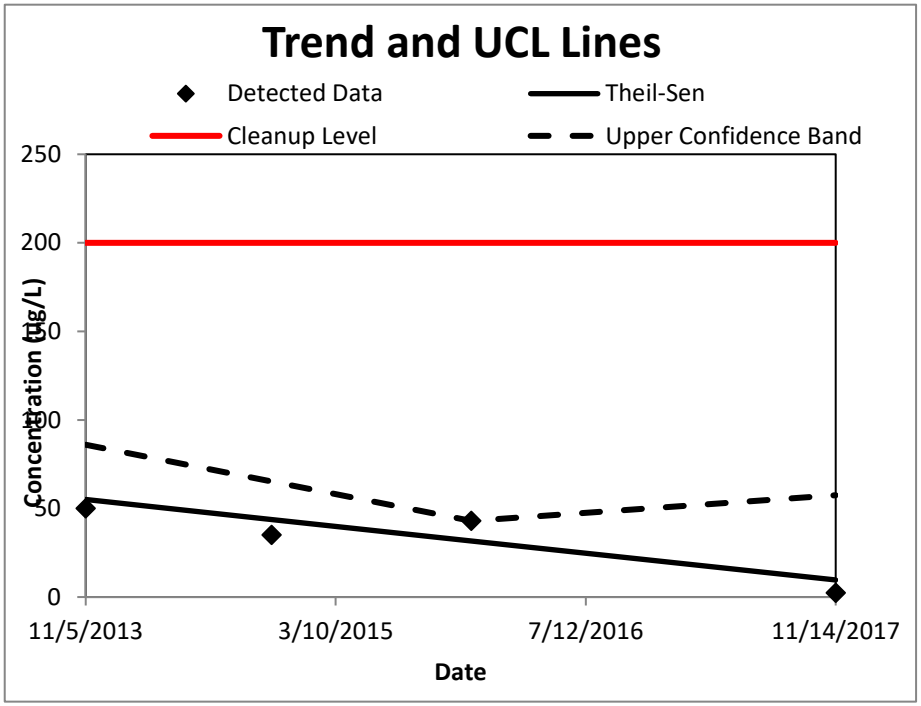
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-112A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	4
Are any potential outliers present?	No
Mean of concentration	33
Standard deviation of concentration	21
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	58
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	57.6
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

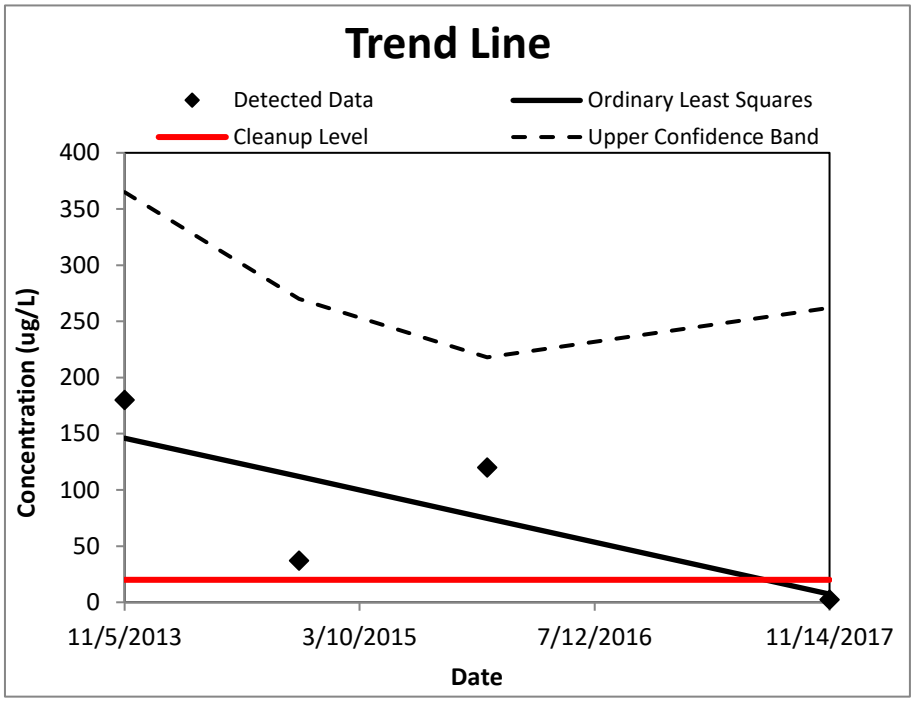
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-112A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	1
Are any potential outliers present?	No
Mean of concentration	85
Standard deviation of concentration	80
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	180
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	262
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

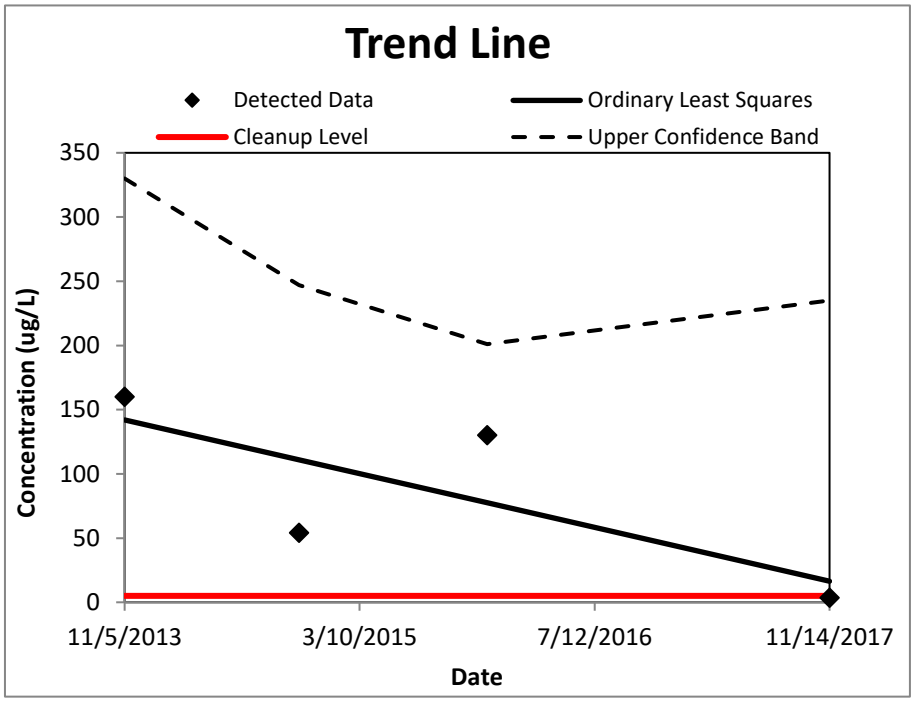
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-112A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	1
Are any potential outliers present?	No
Mean of concentration	87
Standard deviation of concentration	71
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	170
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	235
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

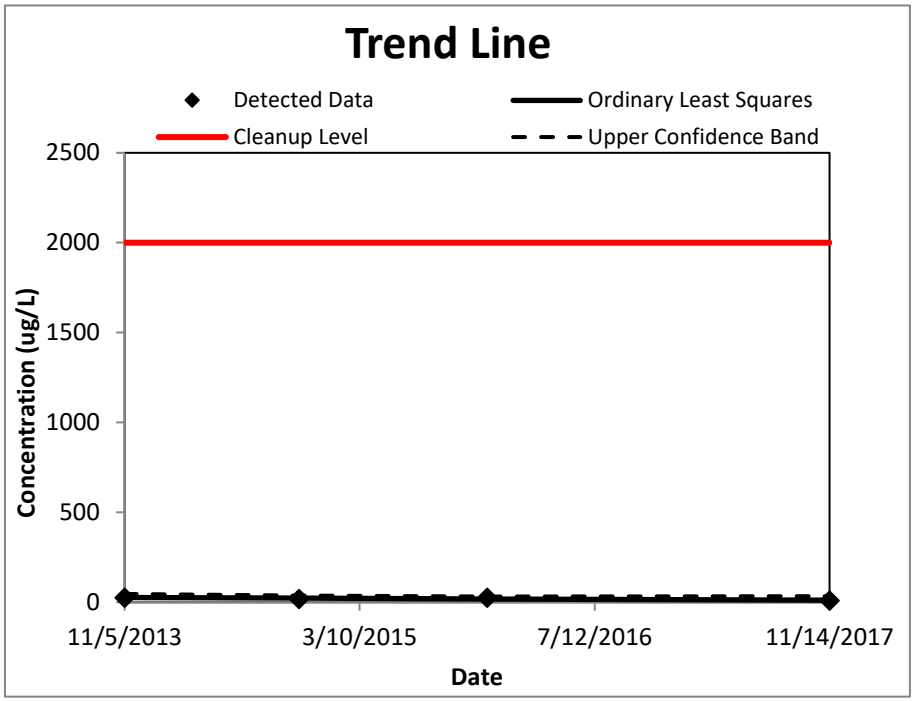
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-112B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	4
Are any potential outliers present?	No
Mean of concentration	20
Standard deviation of concentration	8
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	29
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	34.9
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

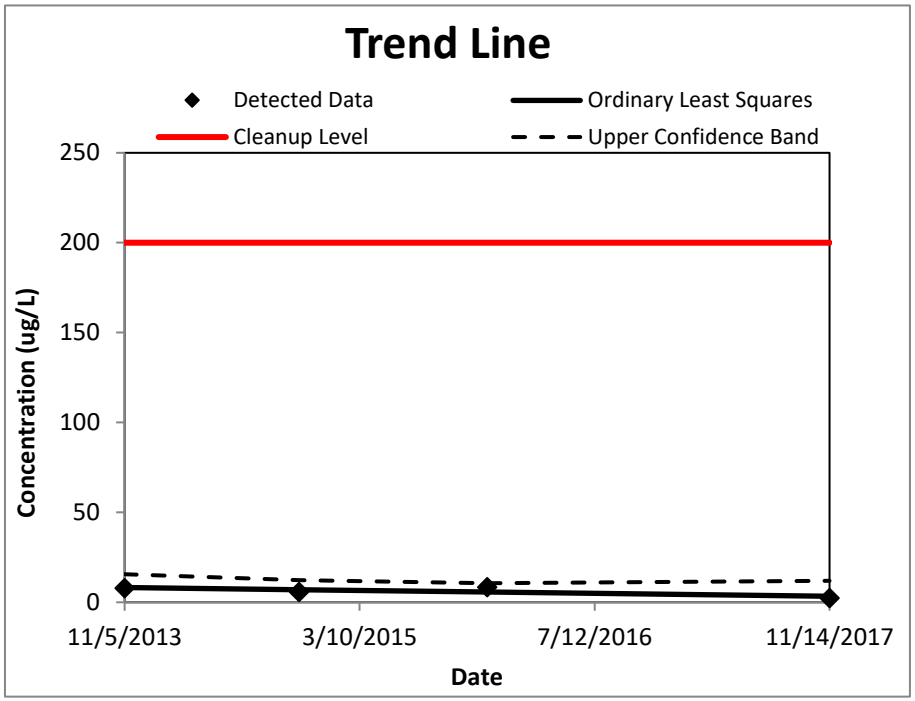
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-112B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	4
Are any potential outliers present?	No
Mean of concentration	6.1
Standard deviation of concentration	2.8
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	9.4
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	12
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

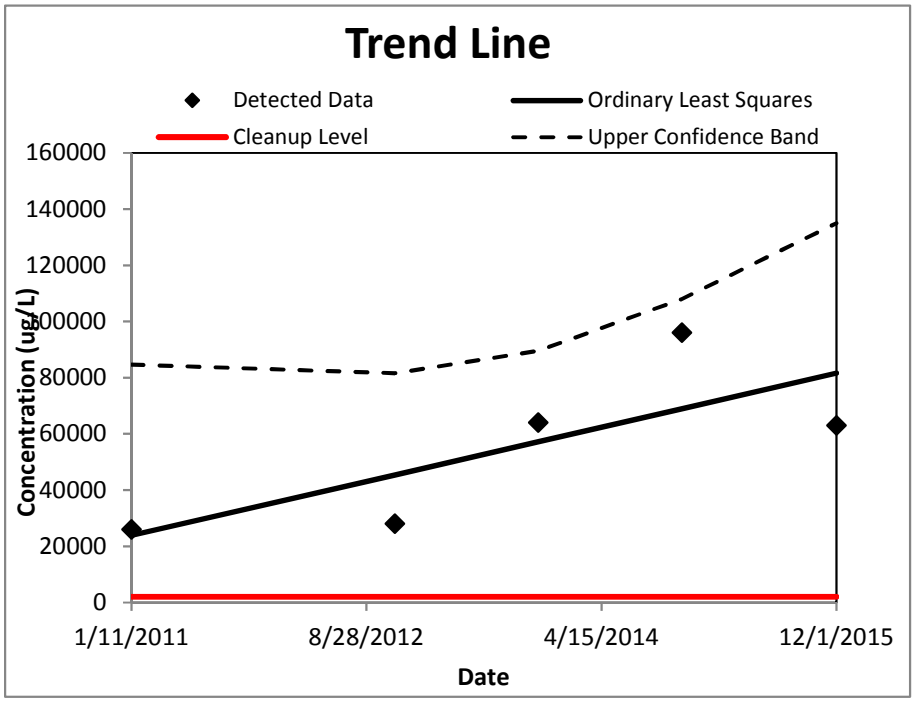
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/4/2016
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-113A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	55000
Standard deviation of concentration	29000
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	83000
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	135000
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

Draft version - Do not distrubute

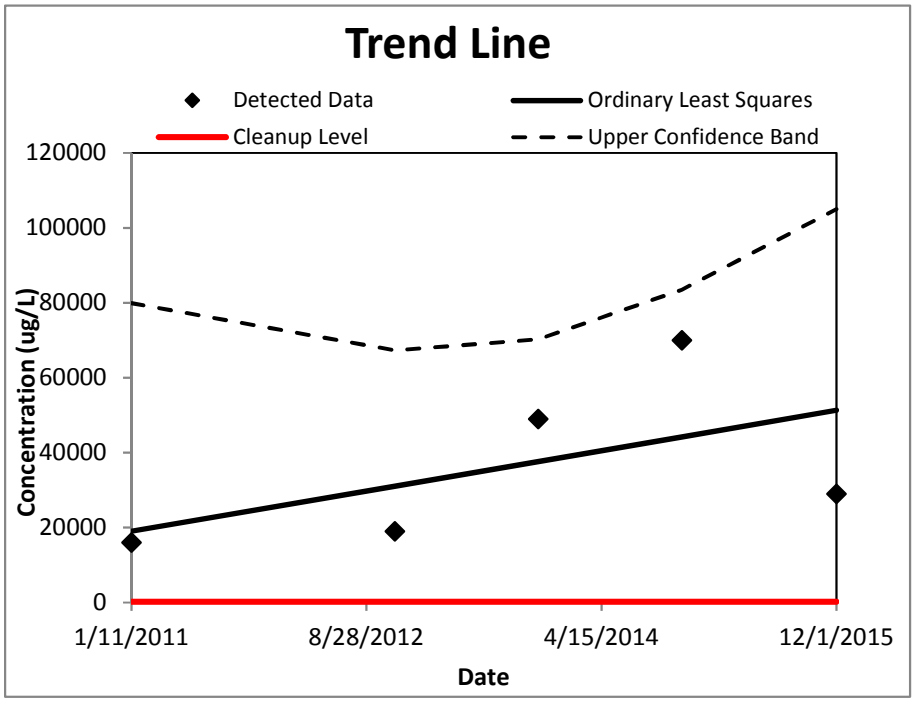
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/4/2016
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-113A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	37000
Standard deviation of concentration	23000
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	59000
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	105000
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

Draft version - Do not distrubute

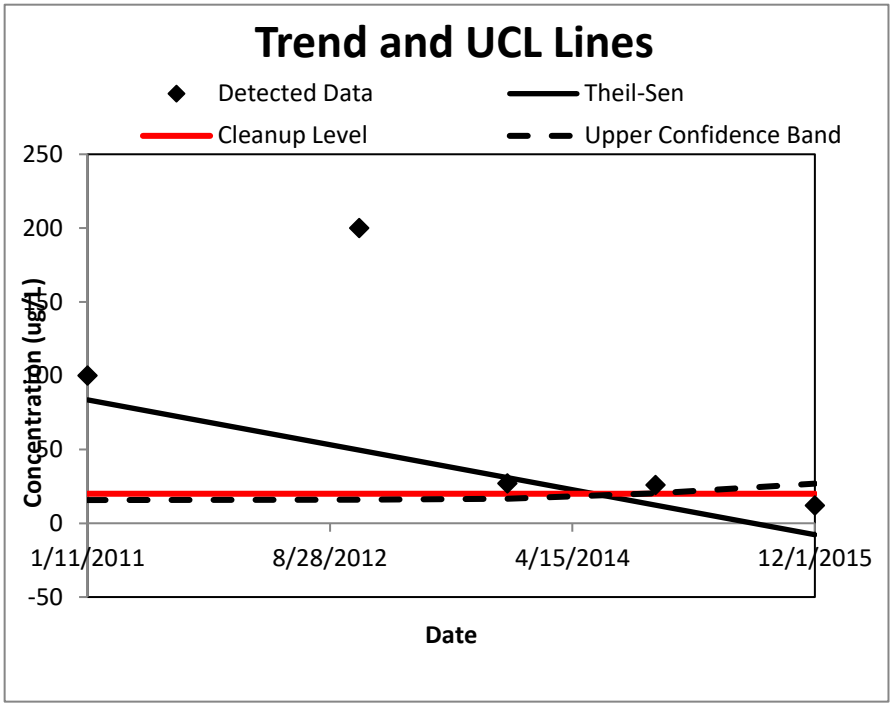
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/4/2016
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-113A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	1
Are any potential outliers present?	No
Mean of concentration	73
Standard deviation of concentration	79
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	150
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	26.8
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

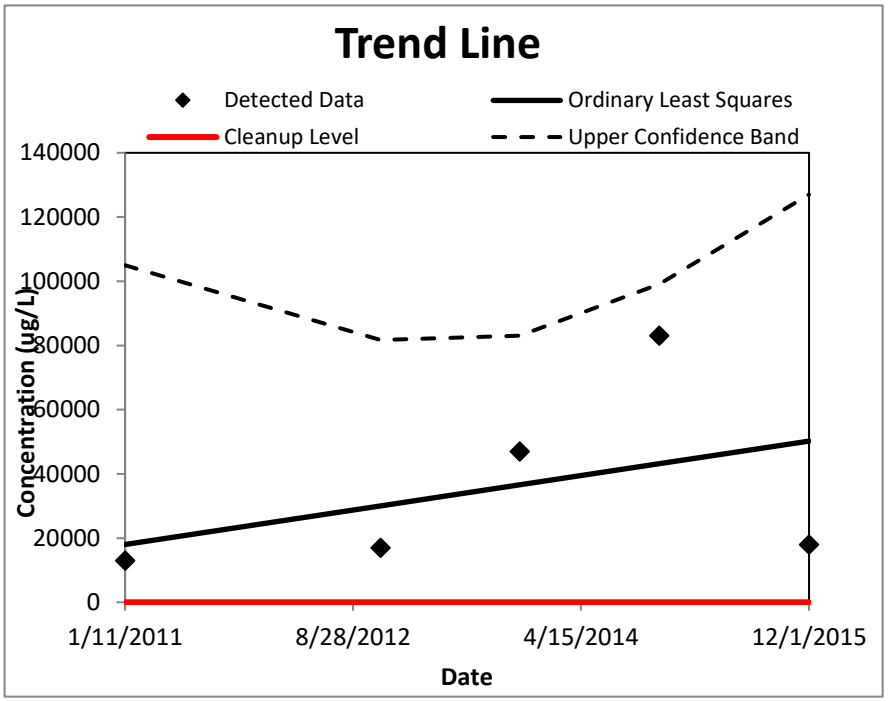
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/4/2016
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-113A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	36000
Standard deviation of concentration	30000
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	65000
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	127000
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

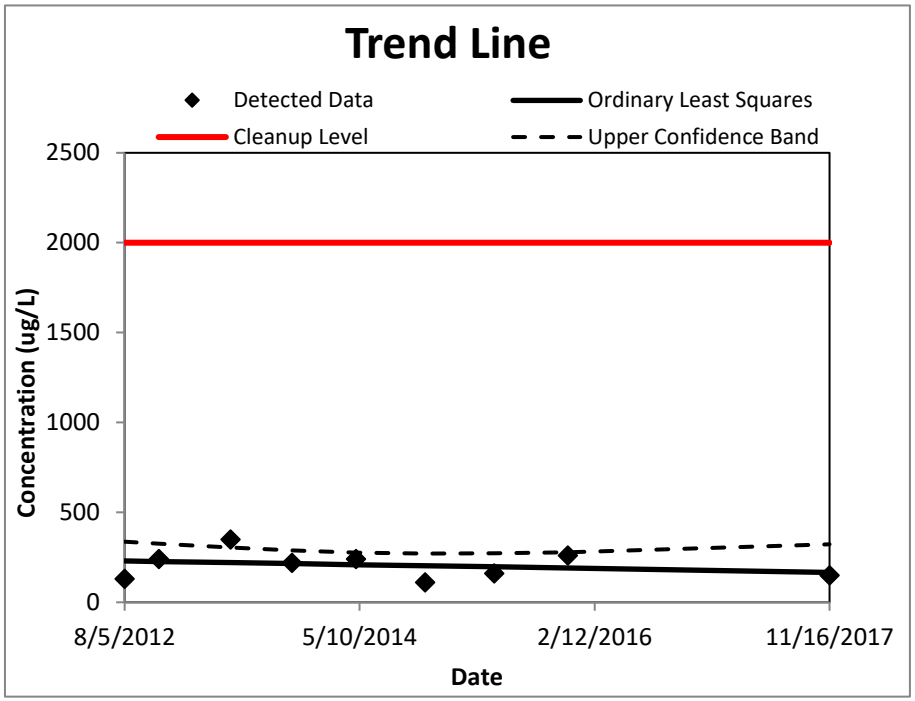
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-113B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	9
Are any potential outliers present?	No
Mean of concentration	210
Standard deviation of concentration	76
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	260
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	322
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

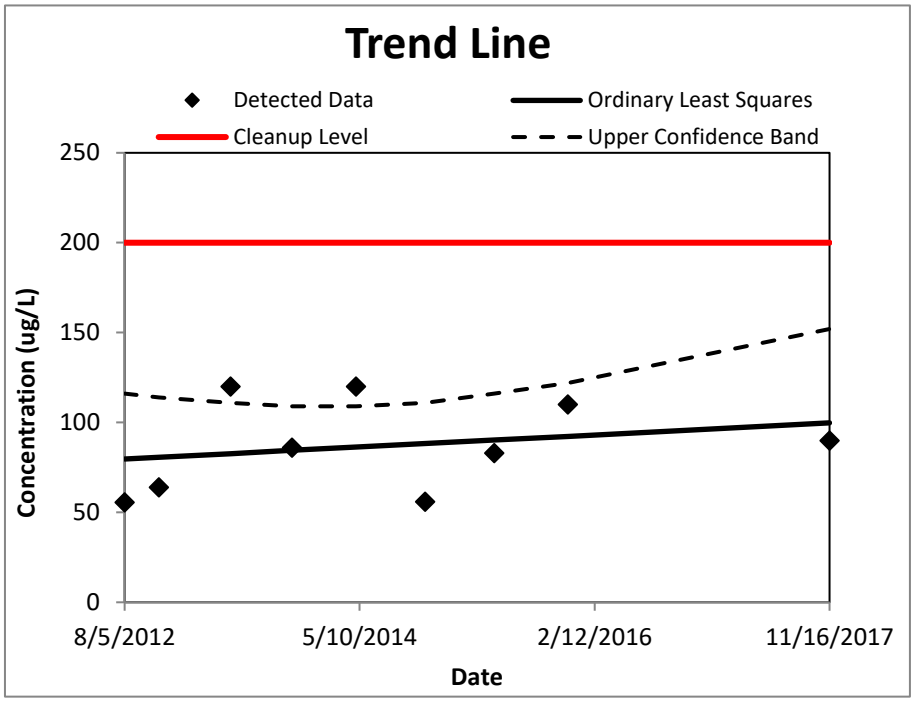
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-113B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	9
Are any potential outliers present?	No
Mean of concentration	87
Standard deviation of concentration	26
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	100
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	152
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

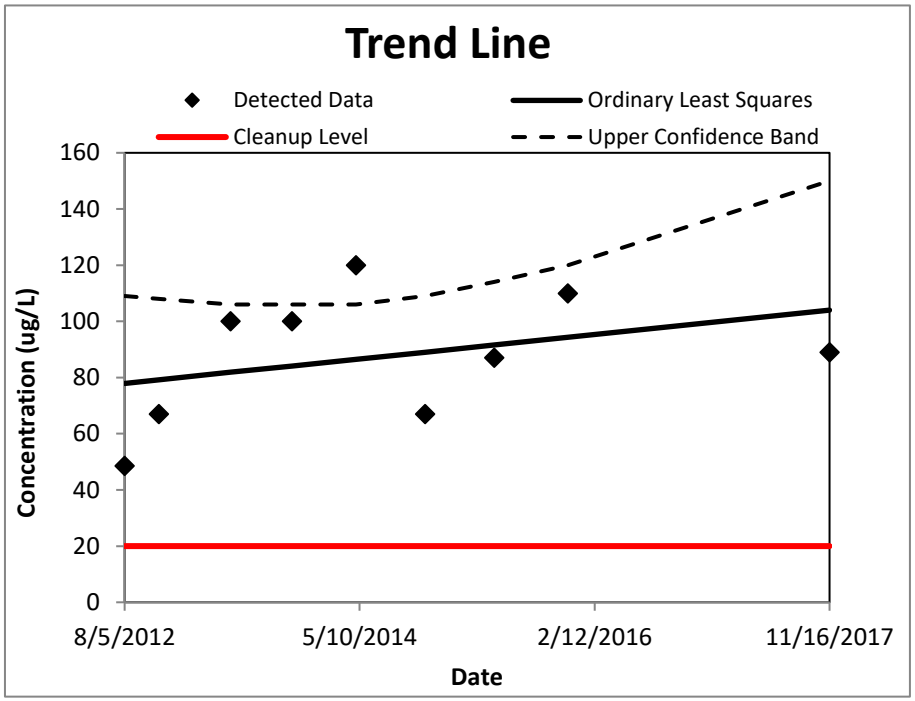
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-113B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	88
Standard deviation of concentration	23
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	100
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	150
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

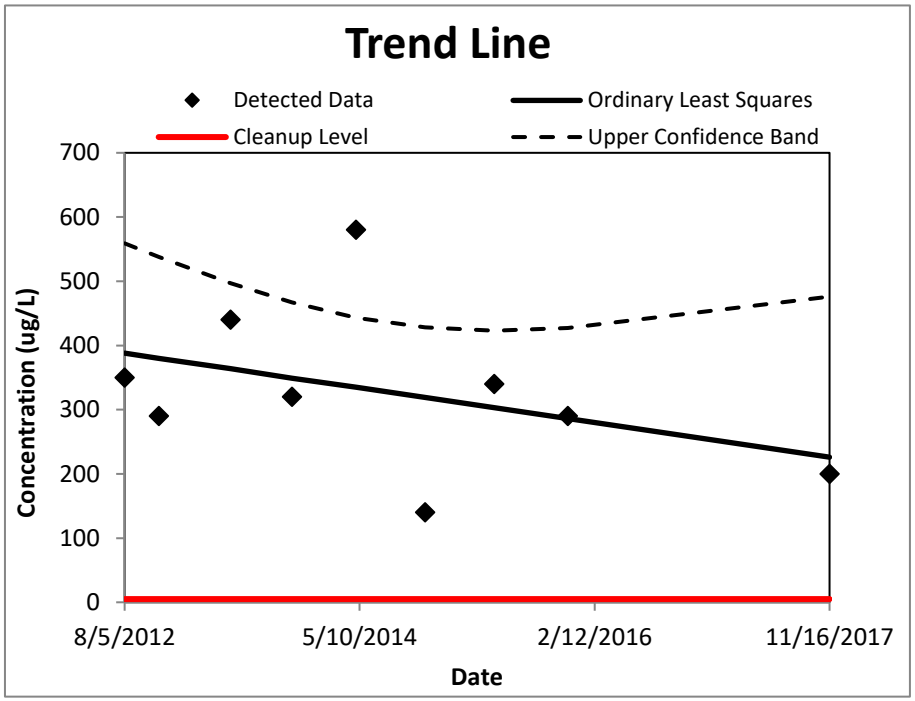
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-113B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	330
Standard deviation of concentration	130
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	410
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	476
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

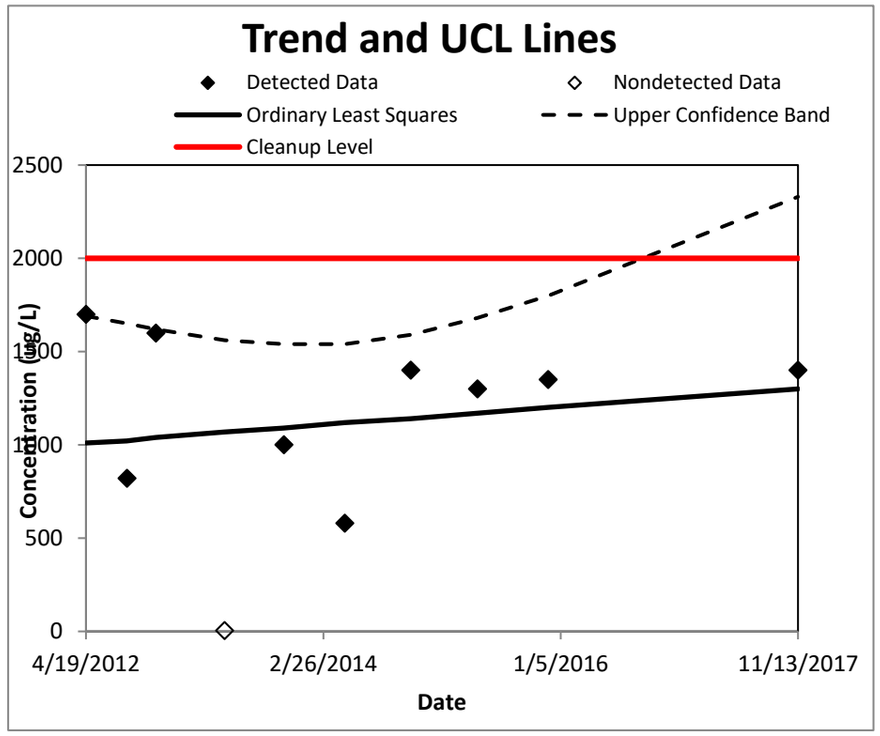
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-115A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	10
Number of detected results	9
Number of non-detected results	1
Detection frequency	90%
Number at or below cleanup level	10
Are any potential outliers present?	No
Mean of concentration	1100
Standard deviation of concentration	490



95% Upper Confidence Limit (UCL)	1800
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	2330
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing

Message: None.

Data, including imputed values

Date (Date)	1,2-DCB Concentration (ug/L)	Data Qualifier	Imputed value*
41018	1700		1700
41135	820		820
41218	1600		1600
41414	5	ND	4.196
41583	1000		1000
41758	580		580
41946	1400		1400
42136	1300		1300
42338	1350		1350
43052	1400		1400

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	49047.76563

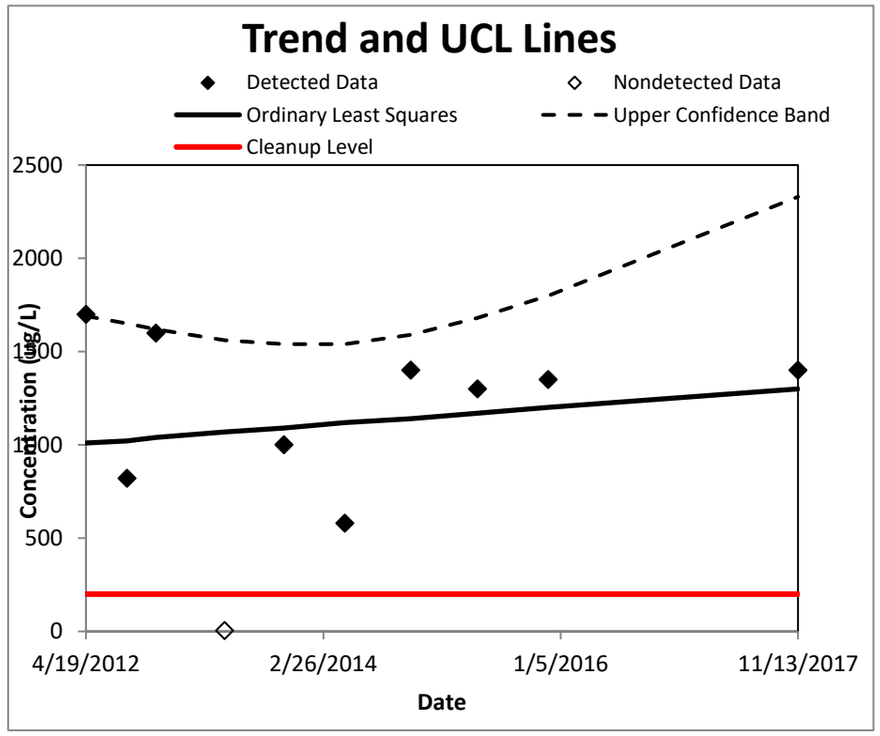
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	e
Well Name/Number	MW-115A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	10
Number of detected results	9
Number of non-detected results	1
Detection frequency	90%
Number at or below cleanup level	1
Are any potential outliers present?	No
Mean of concentration	1100
Standard deviation of concentration	490



95% Upper Confidence Limit (UCL)	1800
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	2330
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing

Message: None.

Data, including imputed values

Date (Date)	Chlorobenzene Concentration (ug/L)	Data Qualifier	Imputed value*
41018	1700		1700
41135	820		820
41218	1600		1600
41414	5	ND	4.543
41583	1000		1000
41758	580		580
41946	1400		1400
42136	1300		1300
42338	1350		1350
43052	1400		1400

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	60546.09375

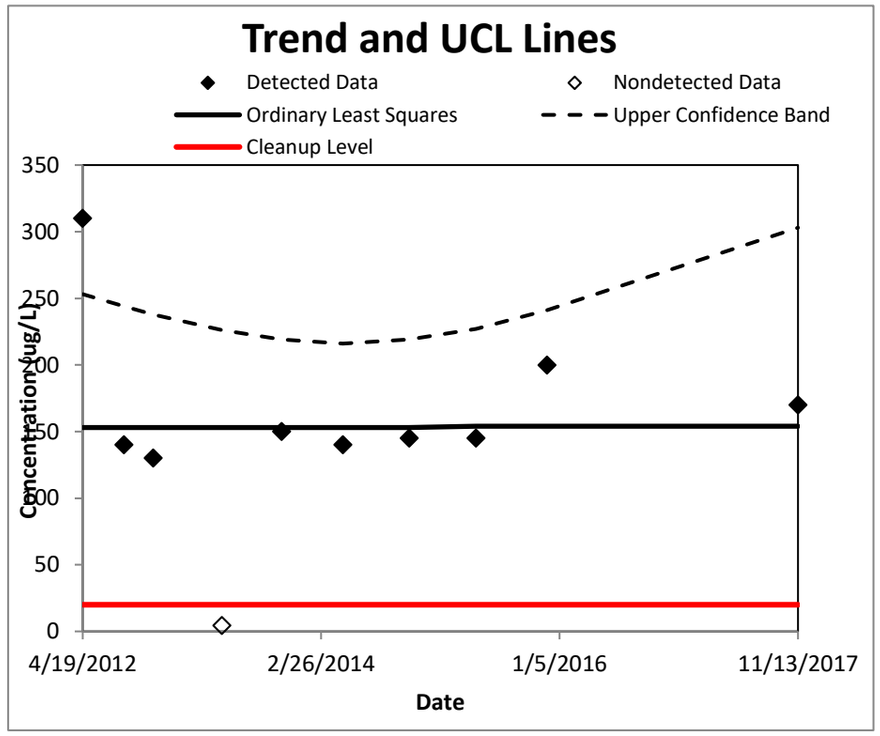
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-115A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	10
Number of detected results	9
Number of non-detected results	1
Detection frequency	90%
Number at or below cleanup level	1
Are any potential outliers present?	Yes
Mean of concentration	150
Standard deviation of concentration	71



95% Upper Confidence Limit (UCL)	260
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	303
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing

Message: None.

Data, including imputed values

Date (Date)	cis-1,2-DCE Concentration (ug/L)	Data Qualifier	Imputed value*
41018	310		310
41135	140		140
41218	130		130
41414	5	ND	4.543
41583	150		150
41758	140		140
41946	145		145
42136	145		145
42338	200		200
43052	170		170

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	60546.09375

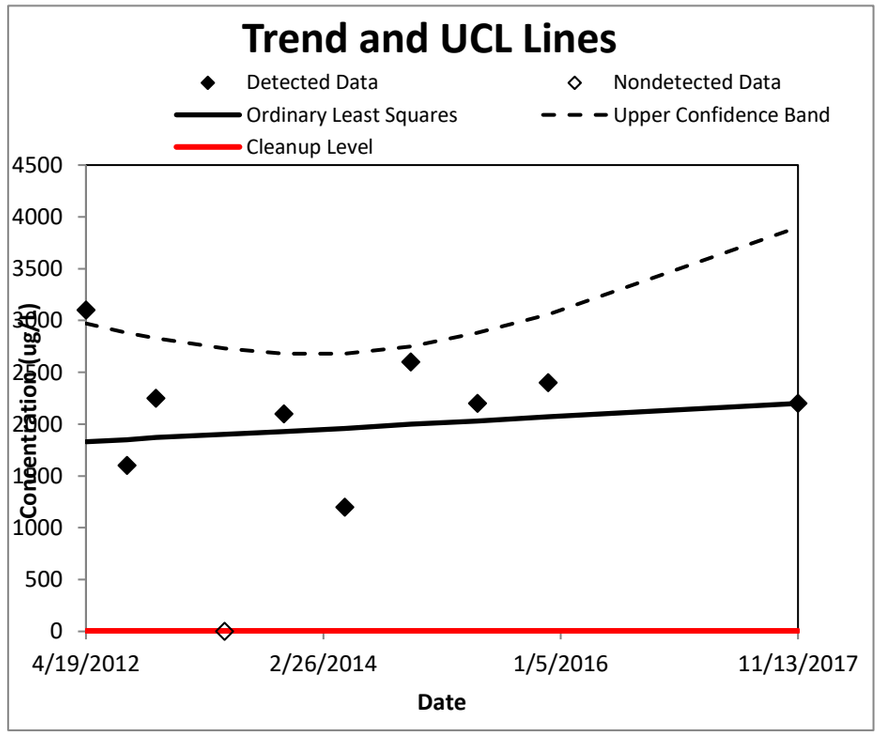
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-115A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	10
Number of detected results	9
Number of non-detected results	1
Detection frequency	90%
Number at or below cleanup level	1
Are any potential outliers present?	No
Mean of concentration	2000
Standard deviation of concentration	820



95% Upper Confidence Limit (UCL)	3200
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	3900
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

Data, including imputed values

Date (Date)	TCE Concentration (ug/L)	Data Qualifier	Imputed value*
41018	3100		3100
41135	1600		1600
41218	2250		2250
41414	5	ND	2.198
41583	2100		2100
41758	1200		1200
41946	2600		2600
42136	2200		2200
42338	2400		2400
43052	2200		2200

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	61103.46094

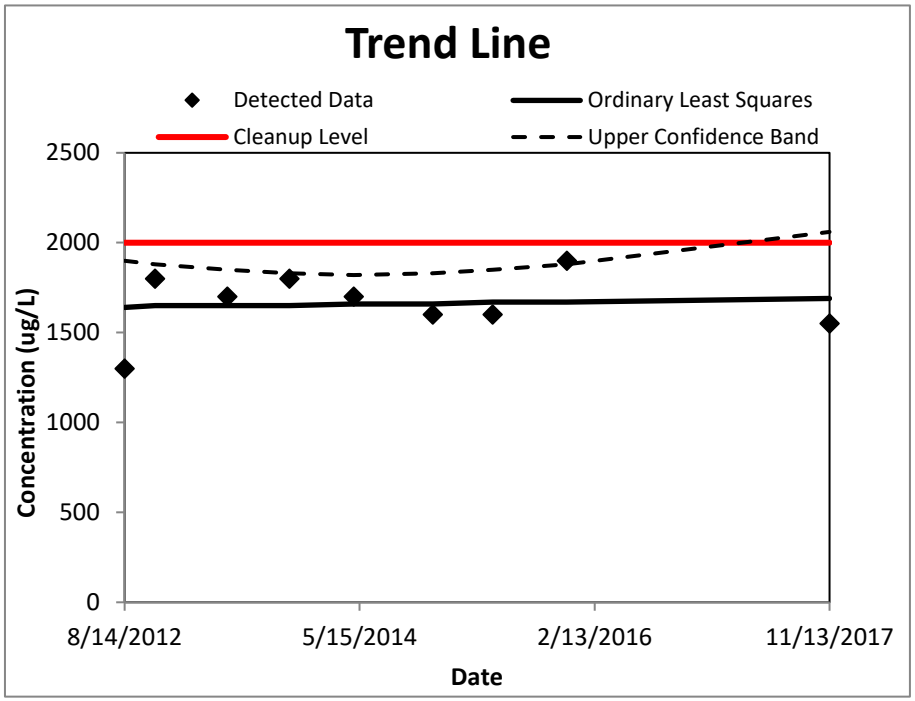
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-115B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	9
Are any potential outliers present?	No
Mean of concentration	1700
Standard deviation of concentration	180
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	1800
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	2060
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

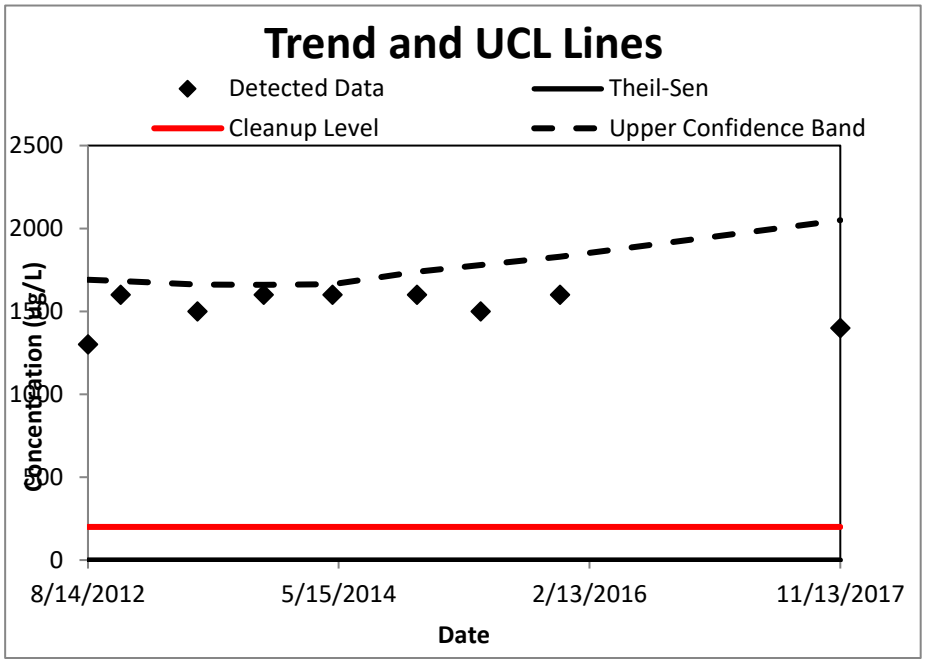
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-115B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	1500
Standard deviation of concentration	110



95% Upper Confidence Limit (UCL)	1700
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	2050
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	32706.5332
Message: None.	

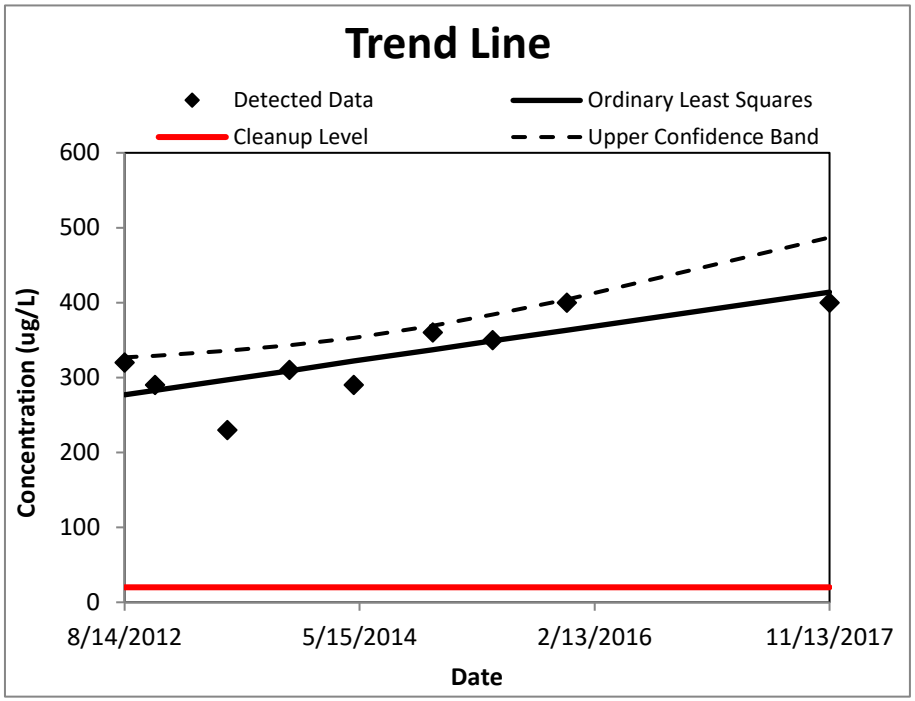
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/14/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-115B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	330
Standard deviation of concentration	56
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	360
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	487
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**No**

When is the concentration predicted to exceed the MCL?	MCL is already exceeded
Message: None.	

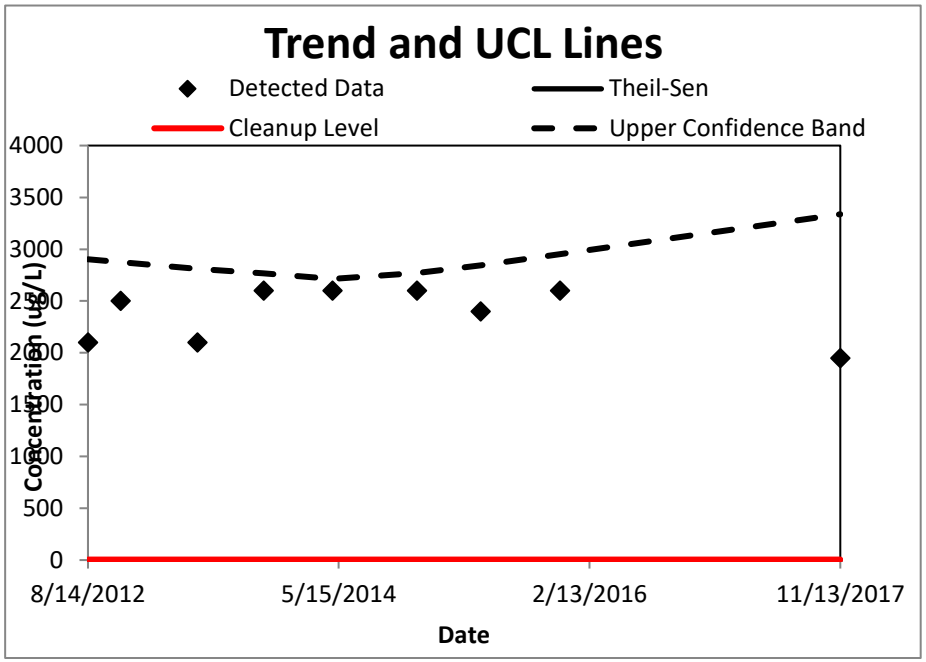
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-115B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	2400
Standard deviation of concentration	260



95% Upper Confidence Limit (UCL)	2800
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	3340
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	33260.08594
Message: None.	

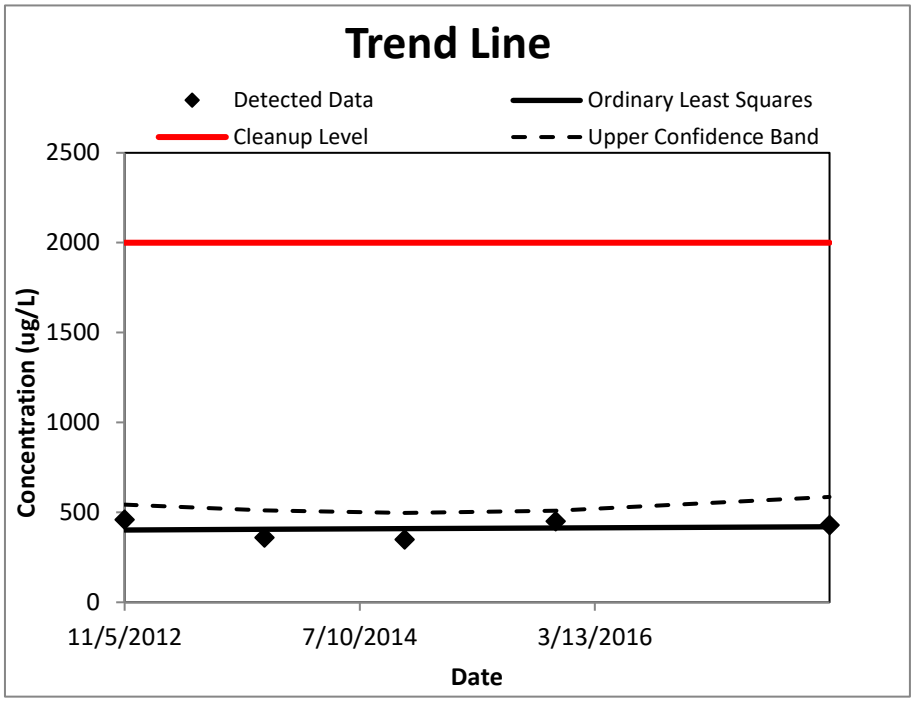
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-201
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	5
Are any potential outliers present?	No
Mean of concentration	410
Standard deviation of concentration	51
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	460
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	586
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

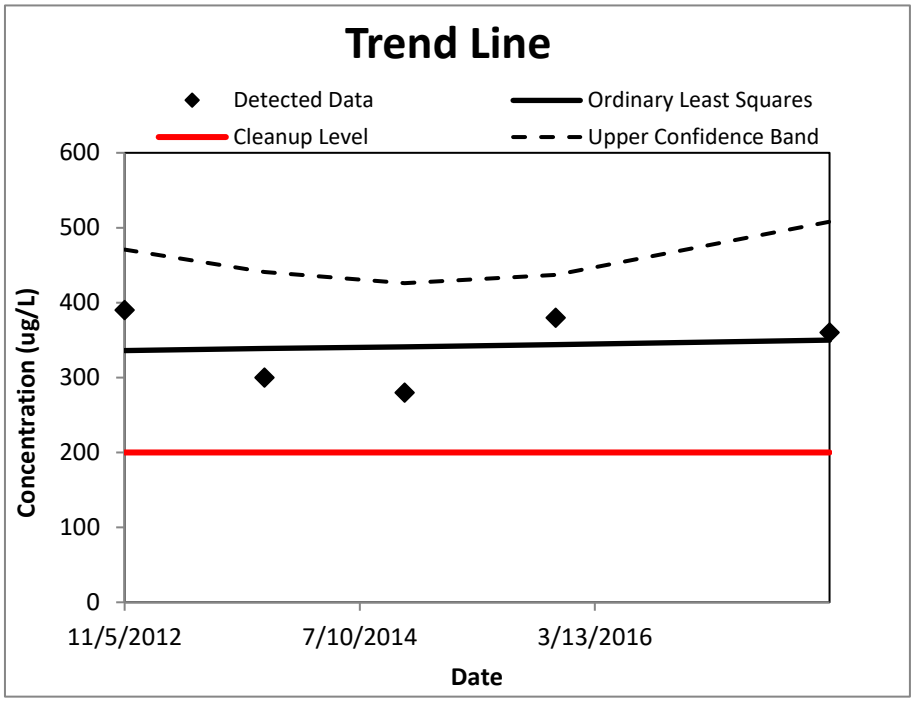
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-201
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	340
Standard deviation of concentration	49
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	390
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	508
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

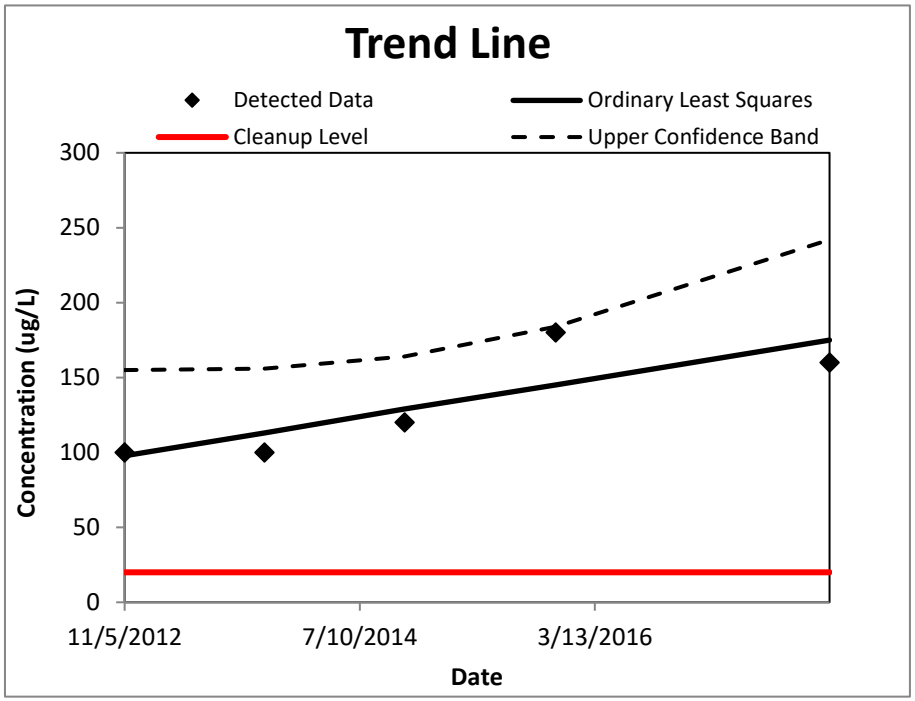
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-201
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	130
Standard deviation of concentration	36
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	160
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	242
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**No**

When is the concentration predicted to exceed the MCL?	MCL is already exceeded
Message: None.	

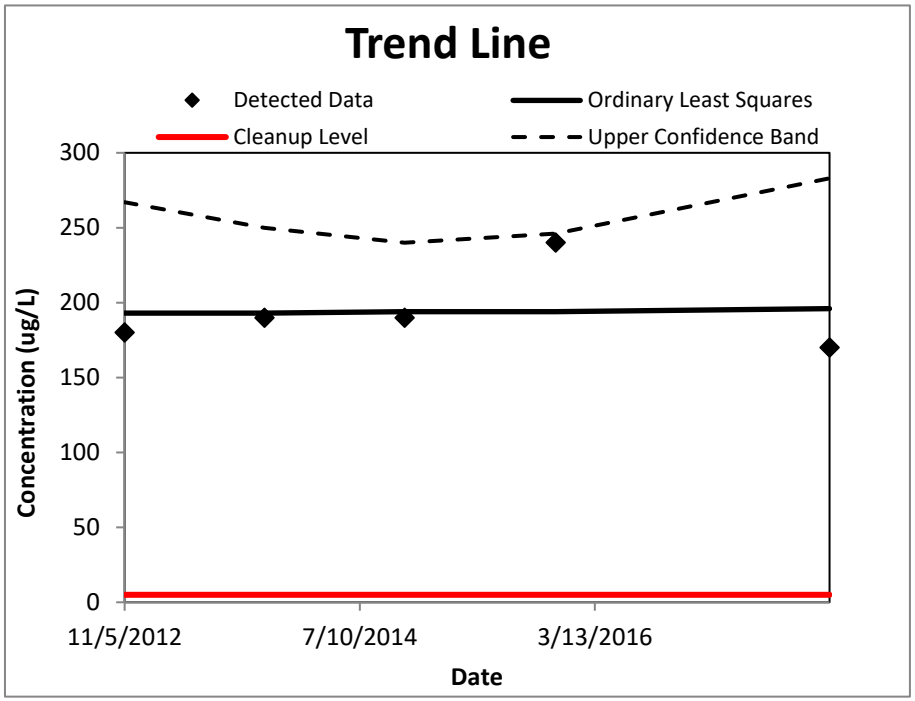
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-201
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	190
Standard deviation of concentration	27
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	220
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	283
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

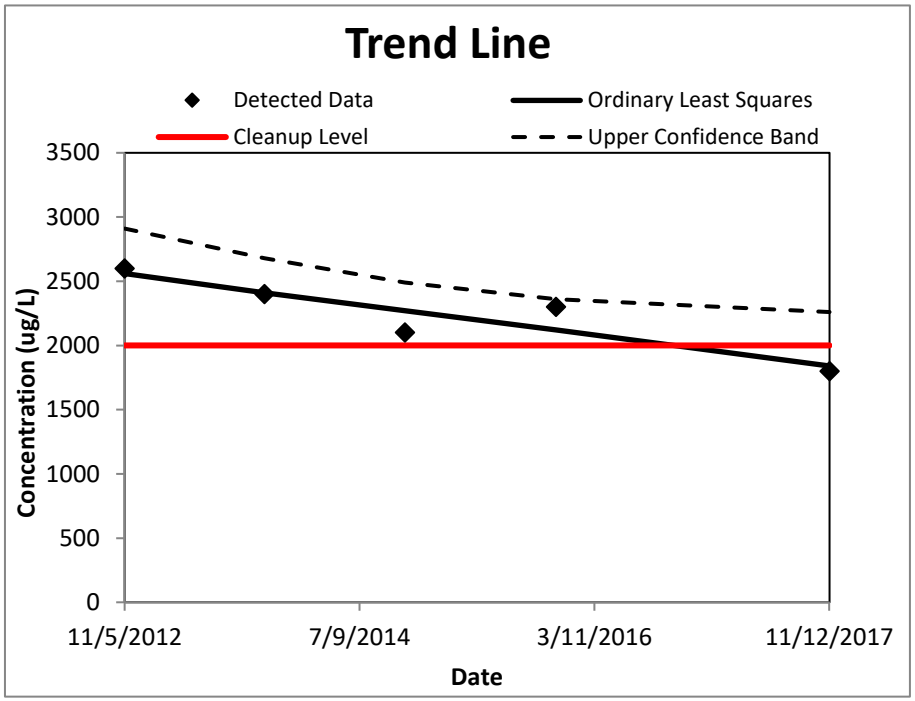
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-202
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	1
Are any potential outliers present?	No
Mean of concentration	2200
Standard deviation of concentration	300
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	2500
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	2260
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

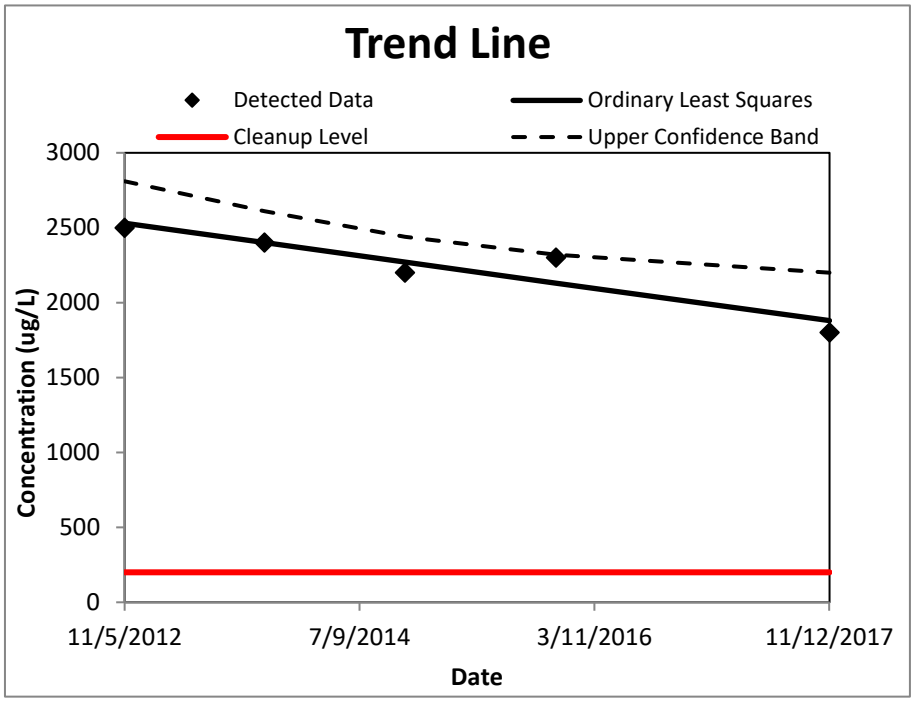
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-202
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	2200
Standard deviation of concentration	270
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	2500
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	2200
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

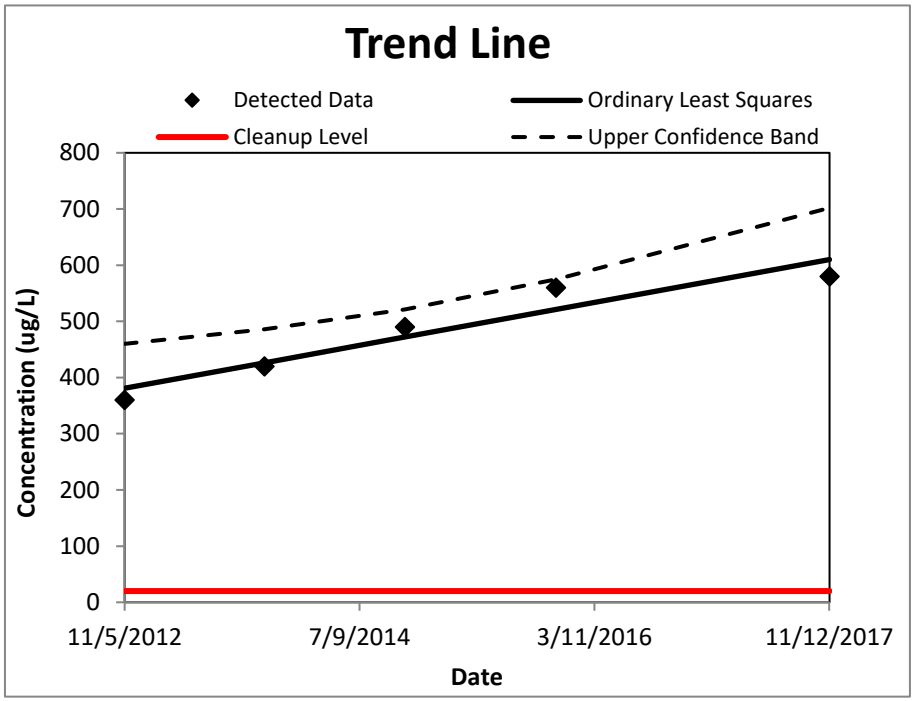
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-202
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	480
Standard deviation of concentration	93
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	570
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	702
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**No**

When is the concentration predicted to exceed the MCL?	MCL is already exceeded
Message: None.	

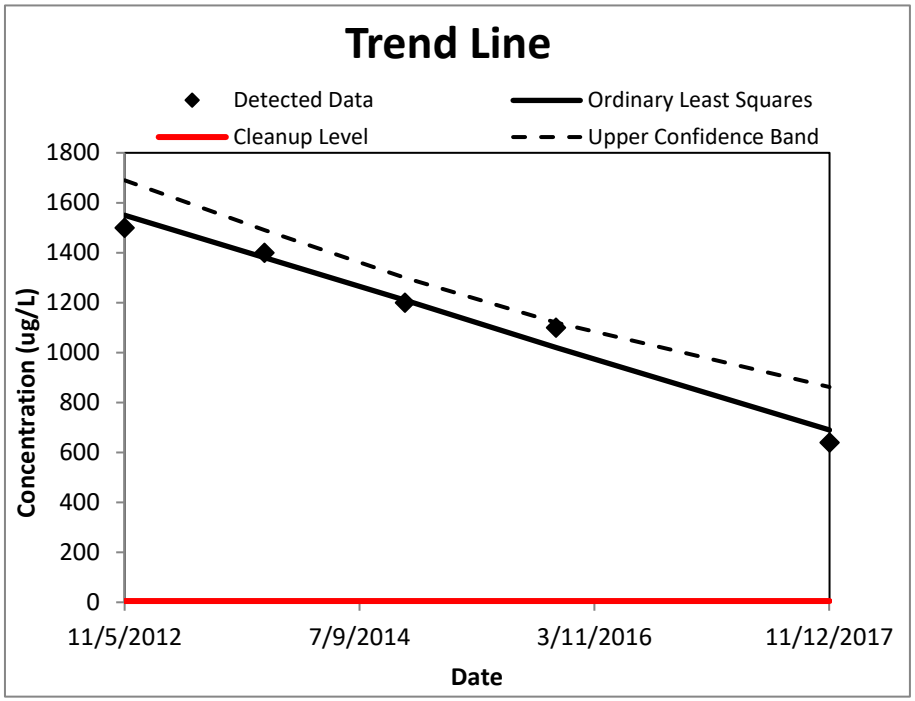
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-202
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	5
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	1200
Standard deviation of concentration	330
t-value for UCL calculation	2.132



95% Upper Confidence Limit (UCL)	1500
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	862
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

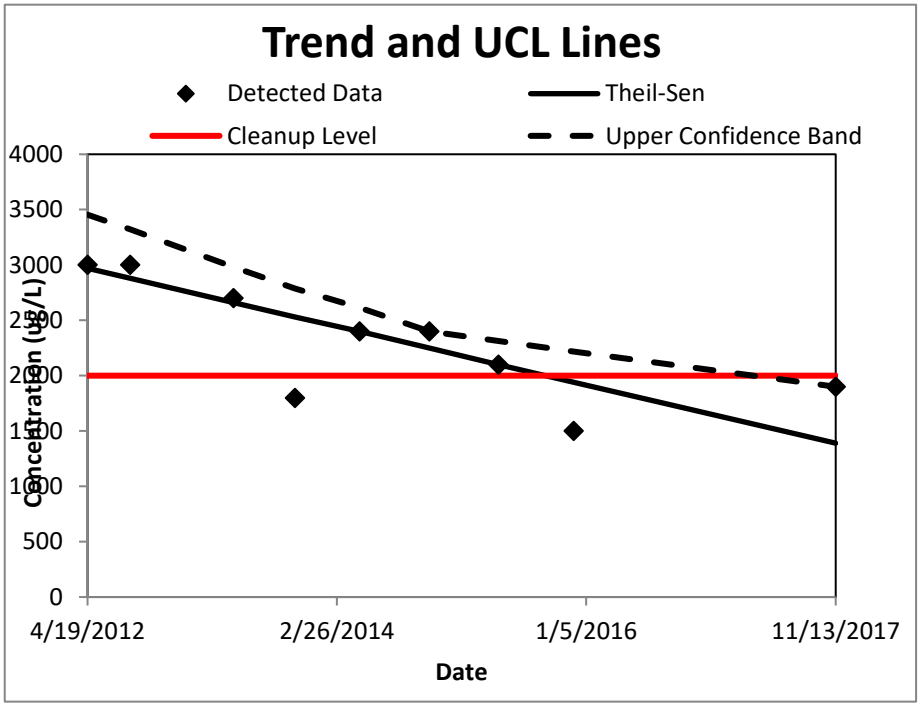
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-203A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	3
Are any potential outliers present?	No
Mean of concentration	2300
Standard deviation of concentration	530
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	2600
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	1900
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

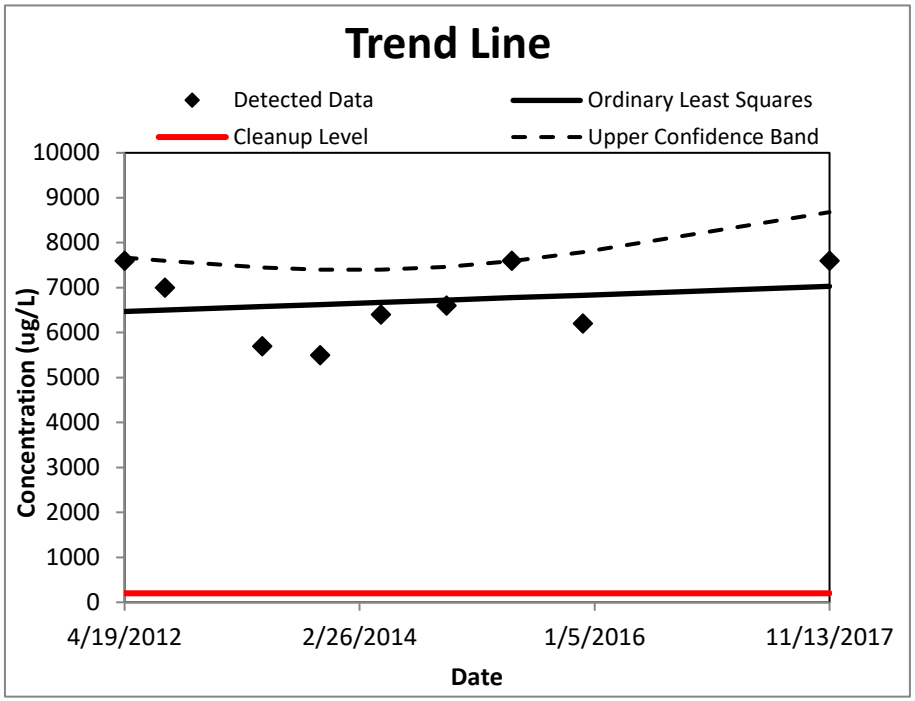
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-203A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	6700
Standard deviation of concentration	810
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	7200
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	8680
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

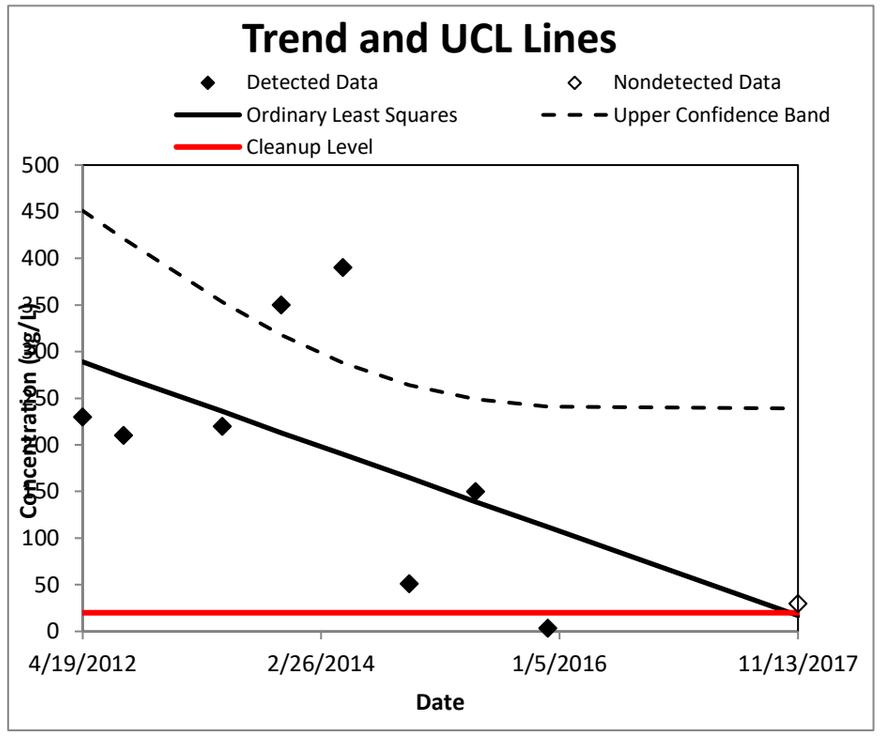
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-203A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number of detected results	8
Number of non-detected results	1
Detection frequency	89%
Number at or below cleanup level	1
Are any potential outliers present?	No
Mean of concentration	180
Standard deviation of concentration	130



95% Upper Confidence Limit (UCL)	380
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	239
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing

Message: None.

Data, including imputed values

Date (Date)	cis-1,2-DCE Concentration (ug/L)	Data Qualifier	Imputed value*
41018	230		230
41134	210		210
41415	220		220
41582	350		350
41758	390		390
41947	51		51
42135	150		150
42340	3.5		3.5
43052	50	ND	29.638

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	35627.40234

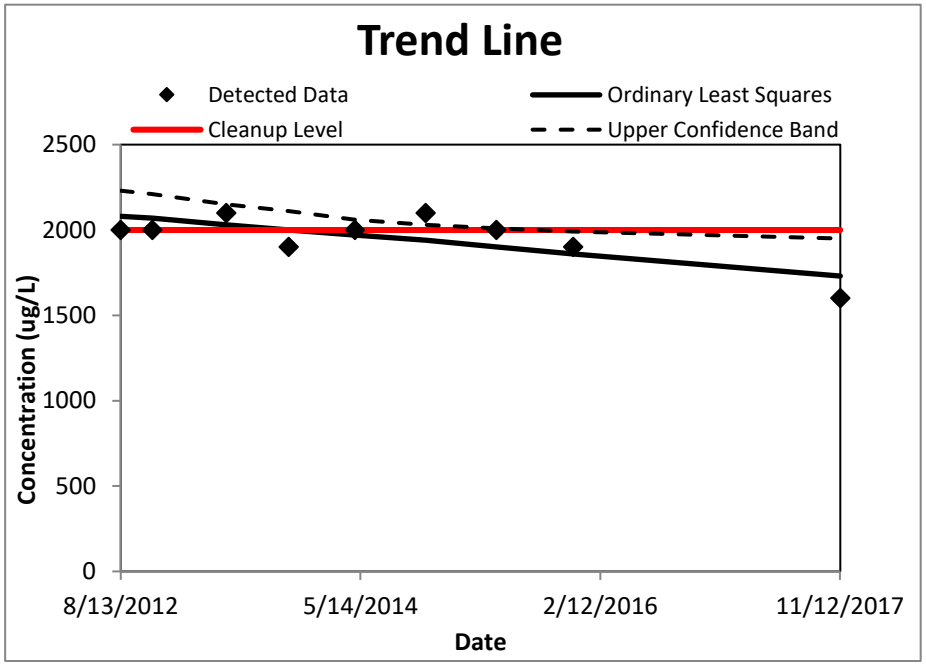
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-203B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	3
Are any potential outliers present?	No
Mean of concentration	2000
Standard deviation of concentration	150



95% Upper Confidence Limit (UCL)	2200
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	1950
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	0
Message: None.	

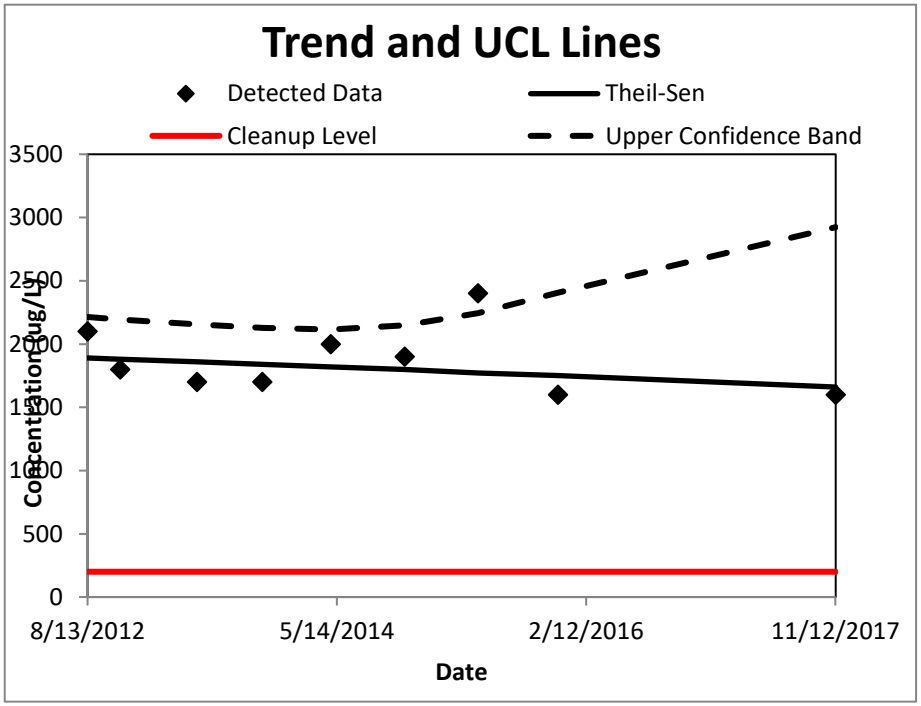
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-203B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	1900
Standard deviation of concentration	260
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	2100
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	2920
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

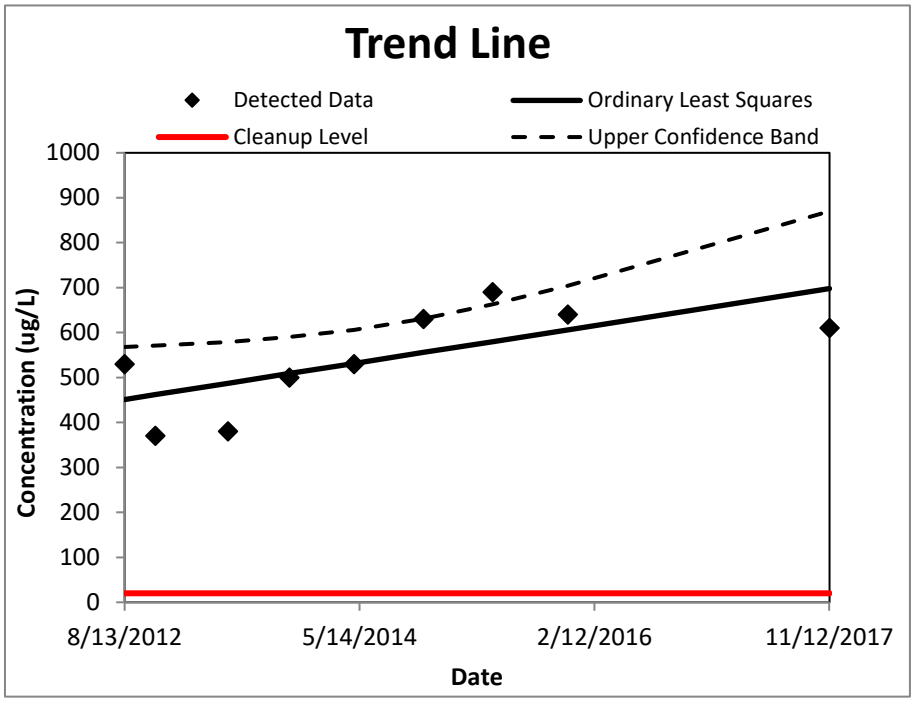
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-203B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	540
Standard deviation of concentration	110
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	610
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	870
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**No**

When is the concentration predicted to exceed the MCL?	MCL is already exceeded
Message: None.	

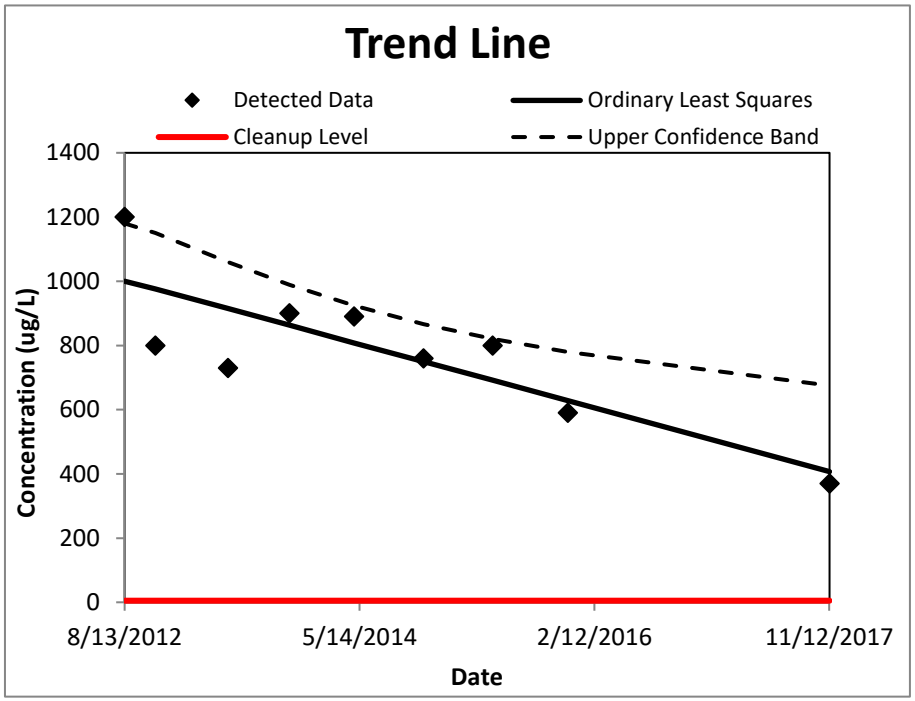
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-203B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	780
Standard deviation of concentration	230
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	920
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	675
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

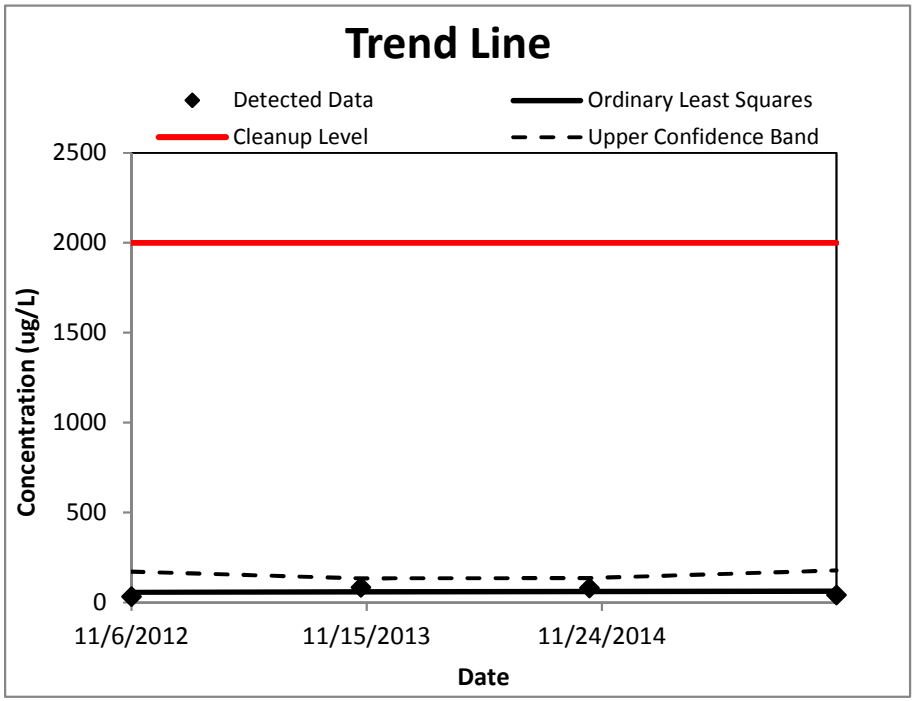
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/5/2016
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-204A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	4
Are any potential outliers present?	No
Mean of concentration	59
Standard deviation of concentration	27
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	91
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	178
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

Draft version - Do not distrubute

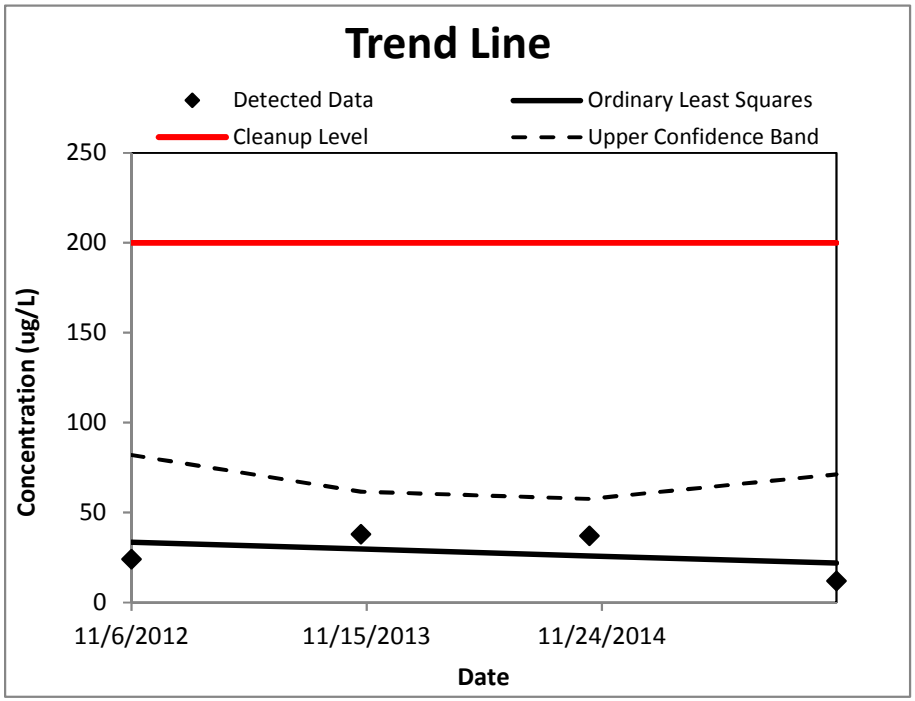
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/5/2016
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-204A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	4
Are any potential outliers present?	No
Mean of concentration	28
Standard deviation of concentration	12
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	42
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	71.2
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

Draft version - Do not distrubute

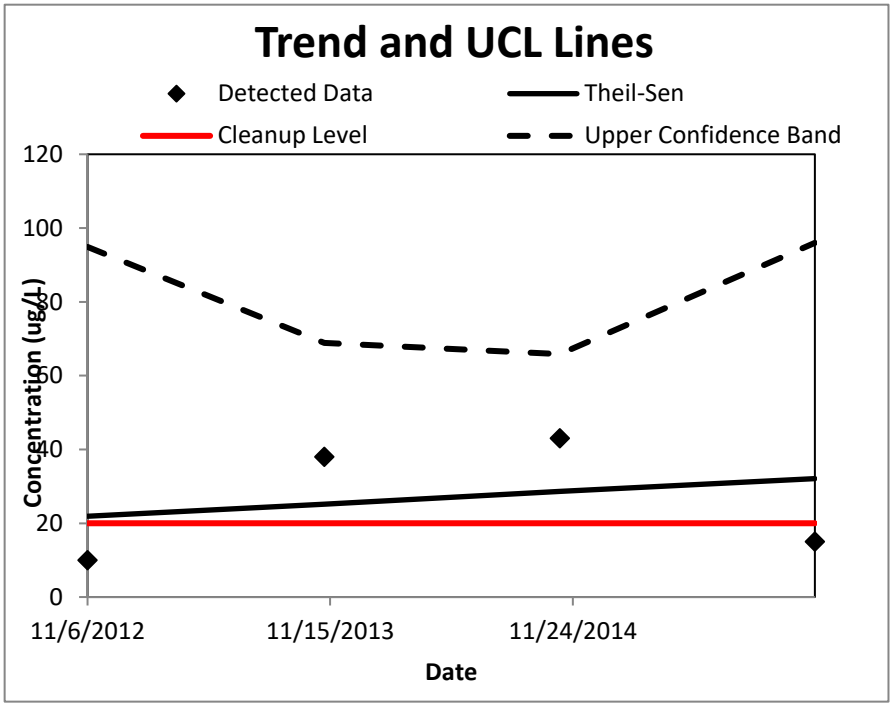
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/52016
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-204A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	2
Are any potential outliers present?	No
Mean of concentration	27
Standard deviation of concentration	16
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	46
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	96
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

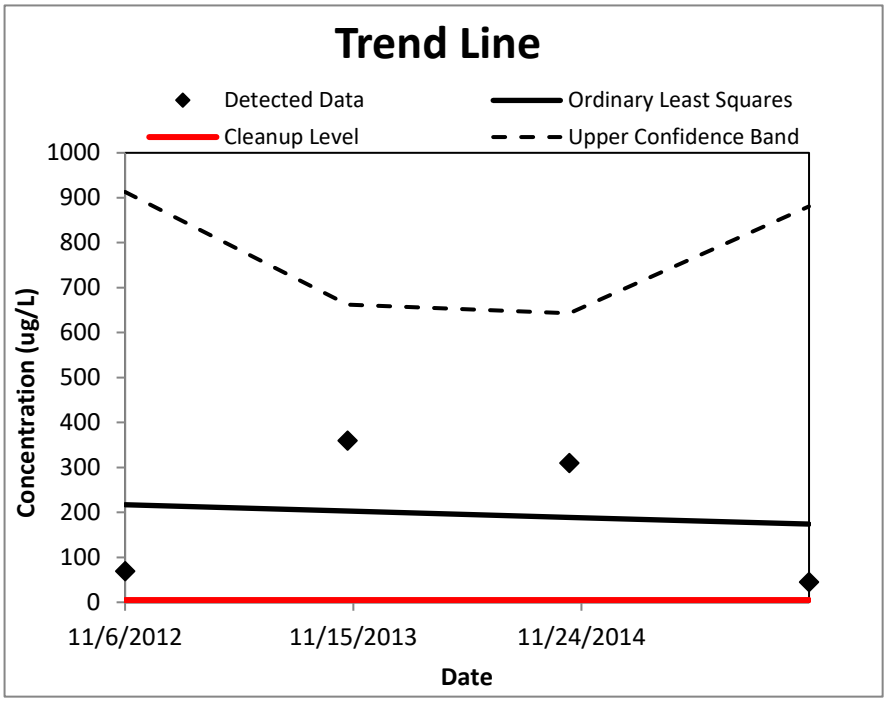
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/52016
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-204A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	200
Standard deviation of concentration	160
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	390
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	881
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

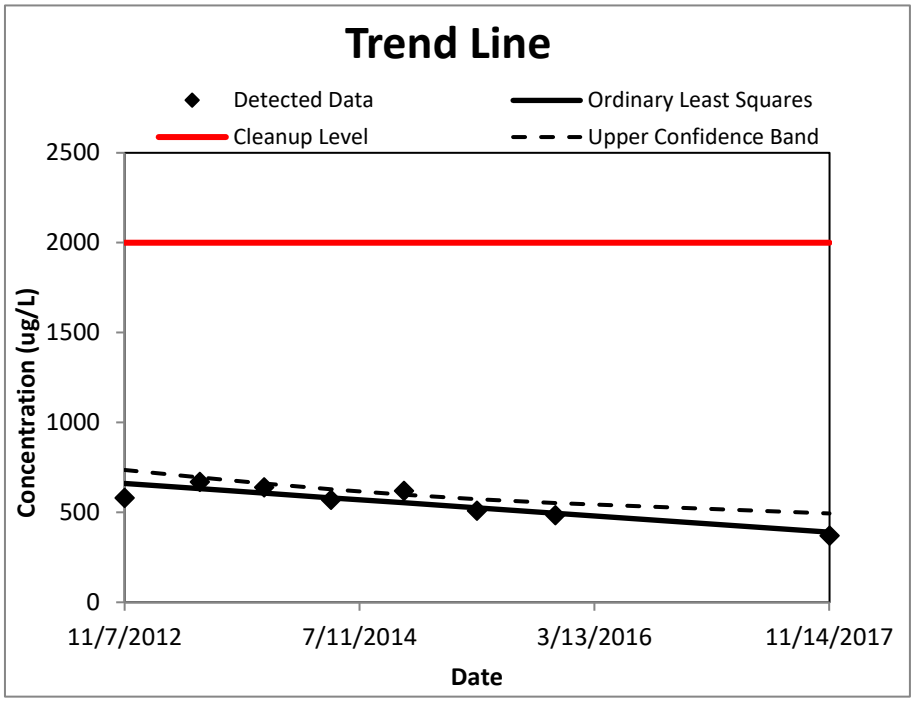
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-302
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	8
Number < cleanup level	8
Are any potential outliers present?	No
Mean of concentration	560
Standard deviation of concentration	98
t-value for UCL calculation	1.895



95% Upper Confidence Limit (UCL)	630
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	494
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

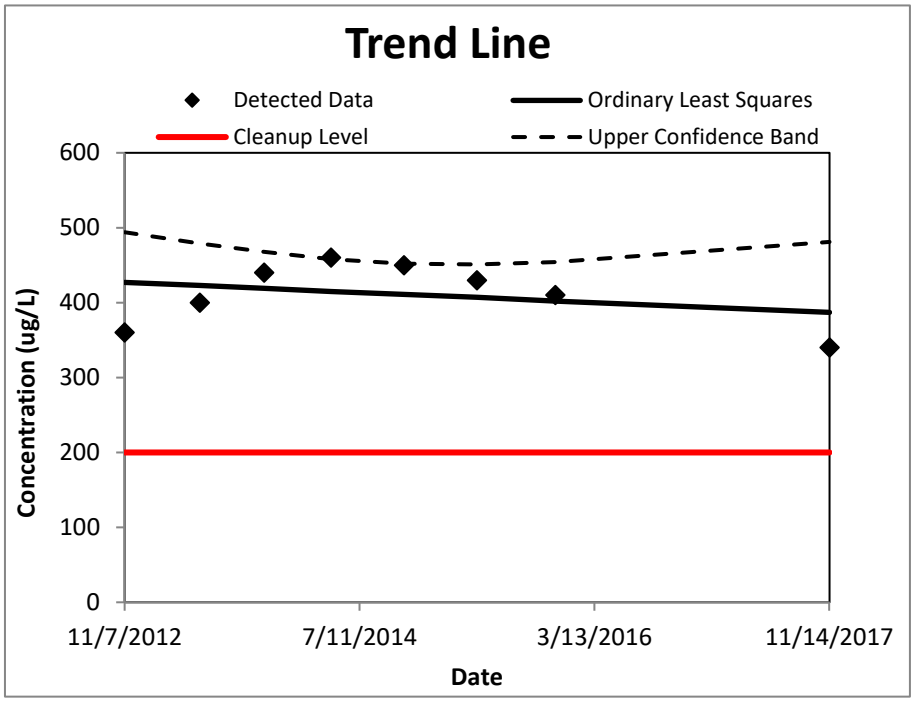
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-302
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	8
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	410
Standard deviation of concentration	43
t-value for UCL calculation	1.895



95% Upper Confidence Limit (UCL)	440
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	481
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

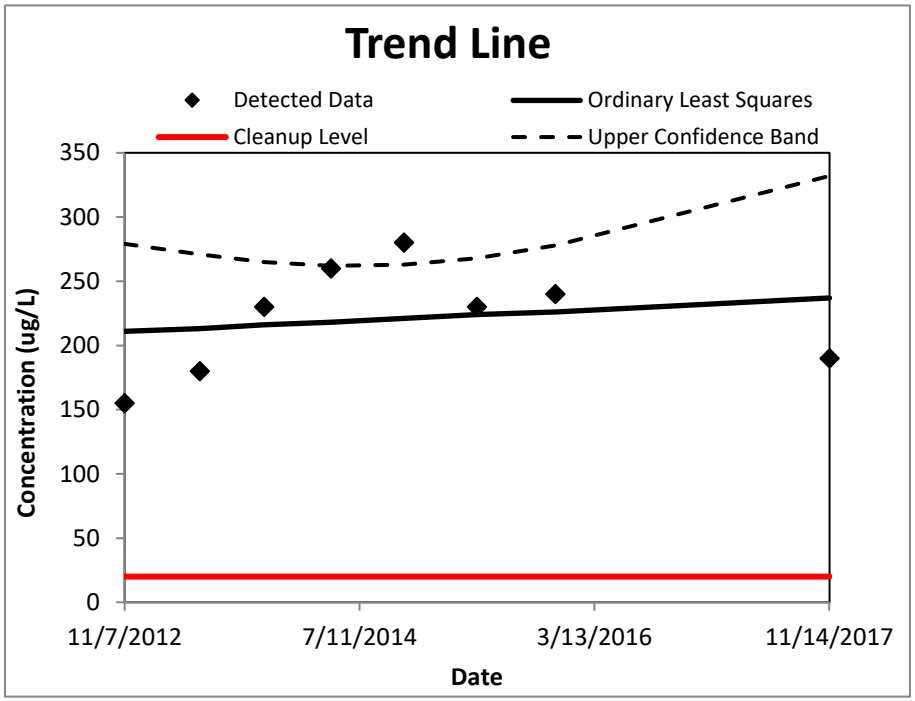
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-302
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	8
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	220
Standard deviation of concentration	42
t-value for UCL calculation	1.895



95% Upper Confidence Limit (UCL)	250
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	332
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

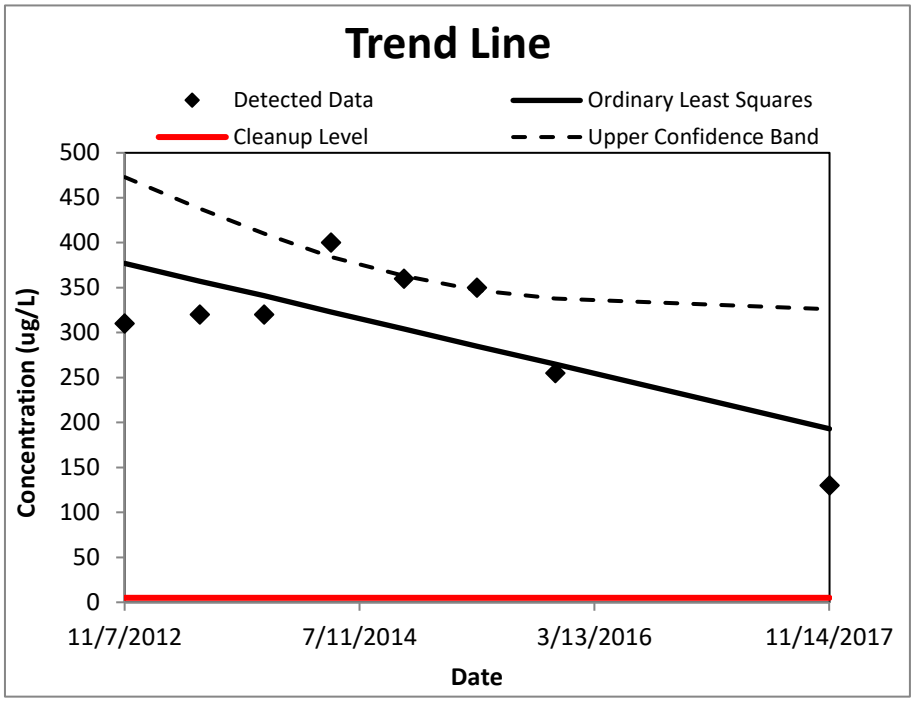
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-302
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	8
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	310
Standard deviation of concentration	83
t-value for UCL calculation	1.895



95% Upper Confidence Limit (UCL)	370
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	326
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

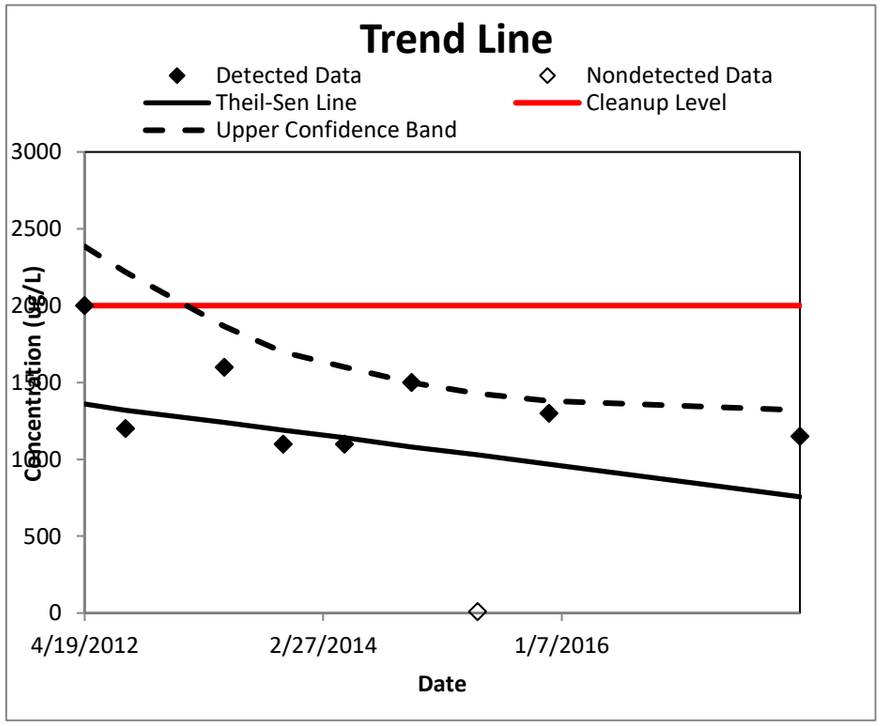
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-304A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number of detected results	8
Number of non-detected results	1
Detection frequency	89%
Number at or below cleanup level	9
Are any potential outliers present?	Yes
Mean of concentration	1200
Standard deviation of concentration	510



95% Upper Confidence Limit (UCL)	2000
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	1320
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing

Message: None.

Data, including imputed values

Date (Date)	1,2-DCB Concentration (ug/L)	Data Qualifier	Imputed value*
41018	2000		2000
41134	1200		1200
41415	1600		1600
41583	1100		1100
41757	1100		1100
41948	1500		1500
42136	20	ND	8.864
42339	1300		1300
43054	1150		1150

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	38224.14844

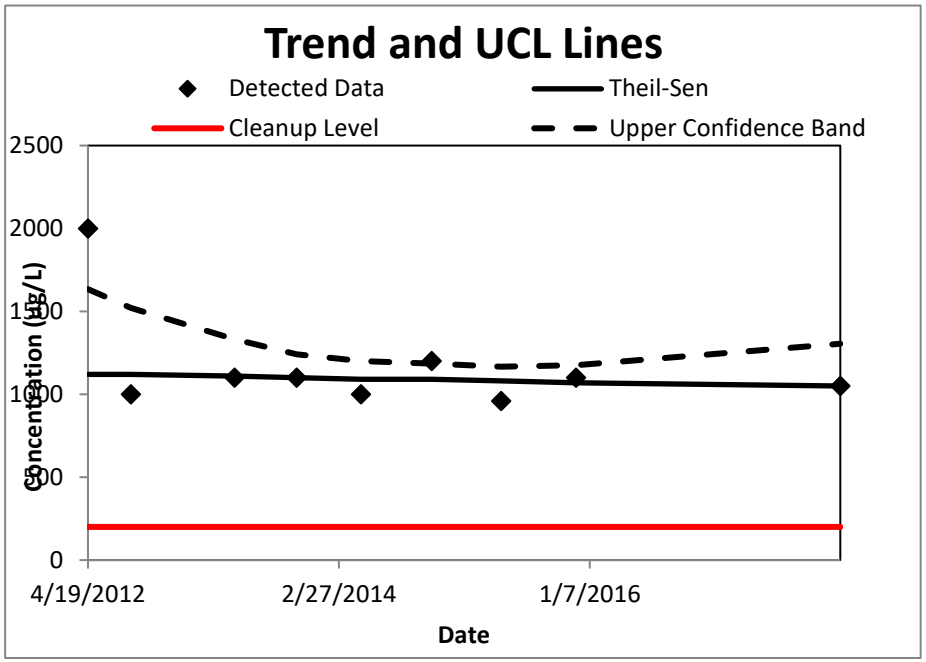
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-304A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	Yes
Mean of concentration	1200
Standard deviation of concentration	320



95% Upper Confidence Limit (UCL)	1700
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	1310
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	38467.69531
Message: None.	

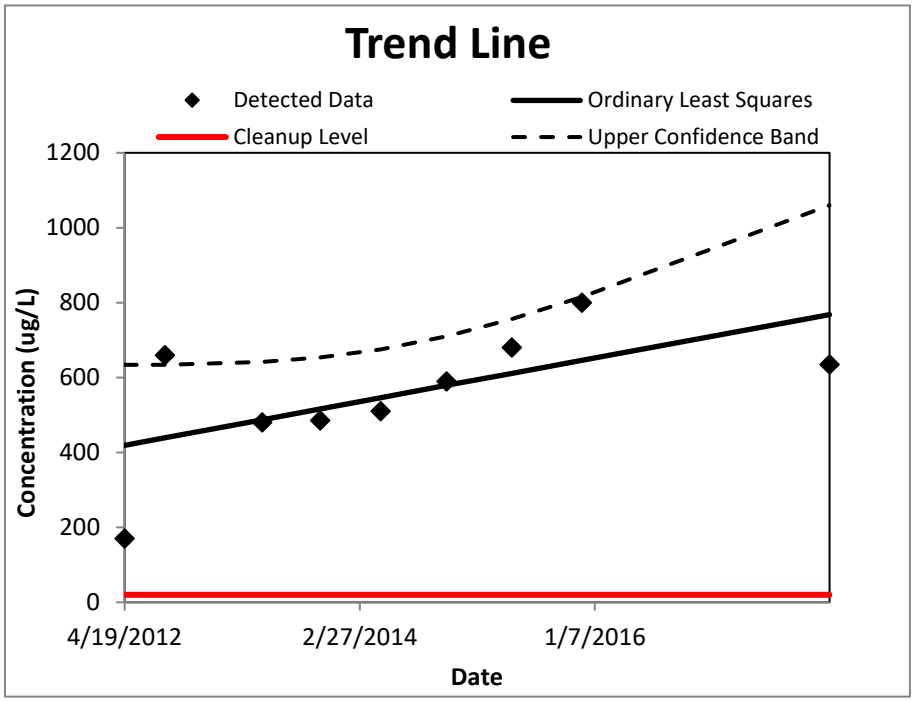
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-304A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	560
Standard deviation of concentration	180
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	670
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	1060
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**No**

When is the concentration predicted to exceed the MCL?	MCL is already exceeded
Message: None.	

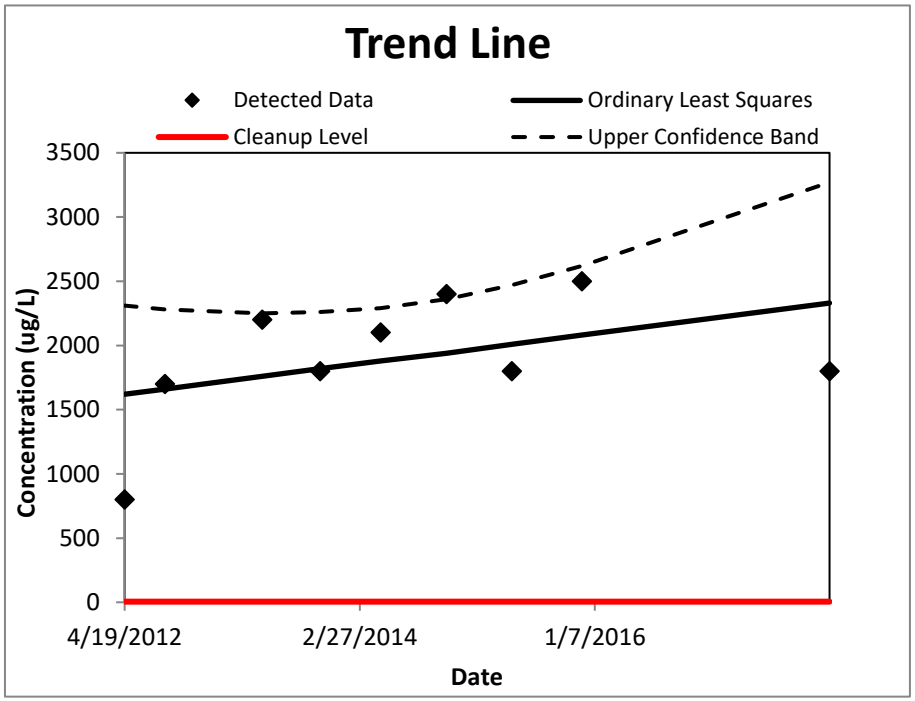
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-304A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	1900
Standard deviation of concentration	500
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	2200
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	3270
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

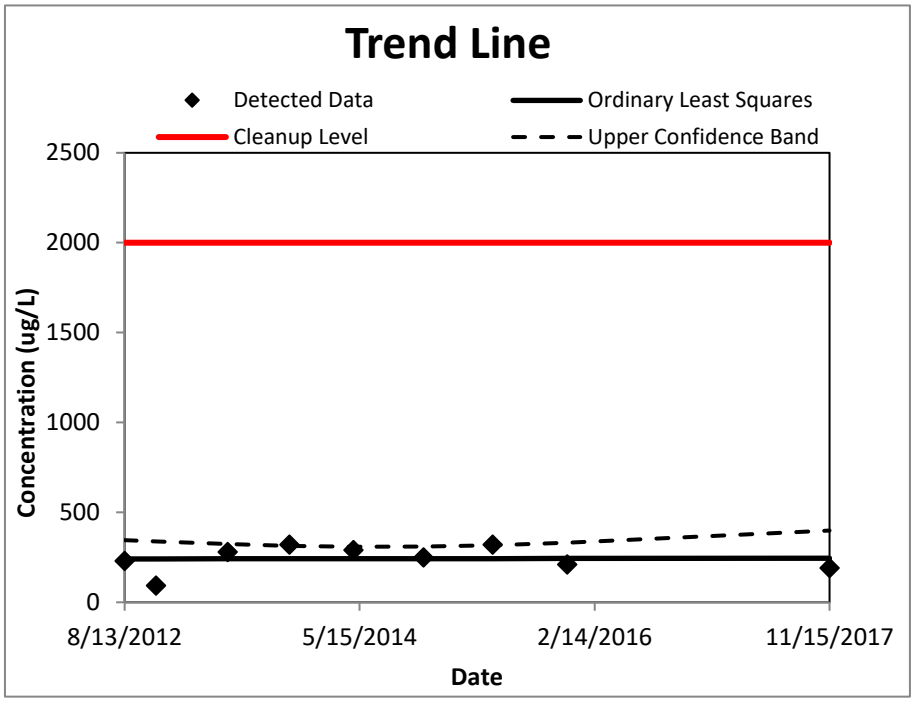
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-304B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	9
Are any potential outliers present?	No
Mean of concentration	240
Standard deviation of concentration	73
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	290
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	399
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

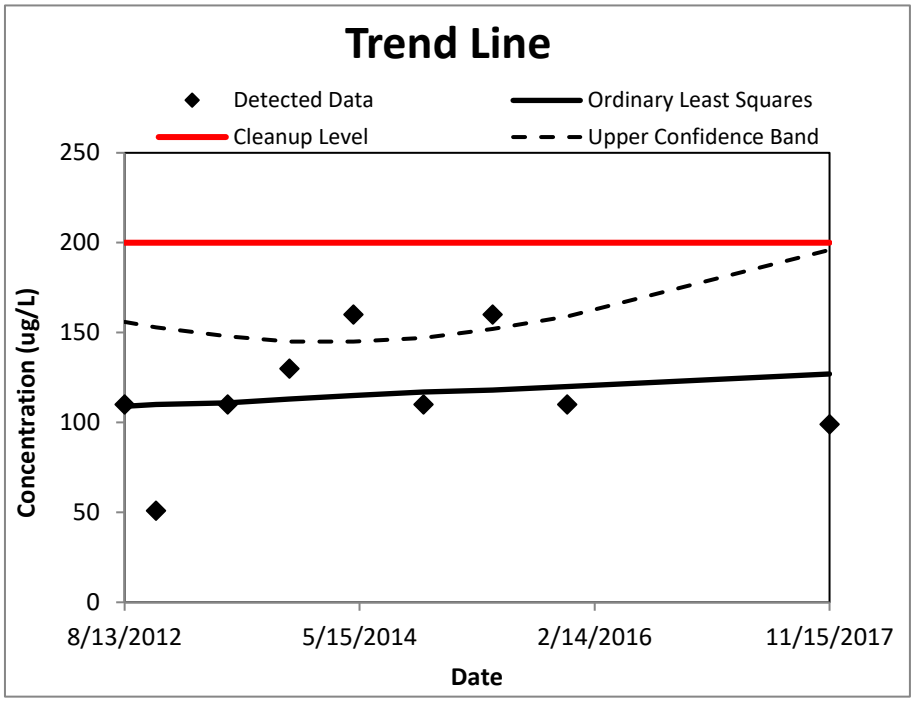
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-304B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	9
Are any potential outliers present?	No
Mean of concentration	120
Standard deviation of concentration	33
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	140
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	196
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

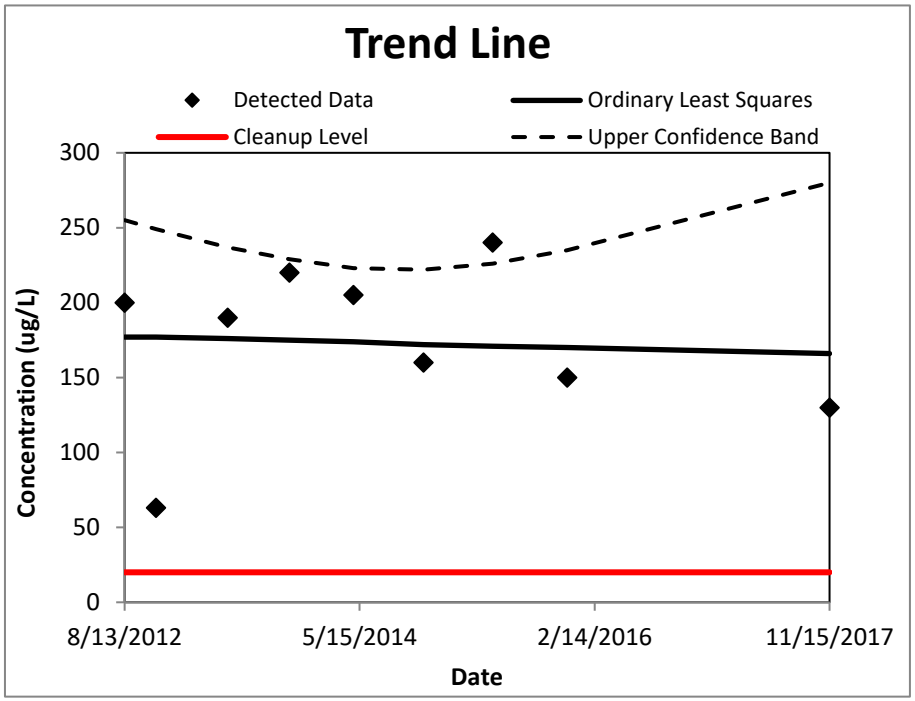
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-304B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	170
Standard deviation of concentration	54
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	200
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	280
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

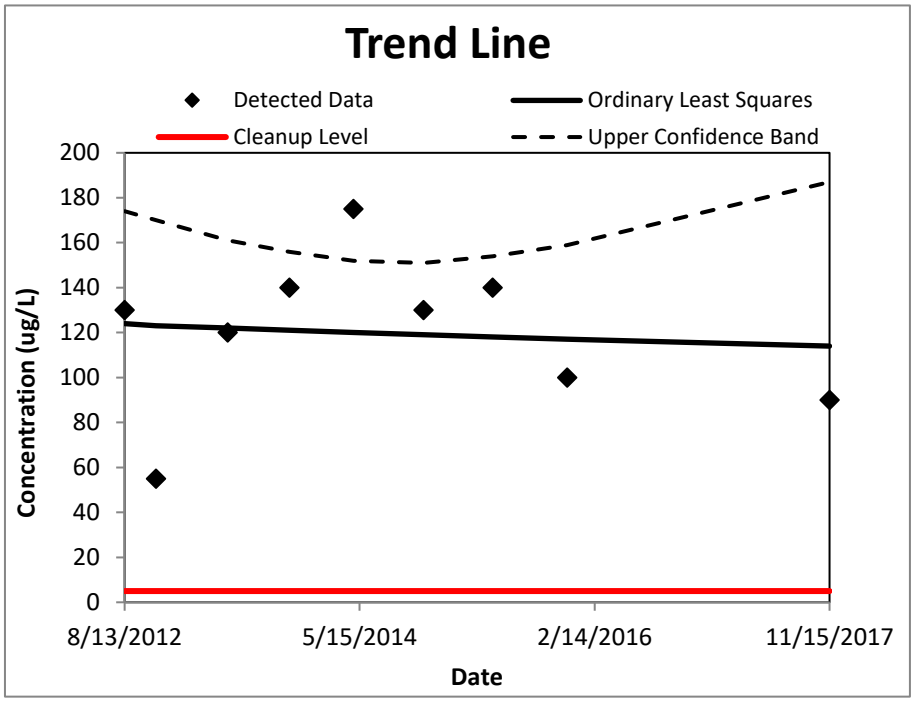
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-304B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	120
Standard deviation of concentration	35
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	140
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	187
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

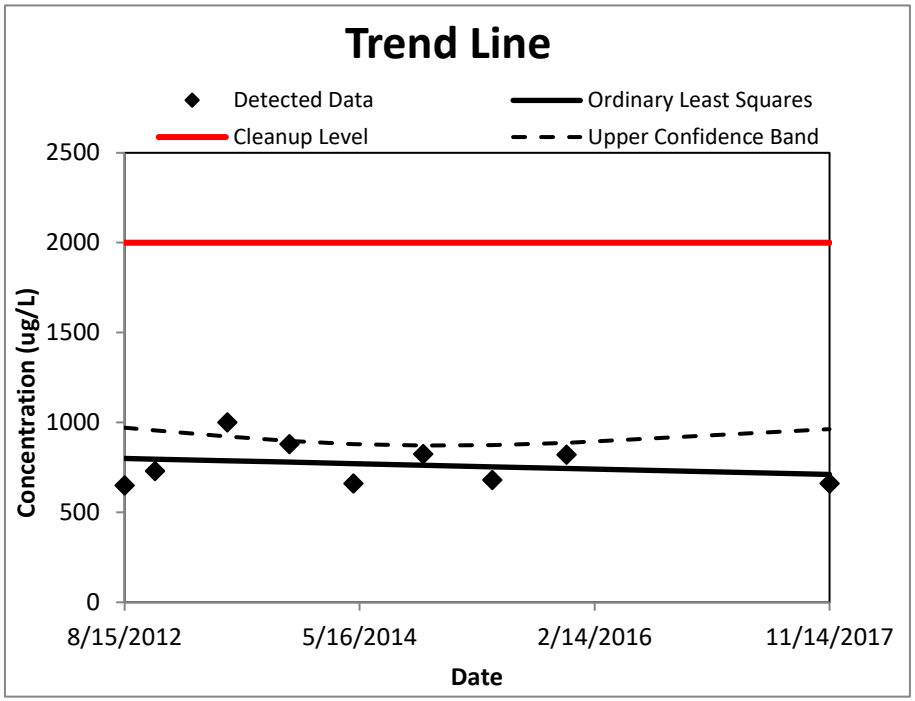
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-305A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	9
Are any potential outliers present?	No
Mean of concentration	770
Standard deviation of concentration	120
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	840
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	963
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

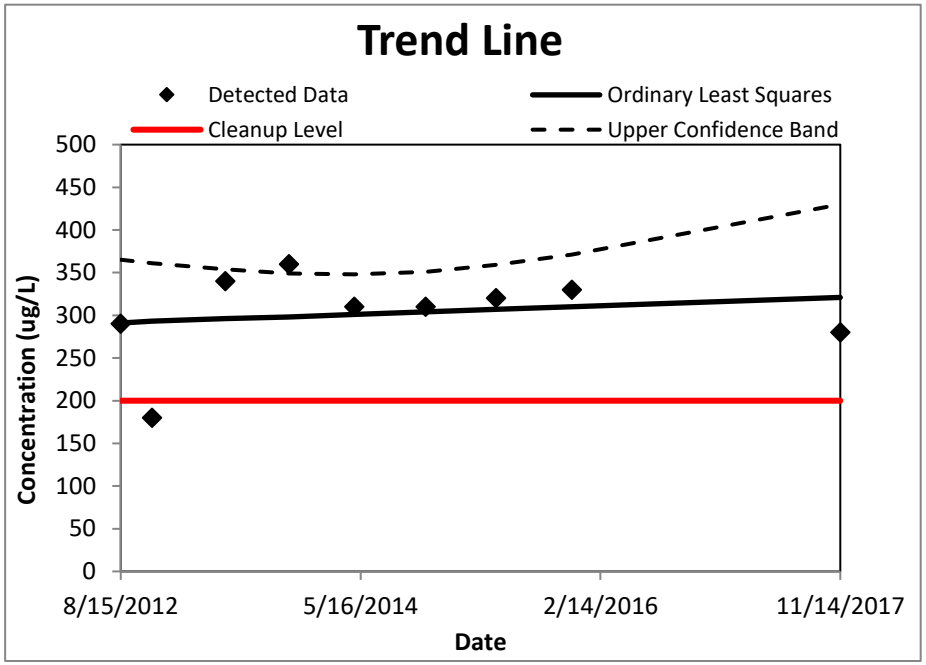
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-305A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	1
Are any potential outliers present?	No
Mean of concentration	300
Standard deviation of concentration	52



95% Upper Confidence Limit (UCL)	380
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	430
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	0
Message: None.	

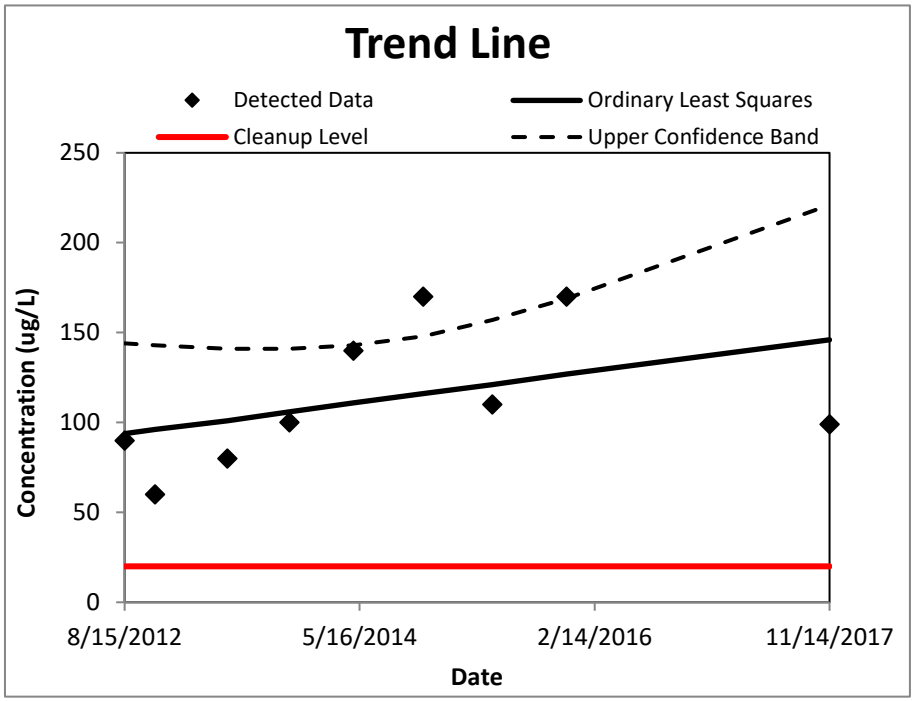
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-305A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	110
Standard deviation of concentration	39
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	130
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	221
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

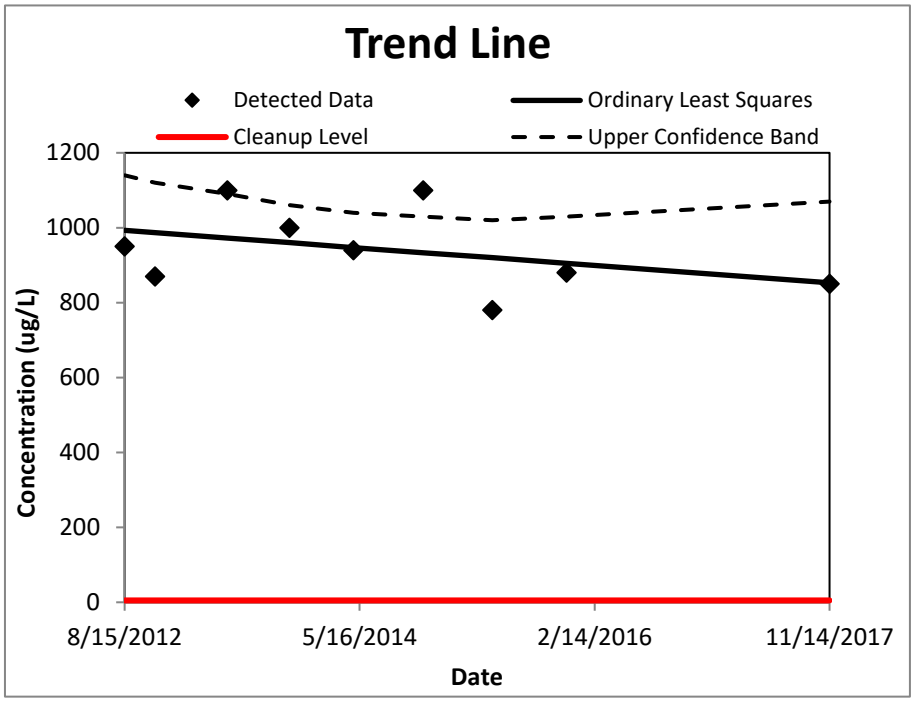
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-305A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	940
Standard deviation of concentration	110
t-value for UCL calculation	1.860



95% Upper Confidence Limit (UCL)	1000
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	1070
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

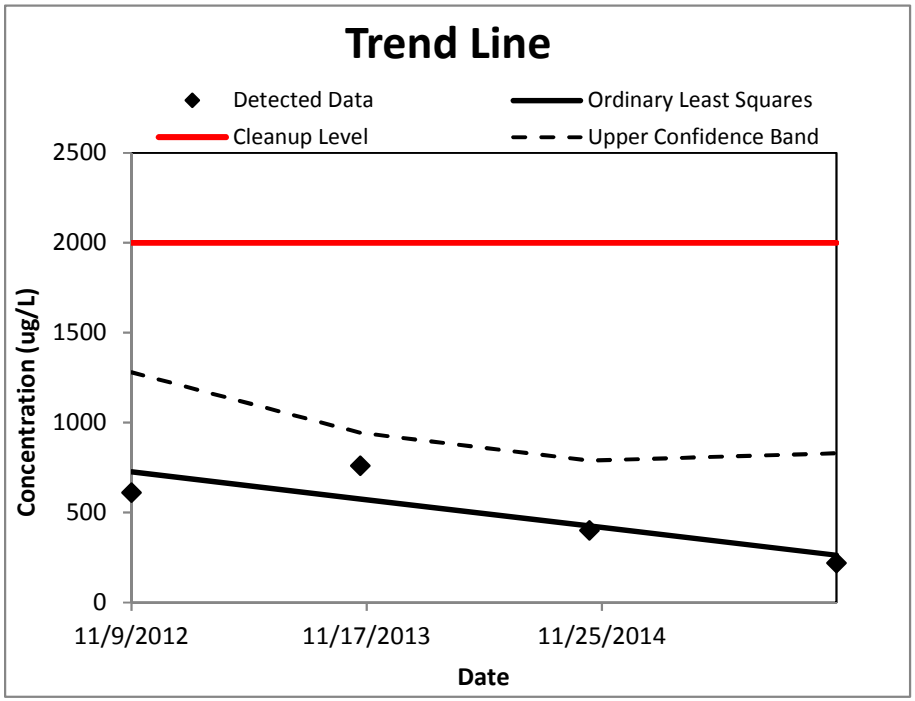
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/5/2016
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-402
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	4
Are any potential outliers present?	No
Mean of concentration	500
Standard deviation of concentration	240
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	780
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	830
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

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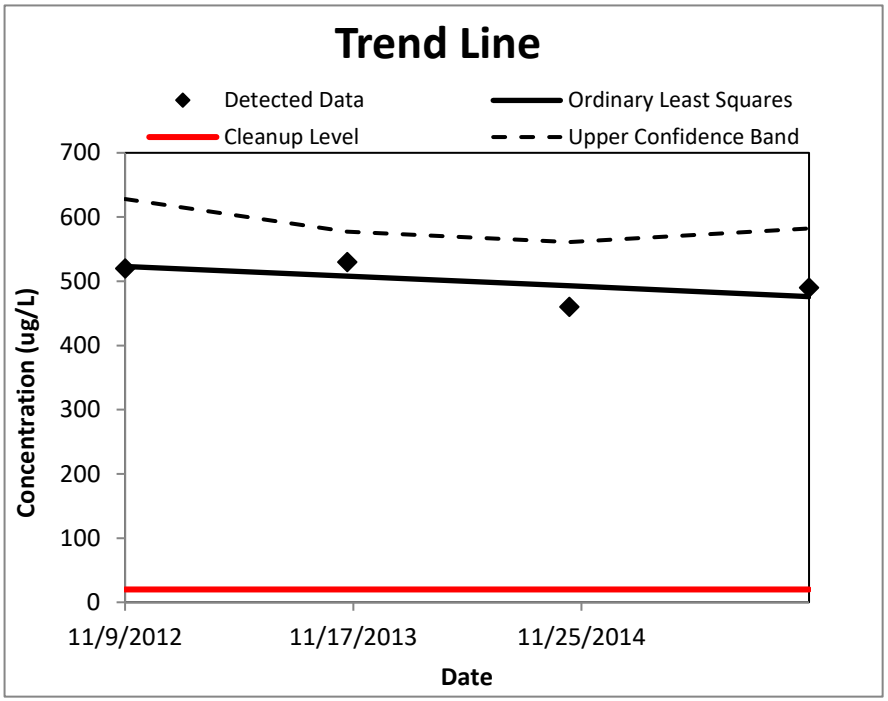
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/5/2016
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-402
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	500
Standard deviation of concentration	32
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	540
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	582
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

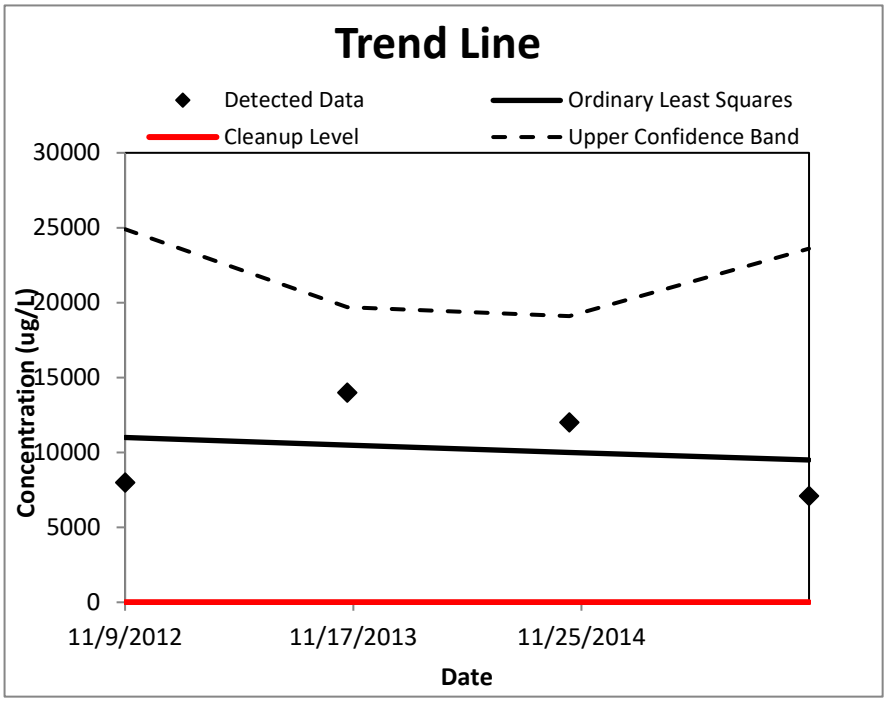
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets that are normally distributed

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/5/2016
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-402
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	4
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	10000
Standard deviation of concentration	3300
t-value for UCL calculation	2.353



95% Upper Confidence Limit (UCL)	14000
Method for calculating UCL	Student's t UCL
Value of 95% Upper Confidence Band value at final sampling event	23600
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

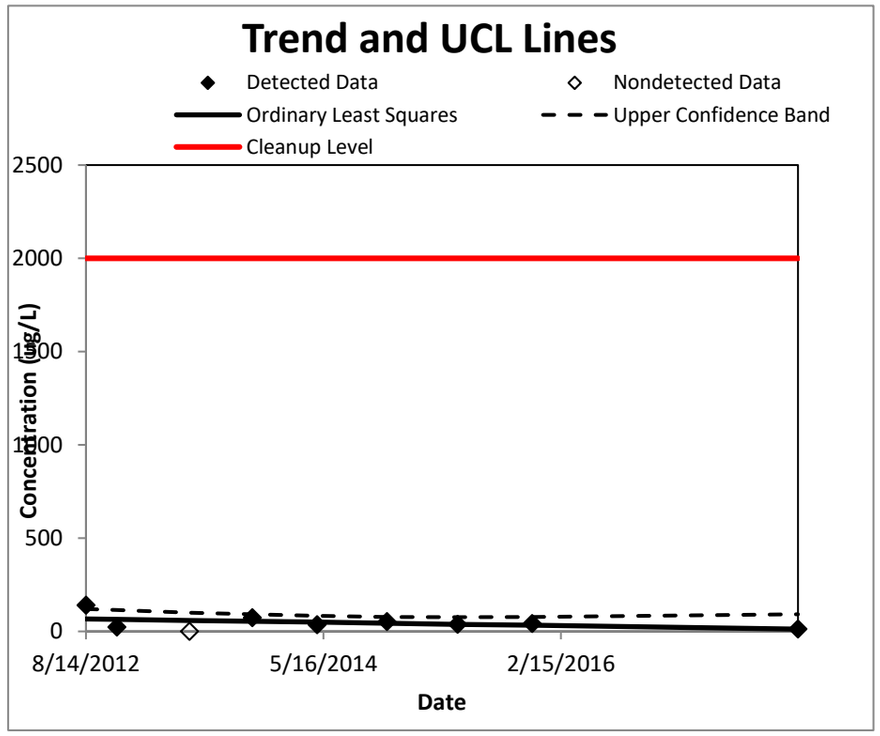
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	RMW-405A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number of detected results	8
Number of non-detected results	1
Detection frequency	89%
Number at or below cleanup level	9
Are any potential outliers present?	No
Mean of concentration	47
Standard deviation of concentration	38



95% Upper Confidence Limit (UCL)	110
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	91.3
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

Data, including imputed values

Date (Date)	1,2-DCB Concentration (ug/L)	Data Qualifier	Imputed value*
41135	140		140
41218	24		24
41414	5	ND	0.753
41583	73		73
41758	36		36
41946	53		53
42137	39		39
42338	42		42
43054	12		12

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	57760.94141

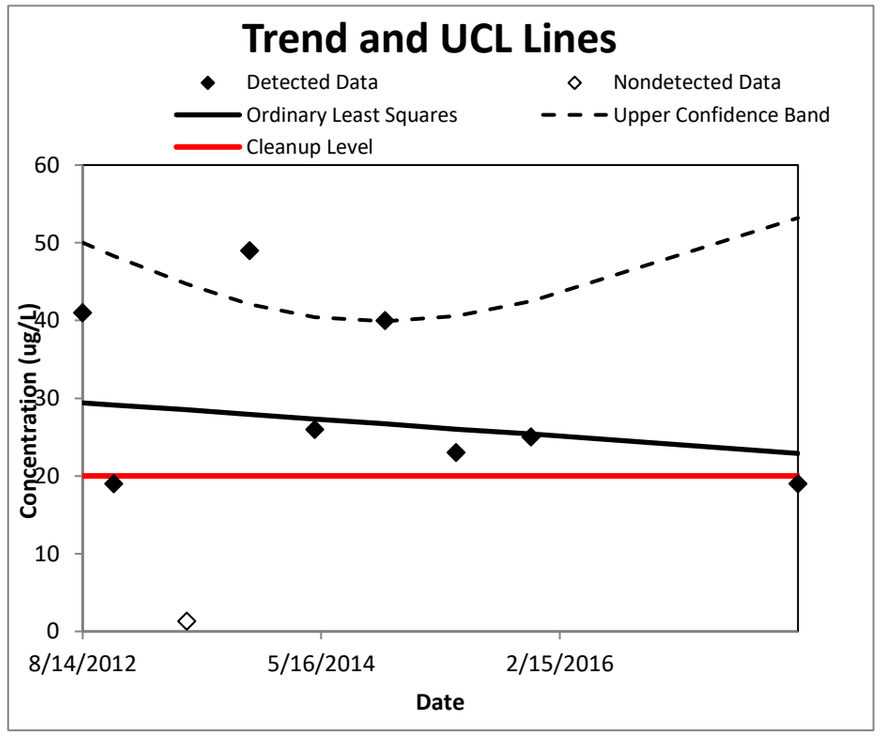
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	RMW-405A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number of detected results	8
Number of non-detected results	1
Detection frequency	89%
Number at or below cleanup level	3
Are any potential outliers present?	No
Mean of concentration	27
Standard deviation of concentration	13



95% Upper Confidence Limit (UCL)	47
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	53.2
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing

Message: None.

Data, including imputed values

Date (Date)	cis-1,2-DCE Concentration (ug/L)	Data Qualifier	Imputed value*
41135	41		41
41218	19		19
41414	5	ND	1.292
41583	49		49
41758	26		26
41946	40		40
42137	23		23
42338	25		25
43054	19		19

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	45297.94922

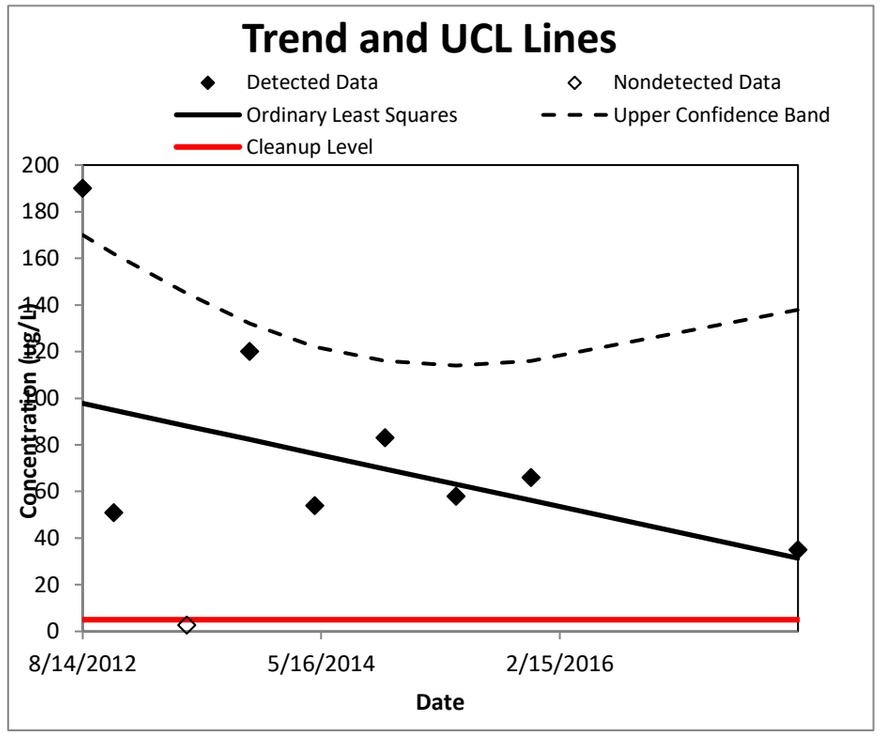
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	RMW-405A
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number of detected results	8
Number of non-detected results	1
Detection frequency	89%
Number at or below cleanup level	1
Are any potential outliers present?	No
Mean of concentration	74
Standard deviation of concentration	51



95% Upper Confidence Limit (UCL)	150
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	138
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing

Message: None.

Data, including imputed values

Date (Date)	TCE Concentration (ug/L)	Data Qualifier	Imputed value*
41135	190		190
41218	51		51
41414	5	ND	2.679
41583	120		120
41758	54		54
41946	83		83
42137	58		58
42338	66		66
43054	35		35

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	45847.41406

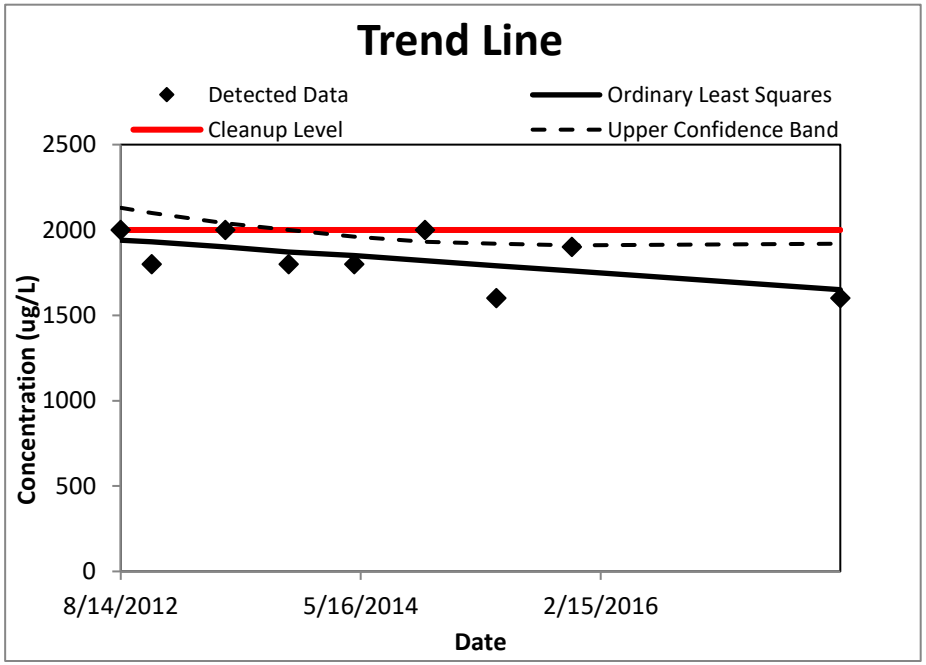
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	RMW-405B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	6
Are any potential outliers present?	No
Mean of concentration	1800
Standard deviation of concentration	160



95% Upper Confidence Limit (UCL)	2000
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	1920
Trend calculation method	Ordinary Least Squares
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	0
Message: None.	

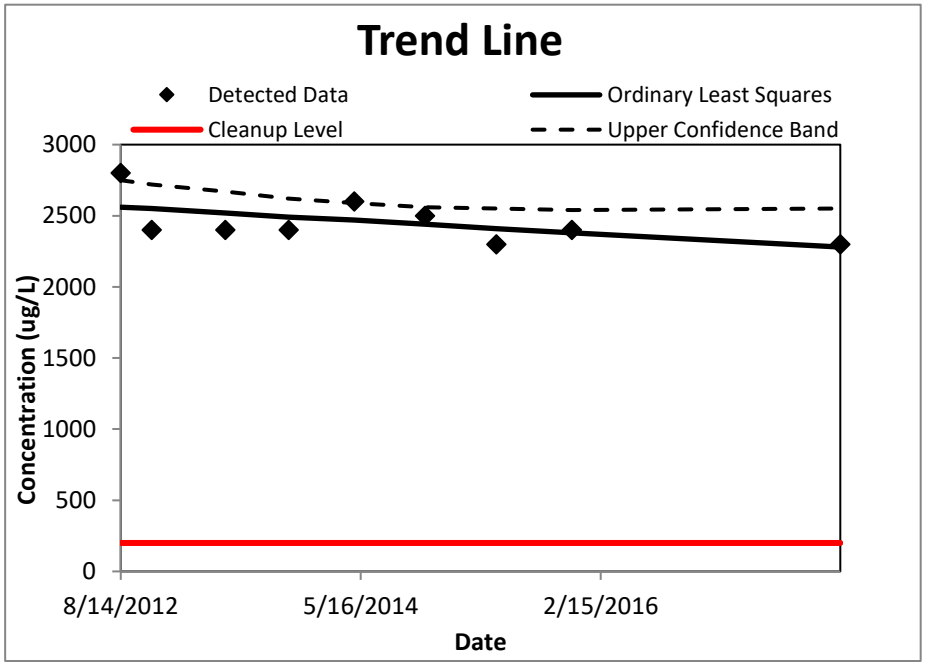
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	RMW-405B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	2500
Standard deviation of concentration	160



95% Upper Confidence Limit (UCL)	2700
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	2550
Trend calculation method	Ordinary Least Squares
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	0
Message: None.	

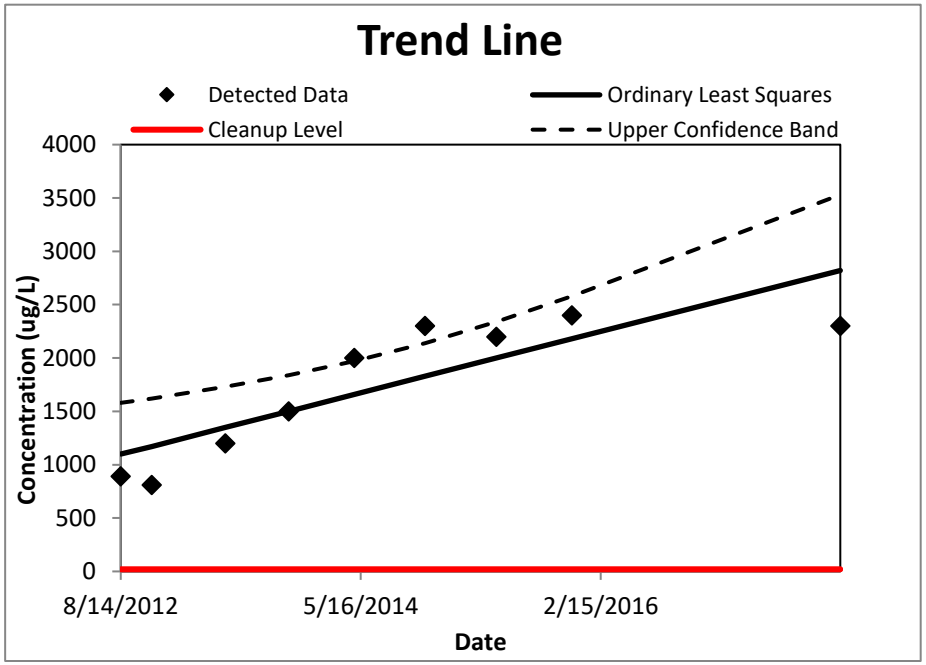
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	5/15/2018
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	RMW-405B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	9
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	1700
Standard deviation of concentration	640



95% Upper Confidence Limit (UCL)	2600
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	3530
Trend calculation method	Ordinary Least Squares
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**No**

When is the concentration predicted to exceed the MCL?	MCL is already exceeded
Random Seed Used	0
Message: None.	

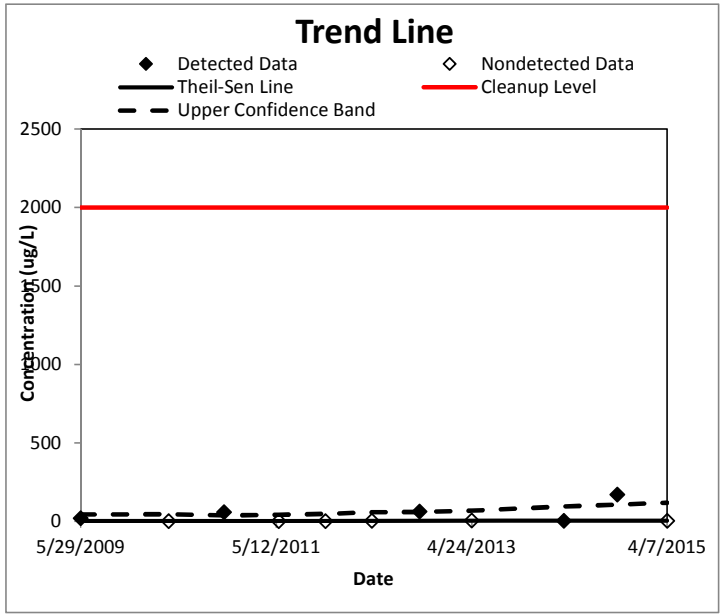
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/5/2016
Person performing analysis	J. Lambert

Chemical of Concern	1,2-DCB
Well Name/Number	MW-503B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	11
Number of detected results	5
Number of non-detected results	6
Detection frequency	45%
Number at or below cleanup level	11
Are any potential outliers present?	No
Mean of concentration	29
Standard deviation of concentration	50



95% Upper Confidence Limit (UCL)	100
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	118
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	2000
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

Data, including imputed values

Date (Date)	1,2-DCB Concentration (ug/L)	Data Qualifier	Imputed value*
39962	18		18
40283	5.26	ND	0.074
40485	58.6		58.6
40684	5.26	ND	1.299
40855	5.62	ND	1.21
41024	5.68	ND	2.987
41198	61.8		61.8
41388	5.62	ND	5.379
41725	1.6		1.6
41919	170		170
42101	9.8	ND	2.172

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	58475.91797

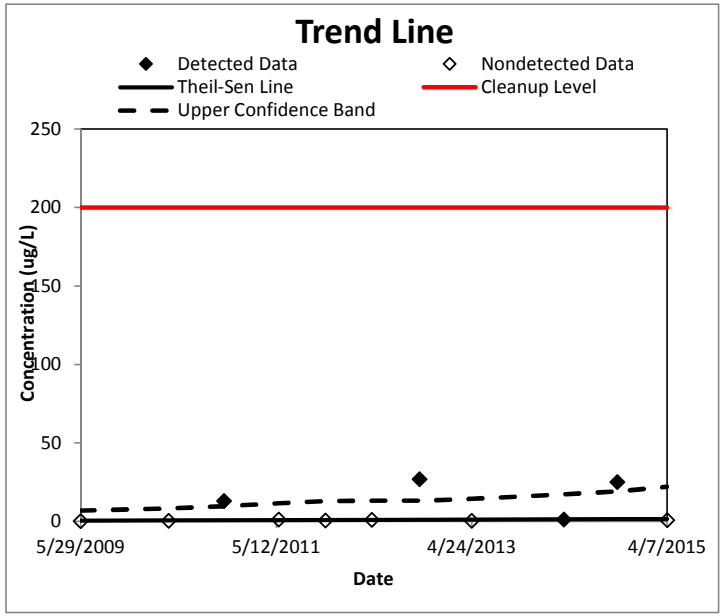
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/5/2016
Person performing analysis	J. Lambert

Chemical of Concern	Chlorobenzene
Well Name/Number	MW-503B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	11
Number of detected results	4
Number of non-detected results	7
Detection frequency	36%
Number at or below cleanup level	11
Are any potential outliers present?	No
Mean of concentration	6.6
Standard deviation of concentration	9.7



95% Upper Confidence Limit (UCL)	21
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	21.9
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	200
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

Data, including imputed values

Date (Date)	Chlorobenzene Concentration (ug/L)	Data Qualifier	Imputed value*
39962	1	ND	0.014
40283	1	ND	0.247
40485	13		13
40684	5	ND	1.077
40855	1	ND	0.526
41024	1	ND	0.957
41198	26.8		26.8
41388	1	ND	0.222
41725	1.1		1.1
41919	25		25
42101	1	ND	0.56

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	58475.91797

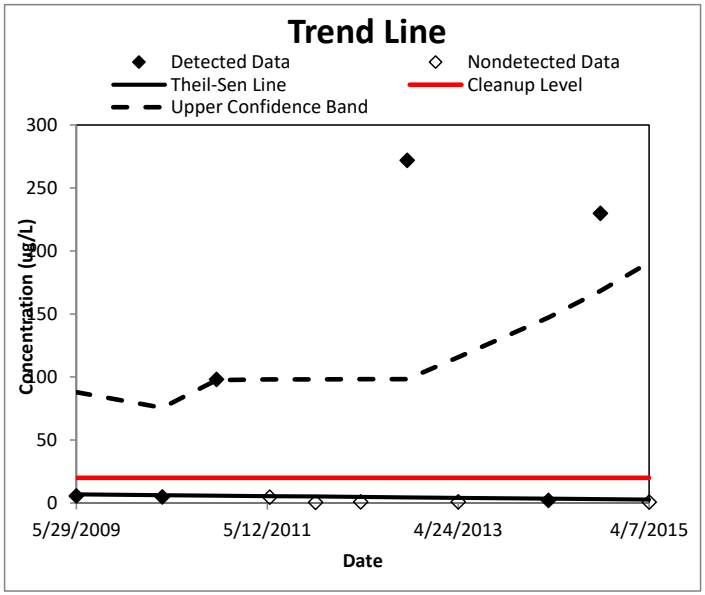
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/5/2016
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-503B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	11
Number of detected results	6
Number of non-detected results	5
Detection frequency	55%
Number at or below cleanup level	8
Are any potential outliers present?	No
Mean of concentration	56
Standard deviation of concentration	96



95% Upper Confidence Limit (UCL)	190
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	191
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Message: None.	

Data, including imputed values

Date (Date)	cis-1,2-DCE Concentration (ug/L)	Data Qualifier	Imputed value*
39962	5.7		5.7
40283	4.9		4.9
40485	98.2		98.2
40684	5	ND	4.731
40855	1	ND	0.514
41024	1	ND	0.844
41198	272		272
41388	1	ND	0.876
41725	2.1		2.1
41919	230		230
42101	1	ND	0.729

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	47568.39453

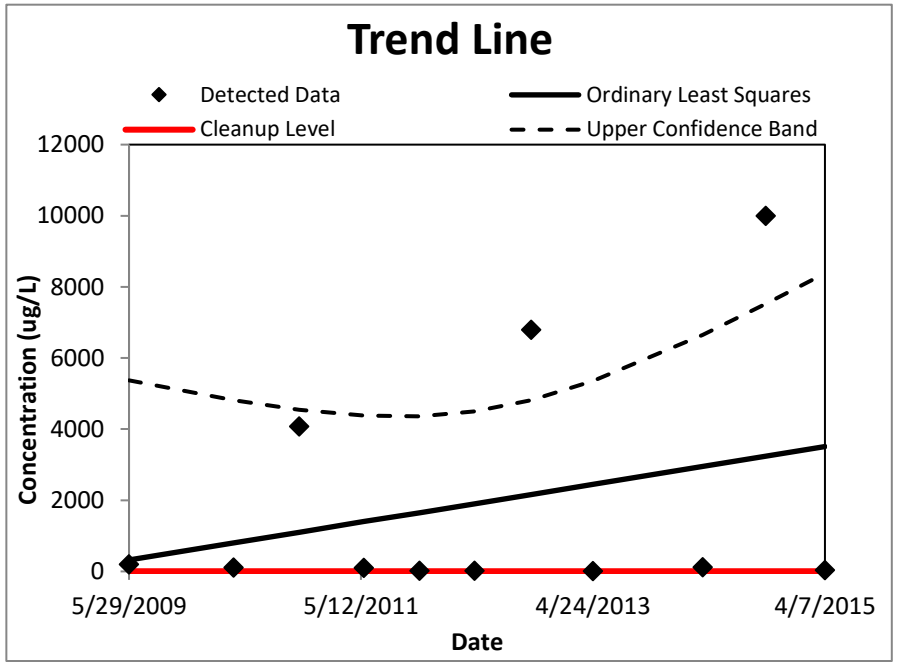
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	2/5/2016
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-503B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	11
Number < cleanup level	0
Are any potential outliers present?	No
Mean of concentration	2000
Standard deviation of concentration	3500



95% Upper Confidence Limit (UCL)	6600
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	8380
Trend calculation method	Ordinary Least Squares
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	0
Message: None.	

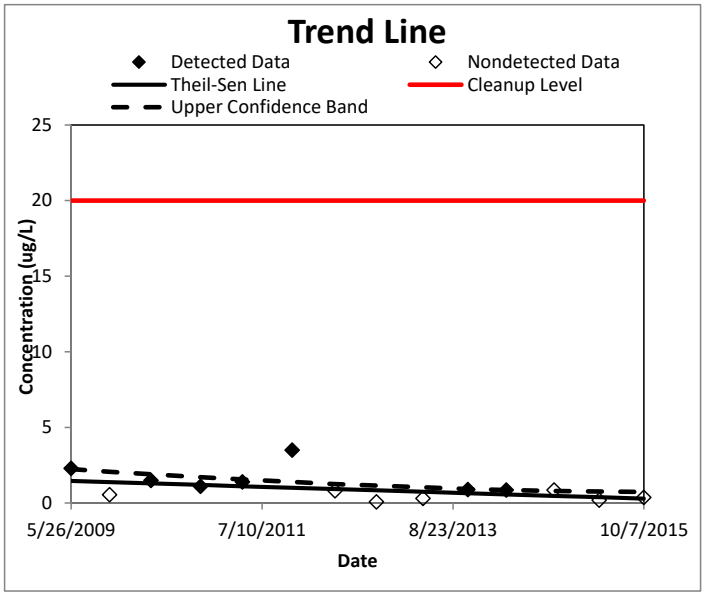
Groundwater Statistics Tool

UCL calculations and summary statistics for data sets with nondetects

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	9/28/2016
Person performing analysis	J. Lambert

Chemical of Concern	cis-1,2-DCE
Well Name/Number	MW-505B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	14
Number of detected results	7
Number of non-detected results	7
Detection frequency	50%
Number at or below cleanup level	14
Are any potential outliers present?	No
Mean of concentration	1.3
Standard deviation of concentration	0.73



95% Upper Confidence Limit (UCL)	2.2
Method for calculating UCL	KM Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	0.733
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	20
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	Yes

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing

Message: None.

Data, including imputed values

Date (Date)	cis-1,2-DCE Concentration (ug/L)	Data Qualifier	Imputed value*
39959	2.3		2.3
40115	1	ND	0.551
40283	1.5		1.5
40484	1.1		1.1
40654	1.4		1.4
40856	3.5		3.5
41030	1	ND	0.816
41198	1	ND	0.07
41387	1	ND	0.312
41569	0.9		0.9
41725	0.86		0.86
41919	1	ND	0.852
42103	1	ND	0.198
42284	1	ND	0.368

* Note that the imputed value column also includes the actual value for detected samples. This is for convenience in copying and pasting the data.

Random Seed Used	52600.16406

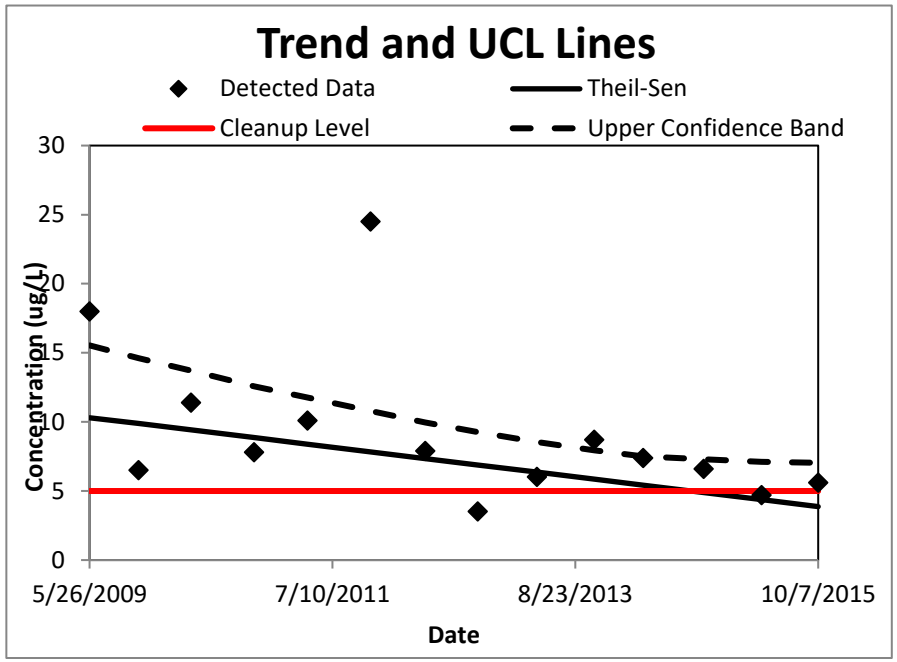
Groundwater Statistics Tool

UCL calculations and summary statistics for nonparametric data sets

Site Name	Nyanza
Operating Unit (OU)	OU2
Type of Evaluation	Remediation
Date of Evaluation	9/28/2016
Person performing analysis	J. Lambert

Chemical of Concern	TCE
Well Name/Number	MW-505B
Date Units	Date
Concentration Units	ug/L

Confidence Level	95%
Number of results	14
Number < cleanup level	2
Are any potential outliers present?	Yes
Mean of concentration	9.2
Standard deviation of concentration	5.6



95% Upper Confidence Limit (UCL)	16
Method for calculating UCL	Chebyshev UCL
Value of 95% Upper Confidence Band value at final sampling event	7.04
Trend calculation method	Theil-Sen/Mann-Kendall
Cleanup level	5
Source of cleanup level	MassDEP GW-2
Is the trend decreasing or statistically insignificant?	**Yes**

When is the concentration predicted to exceed the MCL?	Not applicable - slope is not statistically increasing
Random Seed Used	51497.82813
Message: None.	